

Li Junzhe

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About Me

I am a Computer Science undergraduate at The University of Hong Kong, minoring in Finance, passionate about bioinformatics, biomedical AI, and physical AI. I also have experience in backend development, market analysis, and IoT systems.

Education

The University of Hong Kong

Bachelor of Engineering in Computer Science (Minor in Finance)

First Class Honor Degree, GPA:3.68/4.3 (Equivalent to 3.76/4)

Hong Kong, China

Sept 2022 – June 2026

University of Waterloo (Exchange)

Bachelor of Mathematics in Computer Science

Waterloo, Canada

Jan 2025 – Apr 2025

Research Experience

Research Assistant

CUHK Wave Intelligence Lab

Hong Kong

Dec 2025 – present

Work as a research assistant in the CUHK Wave Intelligence Lab, supervised by Prof. Shengchao Liu (CUHK & Mila). I am currently co-leading a project on "**Generative RNA Backbone Design using Inertial Frames and Flow Matching**".

- Addressing the challenge of structural validity in de novo 3D RNA generation by introducing physics-informed constraints (Rigid Body Dynamics).
- Proposed a novel Inertial Frame construction method for RNA nucleotides using PCA and SVD, replacing traditional atom-based coordinate systems to ensure SE(3)-invariant representation.
- Adapting Riemannian Flow Matching algorithms to model the generative trajectory of RNA backbones on the rigid-body manifold.
- Developing the data pipeline to process complex PDB structures, handling sugar pucker configurations and base-pairing geometry.
- Aiming to build the foundation for Next-Generation Drug Discovery and Virtual Cell Simulation by generating physically rigorous molecular structures.

Research Assistant

HKU CDS BioAI Lab

Hong Kong

Mar 2025 – present

Work as a research assistant and FYP student to improve the performance of Clair3, a well-known variant calling model, by incorporating methylation signals for better phasing results, thus improving Clair3's precision and recall. I was also selected to the **HKU CDS Summer Research Internship Program**.

- First-author poster: "Aggregating Epigenetic Methylation Signals for Improved Long-Read Genetic Variant Calling." Authors: **Junzhe Li**, Ruibang Luo, Zhenxian Zheng. Accepted at *GIW ISCB-Asia 2025*.
- Co-authored paper: "Accelerated long-read variant calling with Clair3 for whole-genome sequencing." Authors: Zhenxian Zheng, Minggao He, Xian Yu, **Junzhe Li**, Lei Chen, Angel On Ki Wong, Jingcheng Zhang, Yekai Zhou, Ruibang Luo. Submitted to *Bioinformatics* (BIOINF-2025-2319).
- Co-authored preprint: "Clair-Mosaic: A deep-learning method for long-read mosaic small variant calling." Authors: Lei Chen, Zhenxian Zheng, Minggao He, Angel On Ki Wong, Xian Yu, **Junzhe Li**, Jingcheng Zhang, Yekai Zhou, Ruibang Luo. Posted on *bioRxiv* (doi: 10.1101/2025.10.31.685831).
- Co-authored poster: "Clair3-RNA: A deep learning-based small variant caller for long-read RNA sequencing data." Authors: Zhenxian Zheng, Ruibang Luo, Xian Yu, **Junzhe Li**, Minggao He, Lei Chen. Accepted at *GIW ISCB-Asia 2025*.

Part-time Research Internship

HKU InfoBodied AI Lab

Hong Kong

June 2025 – July 2025

Contributed to building a 4D dataset for indoor human-object interaction.

- Processed data and performed scene reconstruction from videos with depth information.
- Utilized diffusion models for denoising action data and completing object trajectories.

Work Experience

Backend Developer Intern

Hangzhou NengGong Technology Ltd.

Hang Zhou, China

July 2024 – Aug 2024

Internship at an industry-leading pharmaceutical warehouse control technology company.

- Developed backend solutions for IoT-based warehouse monitoring systems.
- Enhanced system efficiency and precision in pharmaceutical warehouse control.

Data Analyst Intern

Hangzhou Lipo Sports Co., Ltd.

Hang Zhou, China

Dec 2023 – Jan 2024

Use data analytic methods to formulate the company's future development plan.

- Analyze and report on company's annual performance metrics from 2016 to 2022.
- Conduct market research on the European hunting and indoor exercise equipment market.

Projects

[Wat2Eat – Android App for Healthy Living]

Jan 2024 – May 2024

An android application offering recipe discovery, nutritional tracking, and AI-driven health recommendations.

- Utilized Kotlin and database design to create a user-friendly UI/UX.
- Integrated multimodal AI agents for health advice.

[Soccer Robot Car – Computer Vision Robot]

Sept 2023 – Jan 2024

Designed and built a competitive soccer robot car utilizing computer vision and 3D printing.

- Achieved championship in robot soccer competition.
- Applied CAD design and real-time environment detection capabilities.

[Human Society Analogy Model]

June 2023 – Sept 2023

A machine learning-based simulation to model human societal interactions in isolated environments.

- Explored social dynamics using Python and machine learning algorithms.
- Proposed as a foundational model for future societal construction studies.

[Real-time C++ Interactive Game]

Jan 2023 – May 2023

Developed a real-time interactive game application using C++.

- Completed over 2000 lines of efficient object-oriented code.
- Achieved full marks and recognition for project excellence ([Demo Video](#)).

[Image Recognition Kaggle Competition]

Oct 2022 – Jan 2023

Participated in Kaggle CIFAR-10 image recognition challenge.

- Secured 9th place among university peers.
- Applied Python and machine learning techniques effectively.

Skills

Programming Languages & Technologies: Python, C++, Java, Kotlin, Linux Shell, Markdown, LaTeX, CAD

Technical Expertise: Machine Learning, Deep Learning, Computer Vision, Database Design, UI/UX Design, Game Development, IoT

Languages: English (Advanced, IELTS 7.5), Mandarin Chinese (Native), Cantonese (Conversational)

Extracurricular Activities

- Volunteer at Hong Kong Mainland Volunteer Team, collaborated with Hong Kong Police Force in anti-phishing campaigns (since September 2023).
- Love cooking and hiking. Passionate about all sorts of ball games.