

Yunhao Mao

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📍 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 distributed 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 (SIGMOD)*, 2026.
- 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 *CyPress Workshop, IEEE International Conference on Collaborative Advances in Software and COMputiNg (CASCON)*, 2025.
- 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 (VLDB)*, 2025.
- 4 **Y. Mao**, Y. Zhang, and H.-A. Jacobsen, "Optimized storage for seamless multi-cloud systems," in *ACM Symposium on Cloud Computing (SoCC)*, Poster, 2023.
- 5 **Y. Mao**, "Skybridge: A cross-cloud storage system for sky computing," in *Doctoral Symposium, ACM/IFIP International Middleware Conference (Middleware)*, 2022.

- 6 Y. Mao, Z. Liu, and H.-A. Jacobsen, “Reversible conflict free replicated datatypes,” in *ACM/IFIP International Middleware Conference (Middleware)*, 2022.

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)**
CSCCo1 **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**

Miscellaneous (continued)

- 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.