

Haoquan Chen

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EDUCATION

Sun Yat-sen University

Sept 2023 – July 2027

UGrad Student of Computer Science and Technology

- GPA: 3.9/4.0 TOEFL: 110/120

TECHNICAL SKILLS

Programming: Python, C/C++, CUDA

Performance Tools: Nsight, VTune, uProf, Perf

Parallel Computing: MPI, OpenMP, SIMD

HPC & Cloud: Docker, K8s, Slurm

AI Infrastructure: Megatron, PyTorch, NCCL

EXPERIENCE

arcSYSu Lab, Sun Yat-sen University Research Member Advisor: [Xianwei Zhang](#)

Dec 2023 - Present

coMainer: 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 **coMainer**, 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.

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.

GPU Acceleration and Optimization for OpenFOAM CFD Solver

Tech: CUDA C++, NCCL, NVHPC, Nsight Systems

- Optimized GPU execution paths in **OpenFOAM**, achieving **1.5×** overall speedup through kernel and communication optimizations.
- Profiled application performance with **Nsight Systems** to identify GPU and communication bottlenecks.
- Improved multi-GPU and multi-node scalability with **NCCL**-based communication optimization.

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

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

Last updated in August 2026