Haibin Lai

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About Me

I am a fourth-year undergraduate student at **Southern University of Science and Technology** (SUSTech), majoring in **Computer Science**. I am currently engaged in research in Distributed System and Parallel Computing at the SUSTech HPC Lab supervised by **Prof. Zhuozhao Li**.

Education

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

- GPA: 3.70/4.0; Member of Turing Class (designated for elite CS students at SUSTech)

Publication

1. **Haibin Lai**, Sicheng Zhou, Site Fan, Zhuozhao Li. *ParaCOSM: A Parallel Framework for Continuous Subgraph Matching*. In Proceedings of the 54th International Conference on Parallel Processing (ICPP '25), San Diego, CA, USA, 2025.

- Proposed **ParaCOSM**, a parallel framework enabling efficient continuous subgraph matching (CSM) on CPUs.
- Achieved $1.2\times$–$30.2\times$ speedups across diverse datasets, with up to two orders of magnitude faster execution.
- Released as open source at **GitHub**. **Paper Link**.

2. Wenyi Wang, Maxime Gonthier, **Haibin Lai**, Poornima Nookala, Haochen Pan, Ian Foster, Ioan Raicu, Kyle Chard. *Exploring Fine-Grained Parallelism in Dataflow Runtime Systems on Multi-Socket Many-Core Systems*. Supercomputing (SC '25) Poster Track, 2025.

- Profiling **taskflow** on Multi-Socket Many-Core systems. Taskflow is a a General-purpose Task-parallel Programming System. **Poster Link**. **Paper Link**.

Experience

Research Intern, UChicago Globus Lab — March 2025 - Sep 2025

- Supervised by ***Prof. Kyle Chard***
- Improving `llama.cpp` inference engine with better kernels. Boosting large language model inference on many-core CPU.

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.

Research & Engineering Projects

Utilizing Task-based Parallelism for large language model Inference on Many-Core Systems — March 2025 - Sep 2025
*with **Prof. Kyle Chard** and **Prof. Ian Foster** (Globus Lab, University of Chicago), and **Prof. Ioan Raicu** (Illinois Institute of Technology)*

- Developed a suite of task-parallel large language model operators from `llama.cpp`, achieving over 80% throughput improvement on many-core CPU systems. Preparing a full research paper on task-parallel operator design and evaluation.

Virtio Driver for Asterinas OS — Course Project, **Prof. Yinqian Zhang** — Nov 2024 – Jan 2025

- Developed a **virtio-gpu driver** in the Asterinas operating system, enabling user-space programs to access GPU functions via dedicated syscalls.
- Designed the driver integrated with QEMU virtio for para-virtualized GPU support.
- Technologies: Rust, QEMU, Para-virtualization.

Geochem Pi Development — Aug 2024 - March 2025

- **Contributor** of Geochemistry Pi — An open-source Python data processing framework for data-driven geochemistry discovery on tabular data. Contributed pull requests enhancing functionality for geochemistry datasets.

Service

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 clusters. Conduct HPL/HPCG benchmark testing for normal checking.

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

- Collaborated with class advisor on daily affairs and organized impactful events, including dialogues with Turing Award laureate Prof. Joseph Sifakis and thematic report sessions.

Selected Awards

2025 Outstanding Student Award Oct 2025
2024 Outstanding Student Award Nov 2024
2023 Outstanding Student Award Nov 2023
2022 President's Special Scholarship Sep 2022

English Skills & Communication

TOEFL Nov 2025

- Score: 104/120; speaking 22, listening 30, reading 30, writing 22

CET6 Jun 2024

- Score: 649/710

Georgia Institute of Technology ASP Summer Program Jul 2023

- Participated in summer courses at Georgia Tech, enhancing communication and American experience.