Kaisong Huang kha85@sfu.ca https://kaisonghuang.github.io

Research Interests

I am broadly interested in data-intensive systems and work mainly on database engines, transaction processing, storage management, modern hardware and disaggregated systems. A major theme in my research is to build scalable data-intensive systems by fully exploiting modern hardware through carefully designed scheduling strategies.

Education

- **Simon Fraser University**, Metro Vancouver, BC, Canada
  Ph.D. in Computer Science 2020/09 – 2025/03 (Expected)
  – Committee: Tianzheng Wang (advisor), Zhengjie Miao, Dong Xie (external), Zhuoyue Zhao (external).
  – Thesis: Hiding and Reducing Latency in Modern Database Engines.

- **The University of Waterloo**, Canada
  M.Math in Computer Science 2018/09 – 2020/08

- **Nanjing University**, China
  B.Eng. in Software Engineering 2014/09 – 2018/06

Awards

- ACM SIGMOD Research Highlights Award, 2023
- Graduate Fellowship, Simon Fraser University, 2020, 2021, 2022, 2023, 2024
- Computing Science Travel Award, Simon Fraser University, 2022

Experience

- **Simon Fraser University** Metro Vancouver, BC
  Research Assistant, School of Computing Science 2020/09 – Present
  Advisor: Tianzheng Wang

  Teaching Assistant, School of Computing Science
  – CMPT 459/984: Modern Data Systems 2022/05 – 2022/08
  – CMPT 454: Database Systems II 2021/09 – 2021/12

- **Tencent Americas** Metro Vancouver, BC
  Database Kernel Research Intern, Tencent Cloud 2021/08 – 2021/10
  Applied coroutines to memory-optimized online transactional (OLTP) engines.

- **Telus** Greater Toronto Area, ON
  Co-op SDE Intern, Technology Strategy Team 2019/09 – 2020/01
  Automated the SD-WAN service provisioning using Nokia VSD and VMWare VCO.

- **The University of Waterloo** Waterloo, ON
  Research Assistant, Data Systems Group 2019/01 – 2019/08
  Advisor: Jimmy Lin
  Accelerated natural language processing against large documents using Spark.

- **SAP** Shanghai, China
  SDE Intern, Healthcare Team 2017/07 – 2018/02
  Developed patient accounting PoC applications on SAP Cloud Platform.

Artifacts

I have worked on the following systems that are being used by multiple research groups worldwide:

- **MosaicDB**, a memory-optimized OLTP database system for larger-than-memory workloads
  https://github.com/sfu-dis/mosaicdb
  Major contributor and maintainer.
- **CoroBase**, a coroutinized in-memory OLTP database system
  https://github.com/sfu-dis/corobase
  Major maintainer.
- **ERMIA**, a scalable OLTP database system for heterogeneous workloads
  https://github.com/sfu-dis/ermia
  Major maintainer.

Ongoing Research

- Low-Latency Transaction Scheduling via Userspace Interrupts
  Kaisong Huang, Jiatang Zhou, Zhuoyue Zhao, Dong Xie, Tianzheng Wang
  Under review at SIGMOD'25.

Publications[1]

Google Scholar: https://scholar.google.ca/citations?user=U52rdm4AAAAJ
Citations (as of Nov 2024): 77, h-index: 5

- The Art of Latency Hiding in Modern Database Engines.
  Kaisong Huang, Tianzheng Wang, Qingqing Zhou, Qingzhong Meng.
  International Conference on Very Large Data Bases (Proceedings of **VLDB**), 14 pages, 2024.
- DEX: Scalable Range Indexing on Disaggregated Memory.
  Baotong Lu, **Kaisong Huang**, Chieh-Jan Mike Liang, Tianzheng Wang, Eric Lo.
  International Conference on Very Large Data Bases (Proceedings of **VLDB**), 14 pages, 2024.
- Indexing on Non-Volatile Memory: Techniques, Lessons Learned and Outlook.
  Kaisong Huang, Tianzheng Wang.
  Springer Book, 87 pages, 2023.
- Efficiently Making Cross-Engine Transactions Consistent.
  Jianqiu Zhang, **Kaisong Huang**, Tianzheng Wang, King Lv.
  *ACM **SIGMOD** Record* (Invited), Vol. 52, No. 1, 8 pages, 2023.
- The Past, Present and Future of Indexing on Persistent Memory.
  Kaisong Huang, Yuliang He, Tianzheng Wang.
  *International Conference on Very Large Data Bases (Proceedings of **VLDB**)* (Tutorial), 4 pages, 2022.
  Invited for a 90-minute tutorial.
- Evaluating Persistent Memory Range Indexes: Part Two.
  Yuliang He, Duo Lu, **Kaisong Huang**, Tianzheng Wang.
  *International Conference on Very Large Data Bases (Proceedings of **VLDB**)*, 14 pages, 2022.
- Skeena: Efficient and Consistent Cross-Engine Transactions.
  Jianqiu Zhang, **Kaisong Huang**, Tianzheng Wang, King Lv.
  2023 ACM SIGMOD Research Highlight Award
  ACM SIGMOD International Conference on Management of Data (**SIGMOD**), 15 pages, 2022.

[1] Proceedings of VLDB and SIGMOD are the top two conferences for database systems. CIDR is the premier systems-oriented conference, complementary in its mission to the mainstream database conferences like SIGMOD and VLDB, emphasizing the systems architecture perspective.

- Rethinking the Performance/Cost of Persistent Memory and SSDs.
  Kaisong Huang, Darien Imai, Tianzheng Wang, Dong Xie.
  Annual Non-Volatile Memories Workshop (**NVMW**), 2-page extended abstract, 2022.
  Invited for a full-length 20-minute oral presentation.
- SSDs Striking Back: The Storage Jungle and Its Implications on Persistent Indexes.
  Kaisong Huang, Darien Imai, Tianzheng Wang, Dong Xie.
  The Conference on Innovative Data Systems Research (**CIDR**), 8 pages, 2022.

Talks

- Hiding and Reducing Latency in Modern Database Engines.
  – **Microsoft Research**, Redmond, WA, November 2024.
  – **State University of New York at Buffalo**, Buffalo, NY, November 2024.
  – **Penn State University**, State College, PA, December 2024.
- The Art of Latency Hiding in Modern Database Engines.
  – **VLDB**, Guangzhou, China, August 2024.
  – **Simon Fraser University** (systems group seminar), Burnaby, BC, April 2024.
  – **The Northwest Database Society**, Google, Kirkland, WA, February 2024.
- The Past, Present and Future of Indexing on Persistent Memory.
  – **VLDB**, Sydney, Australia, September 2022 (*90-minute tutorial*).
- Skeena: Efficient and Consistent Cross-Engine Transactions.
  – **Microsoft Research**, Redmond, WA, December 2022.
  – **SIGMOD**, Philadelphia, PA, June 2022.
- Rethinking the Performance/Cost of Persistent Memory and SSDs.
  – **NWDS**, San Diego, CA, May 2022

Professional Activities

- **Committee member**: The Conference on Information and Knowledge Management (CIKM) 2024; SIGMOD Availability 2022.
- **External reviewer**: CIKM 2023.
- **Journal reviewer**
  – The VLDB Journal
  – Journal of Systems Architecture
  – ACM Transactions on Architecture and Code Optimization (TACO)
  – IEEE Transactions on Computers (TC)
- **Student volunteer**: VLDB 2023, Vancouver, BC.