

Chi Zhang

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Education

Carnegie Mellon University

2022/08 – 2023/12

Master of Science in Computer Science, GPA 4.10/4.33

Pittsburgh, PA, USA

- Teaching Assistant for 15-445/645 Database Systems (Fall 2022, Spring 2023, Fall 2023)
- Courses: Distributed Systems, Compiler Design, Advanced Database Systems, Deep Learning Systems, etc.

Shanghai Jiao Tong University

2018/09 – 2022/06

Bachelor of Engineering in Computer Science and Technology

Shanghai, China

- GPA 93.80/100, Rank 1/149, National Scholarship 2019 (Top 0.2% national-wide)
- A+ Courses: Operating Systems, Computer Architecture, Computer Networks, and 28 others

Work Experience

Databricks

2025/06 – Present

Member of Technical Staff, Lakebase/Neon Storage Team

Pittsburgh, PA, USA

Neon, acquired by Databricks

2024/02 – 2025/06

Systems Software Engineer, Storage Team

Pittsburgh, PA, USA

- Work in the Neon storage team with the focus on the fundamentals of the storage layer-map structure; implement new compaction strategies (e.g., gc-compaction) to optimize amplifications of the Neon pageserver service — a key-value storage system storing Postgres write-ahead-logs and pages with copy-on-write branches and point-in-time recovery support.
- Design, develop, and ship storage features to meet the product's requirements and customers' needs. Examples: store small files in the key-value storage system (for logical replication); non-continuous sparse key space; detach from parent branches.

Neon

2023/05 – 2023/08

Software Engineering Intern

Pittsburgh, PA, USA

- **Compaction Enhancement.** Conducted an in-depth analysis and evaluation of the storage engine to assess performance metrics and storage space efficiency. Implemented a demo of RocksDB-style tiered compaction and improved page reconstruction strategy, which reduced space amplification by 2x and enhanced read-update performance by 20%.
- **Serverless SQL Driver.** Enhanced the overall reliability of the Neon serverless driver. Developed a Web-Assembly-based solution and collaborated closely with the Prisma ORM team to integrate the serverless driver into Prisma.

RisingWave Labs, Database System R&D Intern

Shanghai, China, 2021/08 – 2022/07

- **Top Contributor¹ of RisingWave.** RisingWave is a Postgres-compatible database with streaming processing support. As a founding member of the company, I worked on things like Rust rewrite of the codebase, streaming index joins, query optimizer for streaming, distributed stream processing, cloud-native LSM state store, and vectorized expression framework.

ByteDance, Storage System R&D Intern, TerarkDB Team

Beijing, China, 2021/06 – 2021/08

- **Co-optimized TerarkDB and ZenFS.** TerarkDB is a fork of RocksDB and ZenFS is a filesystem on zoned namespaces SSDs (ZNS). Implemented zone-aware garbage collection in TerarkDB for ZNS and WAL-aware zone allocator in ZenFS; with both combined reduced 3-4x of space amplification and greatly improved tail latencies caused by zone allocation.

PingCAP, Storage System R&D Intern, TiKV Storage Team

Shanghai, China, 2020/08 – 2021/01

- **Built LSM Storage Engine AgateDB** from ground-up. Inspired by WiscKey and BadgerDB, AgateDB separates large values from the LSM tree into a separate value log, so as to reduce write amplification and improve throughput.

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¹in terms of number of pull requests merged to the main branch; until 6 months after I left the company

Open-Source Contributions

Personal Projects github.com/skyzh

7.7k GitHub followers

- **[mini-lsm](#)** (3.6k stars, top 20 on Hacker News) A self-guided course to build an LSM key-value storage engine in Rust in a week, and then extend its compaction algorithm and implement multi-version concurrency control in the next two weeks.
- **[tiny-llm](#)** (2.9k stars, top 10 on Hacker News) Serve the Qwen2 model on Apple Silicon from scratch only with matrix APIs. The course covers implementing the RoPE, FlashAttention, quantized matrix computations, continuous batching, etc.
- **[type-exercise-in-rust](#)** (1.4k stars) Learn Rust generics by implementing a vectorized expression evaluation framework.
- **[write-you-a-vector-db](#)** (710 stars) A course of turning any relational database into vectordb (based on CMU's BusTub).

BusTub github.com/cmu-db/bustub as Teaching Assistant for Database Systems

2022/08 – 2023/12

- Lead the development of the BusTub educational database system and course projects in CMU Database Systems course.
- Added query processing layer to the system with PostgreSQL syntax support. Restructured the query execution project.
- Added multi-version concurrency control to the system based on HyPer/Umbra undo log version chain implementation.
- Redesigned course projects to help students better understand the concepts and align with industrial database systems.
- Developed leaderboard tests to challenge advanced students and enable further study in optimizing database systems.

RisingLight Maintainer github.com/risinglight

Since 2022/01

- Lead the development of RisingLight, an OLAP database system in Rust for educational purpose. RisingLight supports simple TPC-H queries, and has a merge-tree based columnar storage.

TiKV Committer, Maintainer github.com/tikv

Since 2020/05

- Maintain TiKV Coprocessor, the push-down execution framework of TiDB. Served as mentor for the Linux Foundation LFX Mentorship. Mentored community members to contribute new features (e.g., enum data types, plugin system).

Selected Blog Writings

on chi-z.com

- [State Store in Streaming Systems](#), a survey of state store implementations of Apache Flink, Materialize, and RisingWave.
- [Key-Value Separation in LSM Storage Engines](#), covering RocksDB's BlobDB, TerarkDB, BadgerDB, and TiKV's TitanDB.
- [Lessons Learned from Building an Extensible Optimizer](#) series, a collection of ideas and lessons from my [optd](#) experience.

Research Experience

Extensible Query Optimization Framework github.com/cmu-db/optd-original

2023/09 – 2023/12

CMU Database Group, advised by Professor Andy Pavlo

Pittsburgh, PA, USA

- One of the main developers of CMU-DB's [optd](#) extensible optimizer framework. It is based on the Columbia/Cascades optimizer framework and supports 15 out of 22 TPC-H queries. Key features: partial exploration, adaptive query optimization, Apache Datafusion integration, subquery unnesting, physical properties, and async-task-based optimizer implementation.

PostgreSQL Extension Manager github.com/cmu-db/pgextmgrext

2023/02 – 2023/05

CMU Database Group, advised by Professor Andy Pavlo

Pittsburgh, PA, USA

- A PostgreSQL extension manager as an extension that manages other PostgreSQL extensions and provides new APIs to the PostgreSQL extension developers. One of the new APIs is the output rewriter, and based on that, I wrote a demo extension `pg_poop` that rewrites all query result into poop emojis.