

Gengrui (Edward) Zhang

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EMPLOYMENT

Concordia University Montreal, QC, Canada
 Assistant Professor, Department of Electrical & Computer Engineering 2024 - present

RESEARCH INTERESTS

My primary research goal is to develop high-performance, highly scalable, and highly available distributed systems. By integrating theoretical foundations with real-world imperatives, my research addresses the nuanced challenges that arise in practical applications, including, but not limited to, distributed AI, blockchains, cloud computing, and database management systems (DBMS).

EDUCATION

University of Toronto Toronto, ON, Canada
 Doctor of Philosophy, Electrical & Computer Engineering 2019 - 2024
 Dissertation: *“Efficient and Scalable Consensus Algorithms”*
 Advisor: Hans-Arno Jacobsen (*IEEE Fellow*)

University of Chinese Academy of Sciences Beijing, China
 Master of Engineering, Computer Science 2015 - 2018
 Thesis: *“Digital Content Protection Using Blockchain Technologies”*
 Advisor: Cheng-Zhong Xu (*IEEE Fellow*)

Hunan University Changsha, HN, China
 Bachelor of Engineering, Computer Science 2011 - 2015
 Thesis: *“Design and Implementation of GraphX Algorithms using Apache Spark”*
 Talent Program (Li-Da Talent Program for Computer Science)

FELLOWSHIPS & AWARDS

Best Program Committee Member Award

- IEEE 41th International Conference on Data Engineering (ICDE), Hong Kong 2025

Doctoral Completion Award, University of Toronto 2023 - 2024

ECE Student Fellowship, University of Toronto 2019 - 2023

Research Fellowship, University of Toronto 2019 - 2023

Outstanding Student, University of Chinese Academy of Sciences 2017

University Individual Scholarship, Hunan University 2012 - 2014

Best Paper Award

- The 13th International Conference on Green, Pervasive and Cloud Computing 2018

Prize of Excellence, Asia SuperComputer Challenge (ASC) 2014

Proud Team Award, Asia SuperComputer Challenge (ASC) 2013

PUBLICATIONS

▷ Conference Papers:

- C1 Gengrui Zhang**, Shiquan Zhang, Michail Bachras, Hans-Arno Jacobsen. Cabinet: Dynamically Weighted Consensus Made Fast. *Proceedings of the VLDB Endowment*, 18(5): 1439-1452, 2025 (VLDB'25)
- C2 Yunhao Mao, Gengrui Zhang**, Pezhman Nasirifard, Sofia Tijanic, Hans-Arno Jacobsen. Making CRDTs Not So Eventual. *Proceedings of the VLDB Endowment*, 18(2): 349-362, 2024 (VLDB'25)
- C3 Gengrui Zhang**, Fei Pan, Sofia Tijanic, and Hans-Arno Jacobsen. PrestigeBFT: Revolutionizing View Changes in BFT Consensus Algorithms with Reputation Mechanisms. In *2024 IEEE 40th International Conference on Data Engineering (ICDE)*. IEEE, 2024. (ICDE'24)
- C4 Yuqiu Zhang, Tongkun Zhang, Gengrui Zhang**, and Hans-Arno Jacobsen. Lifting the Fog of Uncertainties: Dynamic Resource Orchestration for the Containerized Cloud. In *Proceedings of the 13th ACM Symposium on Cloud Computing*, 2023. (Acceptance rate: 28.5%, SoCC'23)
- C5 Gengrui Zhang** and Hans-Arno Jacobsen. Escape to Precaution against Leader Failures. In *2022 IEEE 42nd International Conference on Distributed Computing Systems*, 2022. (Acceptance rate: 19.7%, ICDCS'22)
- C6 Gengrui Zhang**. Binding Efficiency and Robustness for Blockchains using Reputation-based Byzantine Fault-Tolerant Consensus Algorithms. In *Proceedings of the 23rd International Middleware Conference*, 2022. (Short Paper) (Middleware'22)
- C7 Gengrui Zhang** and Hans-Arno Jacobsen. Prosecutor: An Efficient BFT Consensus Algorithm with Behavior-aware Penalization against Byzantine Attacks. In *Proceedings of the 22nd International Middleware Conference*, 2021. (Acceptance rate: 25.9%, Middleware'21)
- C8 James Meijers, Edward Au, Yuxi Cai, Hans-Arno Jacobsen, Shashank Motepalli, Robert Sun, Andreas Veneris, Gengrui Zhang**, and Shiquan Zhang. Blockchain for V2X: A Taxonomy of Design Use Cases and System Requirements. In *2021 3rd Conference on Blockchain Research & Applications for Innovative Networks and Services (BRAINS)*. IEEE, 2021
- C9 Gengrui Zhang** and Chengzhong Xu. An Efficient Consensus Protocol for Real-time Permissioned Blockchains under non-Byzantine Conditions. In *International Conference on Green, Pervasive, and Cloud Computing*. Springer, 2018 (Best Paper Award)

