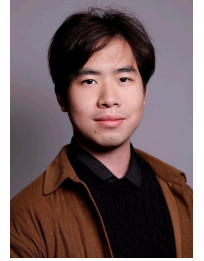


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EDUCATION

Sun Yat-sen University

UGrad Student of Computer Science and Technology

- GPA: 3.9/4.0

Sept 2023 – July 2027

EXPERIENCE

arcSYSu Lab, Sun Yat-sen University Research Member Advisor: *Xianwei Zhang*

Dec 2023 - Present

coMtainer: Compilation-assisted HPC Container Images with Enhanced Adaptability

SC'25 (CCF-A)

Y. Gu, **H. Chen**, X. Chen, J. Du, Z. Chen, N. Xiao, X. Zhang, Y. Lu.

Tech: Python, C/C++, Docker/OCI, Spack, GCC/LLVM, Shell

- Co-developed **coMtainer**, an HPC container framework improving portability and deployment efficiency across heterogeneous clusters.
- Built a **Python/Shell automated validation pipeline** ensuring reliability and reproducibility for diverse HPC applications.
- Achieved **97% native performance** and up to **253% speedup** compared with traditional container deployment workflows.

Institute for AI Industry Research (AIR), Tsinghua University Research Intern Advisor: *Kun Li*

Jan 2026 – April 2026

HorizonAKMC: Rearchitecting Large-Scale Atomistic Kinetic Monte Carlo to Extend Physical-Time Reach

Submitting to SC'26

R.Zhang, H.Han, **H. Chen**, H.Jia, Y.Zhang, Y.Chen, T.Cao, Y.Liu, K.Li

Tech: PyTorch, MPI, Kubernetes, Slurm, Donau Scheduler, Python Multiprocessing

- Developed an **RL-enhanced Kinetic Monte Carlo framework** accelerating large-scale atomistic simulations for nuclear materials.
- Designed a **hybrid distributed architecture (MPI + PyTorch)** enabling scalable execution across heterogeneous supercomputers.
- Benchmarked and optimized performance on **Tianhe, Sunway** and **Tecorigin** scaling to **13M+ CPU cores, 2K+ GPUs** and **1.8×10¹⁴ atoms**.

PROJECTS

Performance Optimization of OpenMX

Tech: C/C++, Fortran, MPI+OpenMP, Intel VTune/uProf, ScaLAPACK/ELPA

- Optimized performance for the OpenMX nanomaterials simulation package on the **Bridges-2** supercomputer.
- Identified performance bottlenecks using **profilers** and refactored critical kernels to restore efficient multithreading.
- Introduced Hybrid **MPI + OpenMP** parallelization to reduce communication overhead and improve scalability.
- Achieved **2.2×** end-to-end performance improvement compared to the baseline implementation.

YatCC-OL: Lightweight HPC Application Platform Based on Starlight and Kubernetes

Tech: Flask, Kubernetes, Redis, Docker

- Built an online development platform above **Tianhe-Xingyi** supercomputer, supporting 200+ students in the **YatCC-AI** course.
- Developed a **Kubernetes** integration module, enabling seamless deployment on standard cloud clusters.
- Implemented backend services in **Flask** to encapsulate HPC cloud APIs and manage containerized compute instances.

AWARDS

World Champion, ISC25 Student Cluster Competition

June 2025

Top Prize (1/424), Tencent Scholarship

Nov 2025

Third Prize, *Compiler Design Competition 2024*

Aug 2024

Scholarship of Outstanding Students, Sun Yat-sen University

2023–2025

TECHNICAL SKILLS

Programming: Python, C/C++, Shell Scripting

Performance Tools: Nsight, VTune, uProf, Perf

Parallel Computing: MPI, OpenMP, SIMD Optimization

HPC & Cloud: Docker, K8s, Slurm

AI Infrastructure: PyTorch, NCCL