Zhanwei Zhang (张展玮)

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Education

M.Phil. in Data Science and Analytics, Hong Kong University of Science and Technology (Guangzhou) **Sep 2025 ~ Present**

Information Hub

Advisor: Prof. Zishuo Ding

B.Sc. in Computer Science and Technology, Southern University of Science and Technology (SUSTech) **Sep 2021 ~ Jun 2025**

Turing Master Class

Advisor: Prof. Yepang Liu

GPA: 3.79 / 4.0 | Weight Avg Score: 90.92 | Ranking: 36 / 195

Main courses: Mathematical Logic (A+), Java Programming (A+), Data Structures & Algorithms (A), Machine Learning (A), Database Systems (A-), Compilers (B+)

Internships

Large Language Model Intern in Lingsome, Shenzhen **Aug 2024 ~ Aug 2025**

Integrated multi-type Retrieval Augmented Generation (RAG) and GraphRAG systems.

Optimized GraphRAG code to extract better entities & relationships and construct domain-specific knowledge graphs.

Developed and refined pipelines to extract improved entities and relationships.

Visiting Researcher in Wuhan University, Wuhan **May ~ Aug 2024**

Advisor: Prof. Jinfu Chen (WHU); Prof. Weiyi Shang (UWaterloo)

Focused on software logging and failure workarounds.

Developed an automated analysis pipeline to extract, filter, and sample code commits containing try-catch blocks.

Selected Projects

AI Micro-Drama Studio **Sep 2025 ~ Present**

Built an end-to-end pipeline that transforms novels or scripts into production-ready storyboards.

Unified creation, generation, editing, and export in one interface to streamline publish-ready video production.

Customizable AI Companion Doll (OpenHarmony TSC Project) **Sep 2025 ~ Jan 2026**

Developed an AIoT system integrating cloud-based LLMs to provide personalized companionship through customizable personalities and multimodal interaction.

Built the cross-platform frontend, including a mobile App and Mini-program.

Othello Game through Java and Python Programming with Strong AI **Oct ~ Dec 2021 & Mar 2023**

Developed visually appealing interface and implemented Monte Carlo & Alpha Beta Pruning algorithm.

Canteen Traffic Monitoring **Dec 2023 ~ Jan 2024**

Calculated the length of the queue by monitoring data and displayed a chart showing the changes in queue length.

Won award for finalist in National College Students' Innovation and Entrepreneurship Training program.

About 30,000 visits within three months.

Simple Compiler **Sep 2023 ~ Jan 2024**

Developed a compiler that translates C language files into Intermediate Representation (IR) and MIPS32.

Supported essential features such as I/O operations, control flow and function calls.

Included lexical, syntax, and semantic analysis, along with informative error messages.

Research

Numerical Error Detection in Floating-Point Computing **Sep 2024 ~ Feb 2026**

PI-detector: A condition-number-guided perturbation approach can replace costly high-precision oracles, finding 173/174 significant-error cases at about 0.13% of oracle cost (up to 73.46× faster).

MGDE: Turn detection into a Newton–Raphson-guided convergent input search, reaching 80 bugs / 47 functions (vs. 70/46 ATOMU, 53/42 FPCC) while being 41.71× and 10.17× faster, respectively.

Reproduction and Evaluation of R1-style Reasoning Pipeline **May 2025 ~ Jun 2025**

Replicated the DeepSeek-R1 training pipeline by implementing GRPO and Cold-start SFT, significantly enhancing the multi-step reasoning capabilities of Qwen2.5 models (0.5B to 7B).

LLM-Based JSON Parser Fuzzing for Bug Discovery and Behavioral Analysis **Sep 2023 ~ Jan 2024**

Used opensource LLMs such as Llama2-7B/13B to generate test cases.

13 JSON Parsers and over 100 types of cases have been tested. Over 26 behavioral diversities have been found.

Publications

Tan, Y., **Zhang, Z.**, Ding, Z., Zheng, L., Chen, J., & Shang, W. (2025). *A mathematics-guided approach to floating-point error detection*. arXiv. https://arxiv.org/abs/2510.10081 (Under Review)

Tan, Y., **Zhang, Z.**, Chen, J., Ding, Z., Xuan, J., & Shang, W. (2025). *Computing floating-point errors by injecting perturbations*. arXiv. https://arxiv.org/abs/2507.08467

Han, Y., Shen, H., He, X., Mai, Z., Zhang, R., Zheng, Z., Liu, Y., Zhang, X., Li, G., **Zhang, Z.**, Liang, Z., Chen, Y., Xie, Y., Li, M., Shen, G., Wang, C., Ye, J., Zhu, L., Fu, T.-M., & Yang, X. (2025). A comprehensive analysis of interflight variability in carbon dioxide emissions from global aviation. *Environmental Science & Technology, 59*(12), 6179–6191. doi:10.1021/acs.est.5c02371

Patents

一种点餐方法、系统、终端及介质（Innovative Ordering Method, System, Terminal, and Medium Patent） **May 2023**

Innovated a method and system to alleviate peak-hour traffic in cafeterias.

Applied on May 5, 2023; Application no: 202310498065

Skills

Languages: English (Fluent; IELTS: 6.5), Mandarin (Native), Cantonese (Native)

Programming Languages & Frameworks: Java, Python, C/C++, SQL, Spring Boot, Vue, React

Tools: IntelliJ IDEA, PyCharm, Visual Studio Code, Anaconda, Git, CMake

Honors & Scholarships

Special Innovation Award (Unique Winner) & Second Prize, OpenHarmony Competition Training Camp	Sep 2025
Postgraduate Studentship (PGS), HKUST(GZ)	Sep 2025
Outstanding Student, SUSTech	Jan 2024
Honorable Mention, Mathematical Contest in Modeling	May 2023
Finalist, National College Students' Innovation and Entrepreneurship Training program	Jun 2023
Third Prize, China Undergraduate Mathematical Contest in Model	Sep 2023