

# 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:** 3.74 / 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, Y. Li, 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 Journal of Computational Physics (JCP)*, Mar. 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 (CPC)* 321 (2026) 110053. (JCR Q1 Top 10%) [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

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- **Secondary Reviewer**, ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD) 2026.
  - Invited by Prof. Victor Junqiu Wei to review a submission related to automated visualization and visual analytics.
- **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**, Hong Kong Institution of Engineers (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

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

## EXTRACURRICULAR COURSES

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**The University of Hong Kong (HKU) Summer Institute**

*Course: AI Engineer: Gen-AI and Virtual Worlds*

Hong Kong S.A.R.

*Jul. 2024*