

# Haibin Lai

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## About Me

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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

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**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

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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 General-purpose Task-parallel Programming System. **Poster Link**. **Paper Link**.

## Experience

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**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

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**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** Nov 2024 – Jan 2025

Course Project, **Prof. Yinqian Zhang**

- 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

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**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

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**8th APAC HPC-AI Student Competition** APAC HPC-AI Nov 2025

- **Second Prize**

- Leader of Team SUSTech. Responsible for parallel optimization on NWChem software and SGLang Deepseek inference, **recording blogs**

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

- **Third Prize**

- Leader of HPC Team. Responsible for parallel optimization on Hoomd-blue 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.

<b>2025 Outstanding Student Award</b>	Oct 2025
<b>2024 Outstanding Student Award</b>	Nov 2024
<b>2023 Outstanding Student Award</b>	Nov 2023
<b>2022 President's Special Scholarship</b>	Sep 2022

## English Skills & Communication

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**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.