Yang Zhao, Ph.D. Student

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Education

2023 – present **University of Science and Technology of China**
Ph.D. Student of Computer Science
Advisor: *Dr. Hong An*
Research Field: *Efficient Graph Deep Learning System; Heterogeneous Parallelism*

2019 – 2023 **Dalian University of Technology**
Bachelor of Computer Science and Technology;
GPA: 4.4/5.0 Rank: 3/139
Thesis title: *Research and Application of Dataflow Parallel Model in SPH.*
Honors: *Outstanding Graduates, National Scholarship, Taoli Alumni Scholarship*

Recent Research Projects

DepBloom: Distributed Training Acceleration for Temporal GNN (Submitted to ASPLOS'26)

- **In collaboration with Yue Dai from Illinois Institute of Technology.**
- Developed a dependency-aware multi-GPU training framework for temporal graph neural networks.
- Improved parallelism and reduced synchronization overhead while preserving model accuracy.
- Achieved 2.63× average and up to 5.16× training speedup over state-of-the-art baselines.

Projects

gSpTRSV: Efficient GPU Sparse Triangular Solve via Graph Scheduling (arXiv)

- Proposed **gSpTRSV**, a SpTRSV framework with graph-based scheduling and sync-free execution.
- Developed task fusion, dependency simplification, and adaptive mapping for improved parallelism.
- Achieved 1.8× average and 31.4× peak speedup on SuiteSparse matrices on Tesla A100.

SWTask: Dataflow Runtime for SPH on Sunway Manycore Systems

- Developed **SWTask**, a dataflow runtime for asynchronous scheduling on Sunway manycore systems.
- Parallelized particle interaction and sorting with automatic communication-computation overlap.
- Contributed to 2023 **Gordon Bell Prize-nominated**.

Research Publications

Submitted Paper

1. J. Chen, Z. Wang, Y. Zhao, and Z. Zhang, "Exascale sph for planetary defense: Quantifying cascading hazards of chicxulub-scale impacts with two trillion particles."
2. Z. Yang, c. Junshi, and et al., "Gsptrsv: A sparse triangular solve on gpus combining graph and sync-free method."
3. Z. Yang, D. Yue, and et al., "Depbloom: Distributed training acceleration for temporal gnn."

Conference Proceedings

1 Y. Zhang et al., "Multi-level load balancing strategies for massively parallel smoothed particle hydrodynamics simulation," in *Proceedings of the 53rd International Conference on Parallel Processing*, ser. ICPP '24, Gotland, Sweden: Association for Computing Machinery, 2024, pp. 400–410, ISBN: 9798400717932. DOI: 10.1145/3673038.3673090.

2 Z. Zheng, J. Chen, Y. Zhao, L. Song, X. Qin, and H. An, "Db-spgemm: A massively distributed block-sparse matrix-matrix multiplication for linear-scaling dft calculations," in *Proceedings of the 53rd International Conference on Parallel Processing*, ser. ICPP '24, Gotland, Sweden: Association for Computing Machinery, 2024, pp. 1156–1165, ISBN: 9798400717932. DOI: 10.1145/3673038.3673159.

Award

2023 China Parallel Application Challenge on Domestic CPU National **Second Prize**
2022 National Undergraduate Embedded Chip and System Design **Third Prize**
2021 Mathematics Competition for College Students **Second Prize**
2022 17th DUT College Student Programming Contest **Second Prize**
2021 16th DUT College Student Programming Contest **Second Prize**

Research Talks

2025.08 Exascale sph for planetary defense: Quantifying cascading hazards of chicxulub-scale impacts with two trillion particles.", at CCF HPC China 2025, Ordos, China

Miscellaneous Experience

Teaching Assistant

Spring 2026 COMP6112 Parallel Computing
Fall 2025 COMP6201 Number Theory for Computing
Summer 2025 USTC-Laoshan Laboratory "Aoshan Computing Summer School"

Patent

2025 A dataflow runtime system for GPU
2024 A dataflow runtime system for many-core heterogeneous platforms