Zhanhao Zhao

https://zhanhaozhao.github.io

Email : zhanhaozhao@ruc.edu.cn

Research Interests

- **Transaction processing**: Concurrency control, serializability, high availability, verifiablity
- **Database Systems**: Built-in temporal support in RDBMSs

Education

- **Renmin University of China** — Beijing, China
  Ph.D. in Computer Science; Advisor: Prof. Xiaoyong Du and Prof. Wei Lu — *Sept. 2017 – June, 2023*

- **National University of Singapore** — Singapore
  Visiting Student; Advisor: Prof. Beng Chin Ooi — *Apr. 2022 – Apr. 2023*

- **Zhongnan University of Economics and Law** — Wuhan, China
  B.E. in Management Information Systems; GPA: 3.62 (Top 3%) — *Sept. 2013 – June 2017*

Publications

Conference Papers

- Hexiang Pan, Quang-Trung Ta, Meihui Zhang, **Zhanhao Zhao**, Yeow Meng Chee, Gang Chen, Beng Chin Ooi, *FC: Adaptive Atomic Commit via Failure Detection*, in revision of **ICDE**, 2024.

- Qiushi Zheng, **Zhanhao Zhao**, Wei Lu, Chang Yao, Yuxing Chen, Xiaoyong Du, Anqun Pan, *Lion: Minimizing Distributed Transactions through Adaptive Replica Provision*, in revision of **ICDE**, 2024.

- Jiamin Hou, **Zhanhao Zhao**, Zhouyu Wang, Wei Lu, Guodong Jin, Dong Wen, Xiaoyong Du, *AeonG: An Efficient Built-in Temporal Support in Graph Databases*, **PVLDB**, 2024.

- **Zhanhao Zhao**, Hexiang Pan, Gang Cheng, Xiaoyong Du, Wei Lu, Beng Chin Ooi, *VeriTxn: Verifiable Transactions for Cloud-Native Databases with Storage Disaggregation*, **SIGMOD**, 2024.

- **Zhanhao Zhao**. *Efficiently Supporting Adaptive Multi-Level Serializability Models in Distributed Database Systems*, Proceedings of **SIGMOD** (SRC), 2021.

- Wei Lu, **Zhanhao Zhao**, Xiaoyu Wang, Haixiang Li, Zhenmiao Zhang, Zhiyu Shui, Sheng Ye, Anqun Pan, Xiaoyong Du. *A Lightweight and Efficient Temporal Database Management System in TDSQL*, **PVLDB**, 2019.

Journal Papers

- **Zhanhao Zhao**, Hongyao Zhao, Qiyu Zhuang, Wei Lu, Haixiang Li, Meihui Zhang, Anqun Pan, Xiaoyong Du, *Efficiently Supporting Multi-Level Serializability in Decentralized Database Systems*, **TKDE**, 2023.

- Hongyao Zhao, **Zhanhao Zhao**, Wanqing Yang, Wei Lu, Haixiang Li, Xiaoyong Du, *Experimental Study on Concurrency Control Algorithms in In-memory Databases*, Journal of Software (**JOS**), 2022. (in Chinese)

- **Zhanhao Zhao**, Wei Lu, Hongyao Zhao, Zongyan He, Haixiang Li, Anqun Pan, Xiaoyong Du, *T-SQL: A Lightweight Implementation to Enable Built-in Temporal Support in RDBMSs*. IEEE Transactions on Knowledge and Data Engineering (**TKDE**), 2021.

- Haixiang Li, **Zhanhao Zhao**, Yijian Cheng, Wei Lu, Xiaoyong Du, Anqun Pan. *Efficient Time-interval Data Extraction in MVCC-based RDBMS*, World Wide Web Journal (**WWWJ**), 2019.

- **Zhanhao Zhao**, Feiran Huang, Xiaoli Wang, Wei Lu, Xiaoyong Du, *SQL-based Solution for Fast Graph Similarity Search*, Journal of Software (**JOS**), 2018. (in Chinese)

Experience

- **Tencent Inc.**   Shenzhen/Beijing, China
  Research Intern; Mentor: Mr. Haixiang Li   *July 2017 - Dec. 2022*
  - **Enable temporal data management in TDSQL**: I introduce a lightweight yet efficient built-in temporal implementation into Tencent's distributed database management system, called TDSQL. More details can be found in the VLDB'19 paper.
  - **Guarantee distributed snapshot isolation in TDSQL**: I develop a plug-in component for TDSQL to support distributed snapshot isolation. This feature has already been integrated into the main branch of TDSQL and provided to customers.
  - **Support multi-level serializability in TDSQL**: I design and implement the bi-directional dynamic timestamp adjustment algorithm supporting multi-level serializability, which doubles the transaction throughput of TDSQL.
  - **Tencent Transaction Processing Testbed (3TS)**: The project aims to provide a unified testbed for analyzing and comparing concurrency control algorithms. I am one of the collaborators of this project. 3TS is open-sourced via https://github.com/Tencent/3TS.

- **Key Laboratory of Data Engineering and Knowledge Engineering (DEKE)**   Beijing, China
  Research and Teaching Assistant   *Sept. 2017 - Apr. 2022*
  - **WooKongDB**: A consensus-based NewSQL system that we develop by deeply modifying Greenplum. I lead this project and develop the system with my teammates.
  - **T-SQL**: A distributed database that efficiently supports temporal data management. I implement T-SQL based on WooKongDB. This work is presented in the TKDE'21 paper, and is publicly available via https://github.com/dbiir/T-SQL.

- **National University of Singapore**   Singapore
  Visiting Student, DB System Research Group   *Apr. 2022 - Present*
  - **VeriTxn**: I design and implement VeriTxn, a cloud-native database that efficiently supports verifiable transactions. VeriTxn disaggregates the transaction layer and relies on trusted execution environments like Intel SGX to facilitate verifiable transactions.

Patents

- Haixiang Li, Wei Lu, **Zhanhao Zhao**, Xiaoyong Du, Anqun Pan, TRANSACTION PROCESSING METHOD, APPARATUS, COMPUTER DEVICE, AND STORAGE MEDIUM, CN111143389B, 2022.

- Haixiang Li, Wei Lu, Xiaoyong Du, **Zhanhao Zhao**, Anqun Pan, DISTRIBUTED DATA READ METHOD AND APPARATUS, CN110196856B, 2022.

- Haixiang Li, Wei Lu, Xiaoyong Du, **Zhanhao Zhao**, Anqun Pan, DATA READ METHOD AND APPARATUS, COMPUTER DEVICE, AND STORAGE MEDIUM, US-2021-0382877-A1, 2021.

Programming Skills

- **Languages**: Mandarin Chinese (Native), English (Fluent).
- **Coding**: C, C++, Java, SQL, LaTeX. Familiar with the source code of MySQL/PostgreSQL.

Honors and Awards

• **Graduates with Honors Award, Beijing Government**	2023
• **First-class Award for Science and Technology Progress, Shenzhen Government**	2022
• **National Scholarship for Ph.D Students, China**	2021
• First-class Student Scholarship, Renmin University of China	2018/2020
• Graduates with Honors Award, Zhongnan University of Economics and Law	2017
• **National Scholarship for Undergraduate Students, China**	2015
• First-class Student Scholarship, Zhongnan University of Economics and Law	2015