

Xiangju Zhu

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EDUCATION

The University of Hong Kong

Ph.D. Candidate in Computer Science

Hong Kong SAR, China

Dec. 2023 – Present

Tianjin University

B.Eng in Computer Science | CGPA: 92/100

Tianjin, China

Sep. 2019 – Jun. 2023

AWARDS

National Scholarship | *China*

Oct. 2020

National Scholarship | *China*

Oct. 2022

‘Internet+’ Tianjin Competition Area Silver Award | *Tianjin, China*

May. 2023

Outstanding Graduate of Tianjin University | *Tianjin University*

Jun. 2023

HKU Postgraduate Scholarship | *Hong Kong SAR, China*

2023 – 2027

PUBLICATIONS

- Xiangju Zhu, Mohammad Matin Najafi, Chrysanthi Kosyfaki, Xiaodong Li, Reynold Cheng, Laks Lakshmanan. “**BEACON: A Benchmark for Efficient and Accurate Counting of Subgraphs**”. *IEEE International Conference on Data Engineering (ICDE)*, 2026.
- Yajun Yang, Hanxiao Li, Xiangju Zhu, Junhu Wang, Xin Wang, Hong Gao. “**HR-Index: An Effective Index Method for Historical Reachability Queries over Evolving Graphs**”. *Proceedings of the ACM on Management of Data (PACMOD)*, 2023.
- Xiangju Zhu, Reynold Cheng, Laks V.S. Lakshmanan, Xiaodong Li, Chenhao Ma, Mohammad Matin Najafi. “**Detection, Measurement, and Mitigation of Echo Chambers in Social Networks: A Survey**”. *IEEE Data Engineering Bulletin*, 2025.

RESEARCH EXPERIENCE AND PROJECTS

Echo Chamber Core Detection in Social Networks | *C++, Boost, STL, Python, Git* January 2024 – Present

- Formulated Echo Chamber Core detection as a Purity-Aware Densest Subgraph problem combining structural density and stance entropy; proved NP-hardness and inapproximability
- Designed PADS-H, a greedy algorithm achieving $2\times+$ speedup over baselines and <2s runtime on 1.67M-node graphs; applied to EC detection and polarization mitigation across real-world datasets

Dense Subgraph Discovery with Negative Weights | *C++, Boost, STL, Python, Git* November 2025 – Present

- Proposed CEP (Contraction–Expansion–Pruning), a scalable heuristic that outperforms peeling-based baselines on 60%+ of instances with $13\times+$ average speedup across 11 real-world and 175 synthetic graphs up to 10^7 nodes
- Designed CQM, a QPBO+MIQP pipeline delivering user-specified accuracy bounds or exact solutions with certificates of optimality, achieving $100\times+$ speedup over exact baselines

Linear Shortest Path Index on Multi-Attribute Networks | *C++, CMake, Git, CGAL* June 2021 – June 2023

- Built a partition-based index combining tree decomposition and convex hull computation to answer preference-weighted shortest path queries on multi-criteria road networks in real time
- Designed a dimension-reducing point-location mapping and A* search with precomputed heuristics, achieving $25\times$ speedup over Dijkstra with 23 ms query time on million-vertex 3D graphs
- Optimized construction via convex hull merge and cross-partition parallelization; evaluated on 5 real US road networks (up to 1.2M vertices, 2–5 cost dimensions)

Adaptive Rate Limiting Engine in Go | *Go, Git*

May 2022 – June 2022

- Implemented token bucket, leaky bucket, and sliding window algorithms behind a unified Limiter interface, enabling runtime strategy switching via the strategy pattern

TECHNICAL SKILLS

Languages: C/C++, Python, Java, Go, SQL (Postgres), Bash

Developer Tools: CMake, Git, Docker, VS Code, Visual Studio, PyCharm, IntelliJ

Libraries: STL, Boost, Eigen, pandas, NumPy, Matplotlib, Pytorch

TEACHING & SERVICE

Teaching Assistant

2023 – 2025

The University of Hong Kong

- COMP7106 Big Data Management (Section 2C), 2023
- COMP7107 Management of Complex Data Types (Section 2B), 2024
- COMP3323 Advanced Database Systems (Section 2A), 2025

Volunteer

2025

IEEE International Conference on Data Engineering (ICDE 2025)