

PROFILE

Systems engineer with doctoral research experience in computational mathematics. Built distributed query-execution and profiling capabilities in a production MPP engine, alongside fourth-order C++ finite-volume and multigrid solvers for complex geometries.

EXPERIENCE

Tencent · Distributed Database Engineering Intern · Qingyun Program

Jul 2025 – Jul 2026

- Extended an MPP execution engine with two-stage aggregation and distributed-plan support for complex subqueries; resolved intermediate-state merging, data redistribution, and cross-node semantic-consistency issues.
- Built a distributed query-profiling path that connects frontend, planner/optimizer, and worker metrics into query, operator, node, and thread views; added operator-boundary inspection for complex-plan debugging.
- Identified lock contention caused by high-frequency instrumentation in a large analytical benchmark and moved collection to operator boundaries to keep diagnostic overhead under control.

Hangzhou Higgs Investment Management Co., Ltd. · Full-Stack Strategy Engineer

Nov 2024 – Jun 2025

- Built high-frequency market-data storage and real-time subscription pipelines with C++/Python, SQLite, and TDengine, supporting concurrent access from multiple threads and processes.
- Integrated brokerage market-data APIs and delivered trading-monitoring and live-parameter query tools for research and operational workflows.
- Prototyped a local document and natural-language SQL assistant with LightRAG, Vanna AI, DeepSeek, and Streamlit for internal troubleshooting.

SELECTED RESEARCH

Fourth-Order Cut-Cell Multigrid Solvers

Researcher · Co-first author

A modular C++ framework for high-order finite-volume discretization and geometric multigrid on irregular embedded boundaries.

- Approximately fourth-order convergence across multiple complex geometries
- Near-optimal complexity for the boundary-value solver under grid refinement

arXiv:2601.02975 (v3) · A Fourth-Order Cut-cell Multigrid Method for Solving Elliptic Equations on Arbitrary Domains

High-Fidelity Solvers for Density-Stratified Flows

Researcher and C++ developer

A high-order finite-volume solver for density-stratified incompressible flows under the Boussinesq approximation, including irregular and moving boundaries.

- Fourth-order accuracy in space and time for manufactured-solution studies
- Numerical results consistent with reference experiments

EDUCATION

Zhejiang University · Direct-track doctoral student in Computational Mathematics

Sep 2021 – Expected Mar 2027

GPA 92/100 · Doctoral degree not yet awarded · Research focus in high-performance numerical computing, finite-volume methods, and multigrid solvers

Zhejiang University · B.S. in Information and Computing Science

2017 – 2021

Overall GPA 4.38/5.00; final two years 4.78/5.00 · Outstanding Graduate (Top 5%) and First-Class Scholarship (Top 2%)

TECHNICAL SCOPE

Production systems: C++ (STL, modern C++, concurrency, resource lifetime); Python and SQL; Linux, Git, CMake, GDB; SQL execution engine and query optimizer internals; MPP execution, data exchange and pipeline scheduling; TPC-H, TPC-DS, MTR, profiling and regression analysis

Scientific computing: Numerical PDEs and finite-volume methods; Geometric multigrid and sparse linear algebra; OpenMP, Eigen, LAPACK / MKL; HDF5 / Silo data workflows; Accuracy, convergence and complexity studies

Data infrastructure: SQLite and TDengine; Concurrent ingestion and real-time subscription; Brokerage market-data API integration; LightRAG, Vanna AI and Streamlit prototypes

HONORS

Zhejiang University Outstanding Graduate · Top 5% · Zhejiang University First-Class Scholarship · Top 2% · CASC Second-Class Scholarship · Outstanding Graduate Student and Outstanding Graduate Student Leader · Guoxiang Scholarship and Freshman Excellence Scholarship