Yunhao Mao

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https://yunhaom94.github.io/ University of Toronto, Toronto, ON, Canada

Education

2021 – Present **Doctor of Philosophy** in Computer Engineering
Edward S. Rogers Sr. Department of Electrical & Computer Engineering, University of Toronto, Canada.
Advisor: Professor Hans-Arno Jacobsen, IEEE Fellow

2019 – 2021 **Master of Applied Science** in Computer Engineering
Edward S. Rogers Sr. Department of Electrical & Computer Engineering, University of Toronto, Canada.
Advisor: Professor Hans-Arno Jacobsen, IEEE Fellow
Thesis: *Reversing CRDTs Through Compensating Operations*

2013 – 2019 **Honors B.Sc** in Computer Science Specialist
Department of Computer Science, University of Toronto, Canada.

Research Interests

Distributed Databases Systems — Designing database systems for distribute transaction management, cloud-native databases, geo-distributed databases.

Data Replication and Consistency — Improvements and applications of conflict-free Replicated Data Types (CRDTs), novel consensus protocols, strong and eventual consistency models.

Vector Data Management — Designing systems for distributed vector databases, vector similarity search algorithms (join and range search), GPU acceleration for vector search.

Research Publications

Journals

1. G. Zhang, F. Pan, **Y. Mao**, S. Tijanic, M. Dang'ana, S. Motepalli, S. Zhang, and H.-A. Jacobsen, "Reaching consensus in the byzantine empire: A comprehensive review of bft consensus algorithms," *ACM Computing Surveys*, vol. 56, no. 5, 2024.

Conferences

1. **Y. Mao**, H. Takata, M. Bachras, Y. Zhang, S. Zhang, G. Zhang, and H.-A. Jacobsen, "Epoch-based optimistic concurrency control in geo-replicated databases," in *Proceedings of the ACM on Management of Data*, 2026 **SIGMOD '26**
2. M. Bachras, M. Dang'Ana, **Y. Mao**, S. Zhang, Y. Zhang, and H.-A. Jacobsen, "Toward intelligent, sustainable, and reliable cloud database systems: A unified research vision," in *IEEE International Conference on Collaborative Advances in Software and COmputiNg*, CyPress Workshop, 2025 **CASCON '25**
3. **Y. Mao**, G. Zhang, Z. Liu, P. Nasirifard, S. Tijanic, and H.-A. Jacobsen, "Making crdts not so eventual," in *Proceedings of the VLDB Endowment*, 2025 **VLDB '25**
4. **Y. Mao**, Y. Zhang, and H.-A. Jacobsen, "Optimized storage for seamless multi-cloud systems," in *ACM Symposium on Cloud Computing*, Poster, 2023 **SoCC '23**

5 **Y. Mao**, "Skybridge: A cross-cloud storage system for sky computing," in *ACM/IFIP International Middleware Conference*, Doctoral Symposium, 2022 **Middleware '22**

6 **Y. Mao**, Z. Liu, and H.-A. Jacobsen, "Reversible conflict free replicated datatypes," in *ACM/IFIP International Middleware Conference*, 2022 **Middleware '22**

Pre-prints

1 G. Zhang, **Y. Mao**, S. Zhang, S. Motepalli, F. Pan, and H.-A. Jacobsen, "V-guard: An efficient permissioned blockchain for achieving consensus under dynamic memberships in v2x networks," Pre-print.

Work Experience

2024/06 – 09 **Applied Scientist Intern,** Alexa Home Productivity, Amazon.
Conducted research on LLM evaluation methodologies and developed LLM-based operational solutions for Alexa applications. Developed an AWS-based pipeline for LLM evaluation, integrating data collection, model inference, and result analysis.

2019 – Present **Teaching Assistant,** University of Toronto.
Instructed graduate and undergraduate courses spanning Introduction to Computer Science, Operating Systems, Computer Engineering, Distributed Systems, Computer Graphics, Algorithms and Data Structures, and Cloud Computing.

2018 – 2019 **Software Developer,** VideoComm Technologies.
Integrated Amazon Alexa Virtual Assistant into smart elevator systems.
Developed a RESTful API backend using PHP Laravel and administered cloud infrastructure on AWS.

2016 – 2017 **Network Engineer Intern,** Bell Mobility.
Designed and implemented an automated device testing framework using Appium, establishing the foundation for the team's transition to test automation.
Maintained and enhanced a Ruby on Rails web application serving as the team's project management system.

Teaching

Teaching Assistantships

CSC148 Introduction to Computer Science
CSC207 Software Design
CSCB09 Software Tools and Systems Programming (U of T Scarborough)
CSCC01 Introduction to Software Engineering (U of T Scarborough)
CSC317 Computer Graphics
ECE345 Algorithms and Data Structures
CSC369 Operating Systems
ECE419 Distributed Systems
ECE444 Software Engineering
ECE1779 Introduction to Cloud Computing
CSC2235 Cloud-native Data Management Systems

Miscellaneous

Honors and Awards

2023, 2025 **Queen Elizabeth II Graduate Scholarship in Science and Technology**

2020, 2022 **Ontario Graduate Scholarship**

2021 – 2023 **Edward S. Rogers Sr. Graduate Scholarships**

Service

2025 **Volunteer Session Chair**, IEEE International Conference on Data Engineering (ICDE) 2025.

Last updated: 2026-02-25