

Haibin Lai

Shenzhen | 12211612@mail.sustech.edu.cn | | blog | github.com/HaibinLai

About Me

I am a Junior Turing Class student at SUSTech, majoring in Computer Science. Problem-solving is my lifelong delight. I am currently participating in research in the fields of Distributed Computing, GPU Computing, and High Performance Computing at the SUSTech HPC-Lab.

Education

Southern University of Science and Technology, BS in Computer Science Sept 2022 – Present

- GPA: 3.70/4.0 (sustech.edu.cn)
- **Coursework:** Operating System(H) 96, Machine Learning(H) 96, Computer Network 88

Research Publication

ParaCOSM: A Parallel Framework for Continuous Subgraph Matching May 2024 - May 2025
Parallel Computing, Graph Computing; Submitted for ICPP 2025;

In this paper, we present ParaCOSM (**Parallel C**ontinuous **S**ubgraph **M**atching), an efficient parallel framework for existing CSM algorithms on CPU. ParaCOSM leverages two levels of parallelism: inner-update parallelism and inter-update parallelism. Inner-update parallelism employs a fine-grain parallelism approach to decompose the search tree during each CSM query, enabling efficient search for large queries under load balancing. In inter-update parallelism, we introduce an innovative safe-update mechanism that uses multi-threading to verify the safety of multiple updates, thereby enhancing the overall throughput of the system under large-scale update scenarios.

- Tools Used: OpenMP, Taskflow, intel TBB, C++

Research & Engineering Projects

Virtio-gpu support for Asterinas OS Repo: [asterinas](#) , Report

- In this project, we implement virtio-gpu driver in Asterinas Operating System on Qemu. The driver works with page buffer scheme and allow user library like mesa communicates with qemu virtio using specific syscall.
- Tools Used: Rust

CrashSimGen: Generating Safety-Critical Scenarios with Diffusion Models Repo: [CrashSimGen](#)

- **First prize** project of CS329 Machine Learning(H). CrashSimGen is a project that generates dangerous road scenarios using diffusion models for autonomous driving risk assessment
- Tools Used: Pytorch, Tensorflow

Geochem Pi, Zhejiang University DataEarth Lab Repo: [Geochemistrypi](#)

- Building Geochemistry Pi, a Python ML framework. Geochemistry Pi is an open-sourced highly automated machine learning Python framework for data-driven geochemistry discovery on tabular data.
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Intern

Intern, UChicago Globus Lab March 2025 - Present

- Testing LLM inference on CPU with a 8-NUMA machine

Student Assistant, SUSTech Center for Computational Science and Engineering Feb 2024 – Aug 2024

- Regularly participate in the operation and maintenance of SUSTech Qiming and Taiyi Supercomputer. Assist engineers in deploying multiple new nodes and resolving various network interruption issues. Conduct HPL/HPCG benchmark testing on the supercomputing cluster.

Intern, Beijing Sunway World Technology Co., Ltd. Aug 2023 - Sep 2023

- Studied the Laboratory Information Management System (LIMS) solutions, gaining insights into software

workflows and architecture alongside the technical department. Learned SpringBoot and Docker. Acquired skills in market demand analysis tools and techniques, as well as in drafting client need analyses and summary reports.

Experience

Deputy Class Monitor, Turing Class, Computer Science Department, SUSTech Sep 2022 – Present

- Assist class advisor in managing daily affairs, organize class activities such as discussions with Turing Award winner Professor Joseph Sifakis, special reports, and class tournaments.

Awards

7th APAC HPC-AI Student Competition: APAC HPC-AI Dec 2024

- Third Prize
- Leader of HPC Team
- Responsible for parallel optimization on Hoomd-blue HPC software, using HPC-X communication library, and a better scheduling strategy for domain decomposition.

ASC Student Supercomputer Challenge: ASC24 Apr 2024

- First Prize
- Group Competition Award
- Responsible for LINPACK benchmark and parallel optimization of materials science calculations in the team, as well as Linux and network monitoring.

Contemporary Undergraduate Mathematical Contest in Modeling (CUMCM) Jan 2024

- Provincial 2nd Award

2024 Outstanding Student Award Nov 2024

2023 Outstanding Student Award Nov 2023

2022 President's Special Scholarship Sep 2022

English Skills & Communication

TOEFL October 2025

- Score: 100/120; speaking 22, listening 26, reading 30, writing 22

CET6 Jun 2024

- Score: 649/710

Georgia Institute of Technology ASP Program Jul 2023

- Participated in summer courses such as Business Case Study and Leadership Across Cultures at Georgia Tech, enhancing international communication skills and gaining insights into American culture.

Techniques

Languages: C++, C, CUDA, Java, python, Rust, SQL

Tools: PostgreSQL, Docker, Hadoop, Linux