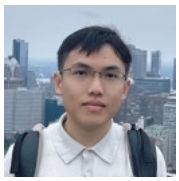
Weiqi Lu, Ph.D. Candidate

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About Me

- I am Weiqi (William) Lu, a fourth-year Ph.D. candidate in CASTLE (Code AnalysiS, Testing and LEarning) Lab at The Hong Kong University of Science and Technology (HKUST), supervised by Prof. S. C. Cheung (IEEE Fellow, Chair Professor) and Prof. Yongqiang Tian (Monash University), and supported by the Hong Kong PhD Fellowship Scheme (HKPFS). Prior to this, I earned my B.Sc. in Computer Science and Mathematics at HKUST.
- My research focuses on **software engineering**, particularly the **algorithmic search, pattern recognition, and anomaly detection in data analytics systems**. I am interested in combining mathematical modeling, theory and algorithms, and engineering practice to improve the quality and reliability of data-driven systems. Additionally, I enjoy exploring mathematics and machine learning, with a specific interest in artificial intelligence for software engineering (**AI4SE**) and large language models for software engineering (**LLM4SE**).
- I am also drawn to **data structures and algorithms and their engineering implementation**. I have solved 1,480+ problems on LeetCode in C++ and Python, including 230+ hard problems, with a global rank under 8,200. Recently, I achieved an **all-kill (AK)** in a LeetCode weekly contest, ranking **837 (top 2%)**. Despite having no prior competitive programming background, I placed **10th at HKUST** and **17th regionally** in the 2026 Hong Kong Joint Collegiate Programming Contest (HKJCPC).

Education

2023.09 – Present — **The Hong Kong University of Science and Technology**
Ph.D. in Computer Science and Engineering
GPA: 4.050/4.30

2019.09 – 2023.07 — **The Hong Kong University of Science and Technology**
B.Sc. in Computer Science and Mathematics
First Class Honors · GPA: 4.109/4.30 · 2023 Academic Achievement Medal · Top 2%

2022.01 – 2022.05 — **Georgia Institute of Technology**
Undergraduate Exchange Program
GPA: 4.00/4.00

2021.06 – 2021.08 — **University of California, Berkeley**
Berkeley Summer Sessions
GPA: 4.00/4.00

Selected Coursework

Statistics — **MATH5431** Advanced Mathematical Statistics I (A+) · **MATH2431** Honors Probability (A+) · **MATH2411** Applied Statistics (A+)

ML & Data — **COMP5212** Machine Learning (A+) · **MATH4432** Statistical Machine Learning (A+) · **COMP4331** Data Mining (A+) · **COMP3311** Database Management Systems (A+)

Algorithms — **COMP5711** Introduction to Advanced Algorithmic Techniques (A+) · **COMP4421** Image Processing (A+) · **COMP3711** Design and Analysis of Algorithms (A+)

Mathematics — **MATH4223** Differential Geometry (A+) · **MATH3343** Combinatorial Analysis (A+) · **MATH3121** Abstract Algebra (A+) · **MATH2352** Differential Equations (A+)

Business — **ISOM1380** Technology and Innovation: Social and Business Perspectives (A+)

Research Publications

1. **W. Lu** and Y. Tian, "Detecting rendering bugs in imperative data visualization libraries via equivalent mutations," *arXiv preprint arXiv:2607.12363*, 2026, **First automated testing work for visualization libraries; successfully found 47 new bugs.**
2. **W. Lu**, Y. Tian, X. Zhong, *et al.*, "An empirical study of bugs in data visualization libraries," *Proceedings of the ACM on Software Engineering*, vol. 2, no. FSE, pp. 2075–2098, 2025, **First systematic study of bugs in visualization libraries; Published at CCF-A venue (FSE).**

3 H. Tian, **W. Lu**, T. O. Li, *et al.*, "Is chatgpt the ultimate programming assistant–how far is it?" *arXiv preprint arXiv:2304.11938*, 2023, **Early benchmark study on LLM coding capability; 400+ citations.**

Projects

- **Automated Testing of Data Visualization Libraries** | arXiv.
  Engineered *VIZDETOUR*, an automated testing framework for stateful systems driven by novel *endpoint-preserving mutations* and automated visual oracles. Evaluated the framework across major visualization libraries (*matplotlib*, *bokeh*, and *plotly*) to expose deep state-management vulnerabilities. Discovered 47 previously unknown bugs, of which 39 were confirmed and 18 were fixed.
- **Uncovering Causal Relationships in Co-location Patterns** | UROP Proceedings 2021–22, Paper.
  Proposed a scalable framework for mining causal relationships among co-location patterns using **Granger causality**. Designed an algorithm that approximates direct causes from Granger causes using unique causal information, addressing limited use of temporal information in prior causal-mining models. Evaluated the approach on real-world datasets.
- **Language-Guided Dense Prediction for Scene Understanding** | UROP Proceedings 2022–23.
  Proposed **OpenCLIP**, a CLIP-guided approach for open-world semantic segmentation, to recognize novel classes without pixel-level annotations. Addressed the class bias of incremental learning by leveraging the semantic representations of CLIP image and text encoders.
- **JoJo Manga Style Transfer Model** | Report, Demo.
  Engineered and trained a generative image-to-image translation model using CartoonGAN to stylize real-world video frames into the distinctive high-contrast art style of *JoJo's Bizarre Adventure*. Preprocessed and aligned 18,000+ CelebA human face photos with 4,000 face-cropped anime frames, applying Canny edge-detection and Gaussian smoothing for edge-promoting adversarial loss.
- **Multiplayer Dou Dizhu (Landlord) Game** | GitHub.
  Architected a full-stack, multi-player Dou Dizhu game in C++ using Qt, featuring integrated GUI elements, automated AI players, and real-time multiplayer support via TCP sockets. Implemented rule-based AI heuristics for strategic hand evaluation, alongside an event-driven user interface complete with dynamic card distribution effects, hint generation, and audio feedback.

Technical Skills

Programming Languages	C++, Python, Java, SQL, R, JavaScript, HTML5, Bash
Libraries & Frameworks	NumPy, Pandas, PyTorch, Pytest, Soot, STL, Qt, JavaFX
Domains	Data Structures & Algorithms, Static/Dynamic Program Analysis, Test Automation, Machine Learning

Teaching and Service

2025 Spring, 2026 Spring	**COMP5111 Fundamentals of Software Testing and Analysis**.
2024 Spring	**COMP2211 Exploring Artificial Intelligence**.
2025 – 2026	Reviewer for **top-tier (CCF-A / CORE A*)** software engineering venues, including **ICSE 2026**, **FSE 2026**, **ASE 2025–2026**, and **ISSTA 2025–2026**.

Honors and Awards

2026	**#10 at HKUST, Hong Kong Joint Collegiate Programming Contest** (HKJCPC 2026).
2025	**ACM SIGSOFT CAPS Award**.
2023 – 2027	**Hong Kong PhD Fellowship Award** (Hong Kong's top PhD scholarship).
2023	**HKUST RedBird PhD Award**.
	HKUST Academic Achievement Medal (highest academic honor at graduation).
2022	**The 17th Epsilon Fund Honorable Mention** (outstanding mathematical scholarship).
	Tin Ka Ping Scholarship (Exchange).
	HKUST Alumni Endowment Fund High Flyers Program Scholarship.
2020 – 2023	**Chiaphua Industries Limited Scholarship for Chinese Undergraduate Students**.
	University's Scholarship Scheme for Continuing Undergraduate Students.
2019 – 2023	**Dean's List for the School of Engineering**.