▷ Journal Articles:

- J1 Gengrui Zhang**, Fei Pan, Yunhao Mao, Sofia Tijanic, Michael Dangana, Shashank Motepalli, Shiquan Zhang, and Hans-Arno Jacobsen. Reaching Consensus in the Byzantine Empire: A Comprehensive Review of BFT Consensus Algorithms. *ACM Computing Surveys (CSUR)*, 2024 (Used by [Hyperledger Fabric](#) for introducing BFT systems!)
- J2 James Meijers, Panagiotis Michalopoulos, Shashank Motepalli, Gengrui Zhang**, Shiquan Zhang, Andreas Veneris, and Hans Arno Jacobsen. Blockchain for V2X: Applications and Architectures. *IEEE Open Journal of Vehicular Technology*, 2022

PATENTS

- **Gengrui Zhang**, Hans-Arno Jacobsen, and Sheng Sun. Method and System for Creating a Distributed Ledger of Verified Vehicle Transactions (Patent Ref: 92014620US01). International Patent. 2022.
- **Gengrui Zhang**, Tongxin Bai, and Chengzhong Xu. A Second-hand Vehicle Transaction Method, Apparatus and System based on Blockchain Technology. CN 106897887 A[P]. 2017.

INVITED TALKS

“Smart Contract for AI Fairness”

- Hong Kong Polytechnic University, Hong Kong, 2024.11

“Fairness in Byzantine Consensus”

- Macau University, Macau, 2021.04

“Scaling Byzantine Consensus”

- Blockchain ACM SACMAT, Toronto, Canada, 2019.06

“Optimizing Consensus Algorithms for Permissioned Blockchains”

- Blockchain Week, Toronto, Canada, 2019.04

“Untangling Blockchain Consensus Protocols from Blockchain 1.0 to 2.0”

- Tencent, Shenzhen, China, 2018.04

“High-level Comparisons between Permissionless and Permissioned Blockchains”

- SIAT-CAS, Shenzhen, China, 2017.11

TEACHING

▷ Instructors:

- COEN6731 Distributed Software Systems, Concordia University, Winter 2025
- COEN352 Data Structures & Algorithms, Concordia University, Fall 2024

▷ Teaching Assistantships:

- ECE1770 Blockchain Technology, Head TA, University of Toronto, 2021–2022
- ECE419 Distributed Systems, Head TA, University of Toronto, 2019–2023
- ECE345 Algorithms and Data Structures, TA, University of Toronto, 2019–2023
- CSC343 Introduction to Databases, TA, University of Toronto, 2023
- ECE244 Programming Fundamentals, TA, University of Toronto, 2019–2023
- CSC263 Data Structures and Analysis, TA, University of Toronto, 2021

INDUSTRY EXPERIENCE

Tencent Technology Co. Ltd

Software Engineer, Platform & Content Group (PCG)

Shenzhen, GD, China
2018

REVIEW AND SERVICE

Conferences:

- Very Large Data Bases (VLDB)
 - Program Committee Member (2026)
- IEEE International Conference on Data Engineering (ICDE)
 - Local Organization Chair (2026)
 - Program Committee Member (2025, 2026)

- ACM/IFIP International Middleware Conference (Middleware)
 - Program Committee Member (**2025**)
- ACM International Systems and Storage Conference (SYSTOR)
 - Program Committee Member (**2025**)
- IEEE International Conference on Decentralized Applications and Infrastructures (DAPPS)
 - Publicity Chair (**2025**)
 - Program Committee Member (**2024, 2025**)

Journals:

- Invited Reviewer for IEEE Transactions on Information Forensics & Security (IEEE TIFS) 2025
- Invited Reviewer for IEEE Transactions on Computers (IEEE TC) 2024
- Invited Reviewer for IEEE Transactions on Network and Service Management (IEEE TNSM) 2023
- Invited Reviewer for Journal of Parallel and Distributed Computing 2018