

ZIYANG MEN

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RESEARCH INTERESTS

My research is on **parallel algorithms and data structures** (shared-memory, thread-level), with a focus on designing parallel indexes for **vector similarity search** (KNN/ANN) and **ordered sets** (BST/B-tree). The goal is to achieve both high-throughput updates and low-latency queries with strong theoretical guarantees for these data structures.

EDUCATION

University of California, Riverside	Sep. 2022 - Expected 2027
Ph.D. in Computer Science	<i>Supervisor: Yihan Sun & Yan Gu</i>
University of Copenhagen	Sep. 2020 - Jul. 2022
M.Sc. in Computer Science	
University of Electronic Science and Technology of China	Sep. 2016 - Jun. 2020
University of Glasgow (Dual degree)	Sep. 2016 - Jun. 2020
B.Eng. in Electronics and Electrical Engineering	

EXPERIENCE

Graduate Student Researcher	Sep. 2022 - Now
<i>University of California, Riverside</i>	<i>Supervisor: Yihan Sun & Yan Gu</i>
- Develop parallel algorithms for <i>spatial indexes</i>, e.g., <i>kd-trees</i> [6], <i>quad-trees</i> [4][5], and related variants [7], to enable efficient tree construction, batch updates, and queries. - Implement a highly optimized C++ library (~12K LOC, 80+ GitHub stars), achieving <i>orders-of-magnitude</i> speedups over the state of the art.	
Software Engineering Intern	Jun. 2026 - Now
<i>Meta — Linux Kernel Team</i>	<i>Mentor: Shakeel Butt</i>
- Submit patches to the kernel tree to enable the BPF support for the CPU and I/O cgroup. - Design a centralized daemon based on BPF to collect and share cgroup data with userspace applications.	
Visiting Ph.D. Student	Sep. - Dec. 2025
<i>University of California, Berkeley</i>	<i>Host: Simons Institute</i>
- Program: Algorithmic foundations for emerging computing technologies. - Designed novel memory layouts with <i>lock-free parallelism</i> for tree-based data structures.	
Student Researcher	Jul. - Sep. 2025
<i>Georgia Institute of Technology</i>	<i>Mentor: Helen Xu</i>
Designed the first parallel B^+-tree [1] with optimal I/O bounds for construction and batch updates.	
Research Assistant	Feb. 2018 - Aug. 2020
<i>University of Electronic Science and Technology of China</i>	<i>Supervisor: Yi Zhou & Mingyu Xiao</i>
- Designed the first efficient ILP algorithm for the partitioned Steiner tree problem [8]. - Implemented the algorithm in C++ (~6.4K LOC) using the LP solvers CPLEX and Gurobi.	

PUBLICATIONS

Preprints

- [1] **Parallel B^+ -tree: Theory and Practice.**
Ziyang Men, Yan Gu, Yihan Sun, Helen Xu.
- [2] **VSSort: Vectorized SampleSort on Multicore.**
Xiaopei Wang, Ziyang Men, Yan Gu, Yihan Sun.
- [3] **PABench: Benchmark for Parallel Algorithmic Reasoning in Large Language Models.**
Xiangyun Ding, Letong Wang, Ziyang Men, Yan Gu, Yihan Sun.

