Zecheng (Aaron) Qiu

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Personal Website | Google Scholar | ORCID | GitHub

EDUCATION

Macau University of Science and Technology (M.U.S.T.) Macao S.A.R.
Bachelor of Science in Computer Science *Sep. 2023 – Aug. 2027 (Expected)*

- **CGPA:** 3.73 / 4.00 | **2024-2025 GPA:** 3.85 / 4.00 (Rank: 14/429)
- **Honors:** Dean's Honor List (2024-2025); Entrance Scholarship (Outstanding Category).

PUBLICATIONS

- **Z. Qiu**, Y. Wu, J. Yang. "Semi-implicit ADI operator-splitting method with Richardson extrapolation for the phase-field model of curvature-dependent tissue growth on surfaces." *Submitted to Computer Methods in Applied Mechanics and Engineering (CMAME)*, Feb. 2026. (Under Review) [Code]

- Y. Wu, **Z. Qiu**, J. Yang. "A three-dimensional multi-phase-field vesicles model and its practical finite difference solver." *Computer Physics Communications* 321 (2026) 110053. (JCR Q1) [Paper] [Code]

RESEARCH EXPERIENCE

Research Group of Prof. Victor Junqiu Wei M.U.S.T.
Research Assistant *Mar. 2025 – Present*

- **Conversational Text-to-Trajectory Visualization (Text2Traj).**
  - Developed a dialogue-centric visualization system on **PostgreSQL** and **PostGIS**, integrating Text-to-SQL paradigms to process complex spatio-temporal queries.
  - Implemented an **LLM-based semantic reasoning layer** to autonomously detect and resolve query ambiguities (e.g., spatial granularity conflicts, underspecified visualization types) and identify unanswerable requests.
  - Constructed a large-scale benchmark dataset containing adversarial examples to evaluate the robustness of Large Language Models in handling spatial constraints and administrative boundary logic.

PF-CFD Team (Prof. Junxiang Yang) M.U.S.T.
Research Assistant *Feb. 2024 – Present*

- **Multi-Phase-Field Vesicle Simulation**
  - Implemented a hybrid numerical solver for 3D fluid vesicle dynamics in **C++**, integrating phase-field models into an existing simulation framework.
  - Applied a semi-implicit finite difference scheme to evolve phase-field equations, ensuring rigorous numerical stability and energy conservation.
  - Optimized memory management and data storage strategies, significantly reducing computational overhead for multi-vesicle interaction simulations.

- **3D Phase-Field Simulation for Tissue Growth**
  - Developed a proprietary **C++** simulation framework from the ground up, implementing a novel **Implicit ADI scheme** to overcome the stability bottlenecks of traditional explicit methods.
  - Achieved **second-order temporal accuracy**, enabling **high-fidelity** long-term simulations that were previously infeasible.
  - Extended the theoretical model from 2D surfaces to **3D volumetric geometries**, enabling precise prediction of tissue evolution in realistic porous structures.

INTERNSHIP EXPERIENCE

CoCreative Information Technology Co., Ltd. Shenyang, China
Java Software Engineer *Jun. 2025 – Aug. 2025*

- Developed and maintained software functions using **Java** and **JavaWeb** technologies.
- Performed **SQL** query optimization to enhance database performance and project efficiency.
- Contributed to the core codebase and participated in the full development lifecycle of company software projects.

ACADEMIC SERVICES

- **External Reviewer**, IEEE International Conference on Data Engineering (ICDE) 2026.
  - Invited by Prof. Victor Junqiu Wei to review submissions related to DB4AI and LLM Agent Memory Systems.
- **Student Representative**, HKIE Accreditation Interview Panel.
  - Served as one of the student representatives during the HKIE accreditation interview to support the validation of the BSc in Computer Science program.

TECHNICAL SKILLS

- **Languages:** C/C++ (High Proficiency), Python, SQL (PostgreSQL), Java, LaTeX.
- **Technologies:** PyTorch, PostGIS, MATLAB, Linux, Git, Docker.
- **English:** IELTS 7.0 (Proficient).

EXTRACURRICULAR COURSES

The University of Hong Kong (HKU) Summer Institute Hong Kong S.A.R.
Course: AI Engineer: Gen-AI and Virtual Worlds *Jul. 2024*