Full Papers

- [4] **Parallel Dynamic Spatial Indexes.**
PPoPP'26 *Symposium on Principles and Practice of Parallel Programming, 2026.*
Ziyang Men, Bo Huang, Yan Gu, Yihan Sun.
- [5] **PIM-zd-tree: A Fast Space-Partitioning Index Leveraging Processing-in-Memory.**
PPoPP'26 *Symposium on Principles and Practice of Parallel Programming, 2026.*
Yiwei Zhao, Hongbo Kang, Ziyang Men, Yan Gu, Guy E. Blelloch, Laxman Dhulipala, Charles McGuffey, and Phillip B. Gibbons.
- [6] **Parallel kd-tree with Batch Updates.**
SIGMOD'25 *International Conference on Management of Data, 2025.*
Ziyang Men, Zheqi Shen, Yan Gu, Yihan Sun.
- [7] **Parallel Longest Increasing Subsequence and van Emde Boas Trees.**
SPAA'23 *Symposium on Parallelism in Algorithms and Architectures, 2023.*
(In alphabetical order) Yan Gu, Ziyang Men, Zheqi Shen, Yihan Sun, and Zijin Wan.
- [8] **A vertex-separator-based integer linear programming formulation for the partitioned Steiner tree problem.**
COR'23 *Computers & Operations Research, 2023.*
Mengfan Ma, Ziyang Men, André Rossi, Yi Zhou, and Mingyu Xiao.
- [9] **Leveraging cutting planes reasoning for fast Pseudo-Boolean solving and optimization.**
Master Thesis *Department of Computer Science, University of Copenhagen, 2022.*
Ziyang Men.

Peer-Reviewed Short Publications

- [10] **Parallel kd-tree with Batch Updates.**
Ziyang Men.
VLDB'25 Ph.D. Workshop at the *International Conference on Very Large Data Bases, 2025.*
ACDA'25 SIAM Workshop on *Applied and Computational Discrete Algorithms, 2025.*
HOPC@SPAA'25 ACM Workshop on *Highlights of Parallel Computing, 2025.*

HONORS AND AWARDS

SIGHPC Travel Grant, PPoPP (4 grants for students).	2026
Graduate Student Association Travel Grant, UCR.	2023
Dean's Distinguished Fellowship, UCR.	2022
National Encouragement Scholarship, MoE (China) & UESTC (award rate: $\sim 2\%$).	2019

National Encouragement Scholarship, MoE (China) & UESTC (award rate: $\sim 2\%$). 2018
 Student Travel Grant from conferences (award rate: $\sim 15\%$): SPAA'25, SIGMOD'25, PPOPP'25, and ACDA'25.

ACADEMIC SERVICE

PC Member

- International Conference on Very Large Data Bases (VLDB) 2026

Shadow PC Member

- Symposium on Parallelism in Algorithms and Architectures (SPAA) 2026
- International Conference on Very Large Data Bases (VLDB) 2026

Artifact Evaluation Committee Member

- Symposium on Principles and Practice of Parallel Programming (PPOPP) 2026
- Symposium on Algorithm Engineering and Experiments (ALENEX) 2025
- International Conference on Management of Data (SIGMOD) 2025

Conference Reviewer

- International Conference on Supercomputing (ICS) 2026
- Symposium on Experimental Algorithms (SEA) 2026
- Symposium on Algorithm Engineering and Experiments (ALENEX) 2026
- European Symposium on Algorithms (ESA) 2024
- European Conference on Parallel and Distributed Computing (Euro-Par) 2024

Journal Reviewer

- ACM Transactions on Parallel Computing (TOPC) 2025
- ACM Transactions on Architecture and Code Optimization (TACO) 2025

Student Volunteer

- Symposium on Parallelism in Algorithms and Architectures (SPAA) 2025
- Symposium on Principles and Practice of Parallel Programming (PPOPP) 2025

LEADERSHIP & INVOLVEMENT

University Chinese Orchestra

Mar. 2018 - Jun. 2020

Lead Alto-Erhu Player

University of Electronic Science and Technology of China

- Led Alto-Erhu section in performances and rehearsals.
- Collaborated with orchestra members for concerts and events.

Students' Representative Council

Sep. 2016 - Jun. 2020

Student Representative

University of Glasgow

- Represented students in university meetings and policy discussions.
- Worked with faculty to improve academics and engagement.

Sri Lanka Orphan Care Program

Jun. 8th - 22nd, 2017

Team Leader

Nuwaraeliya, Sri Lanka

- Led a volunteer team (~ 30 members) supporting orphan care and community activities.
- Coordinated daily operations and engagement with local organizations.

Chengdu International Marathon

Sep. 23rd, 2017

Contestant

Chengdu, China

- Ranked 10th in the 19-21 age group.