Weikang FU

Mathematics · Machine Learning Researcher

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Education

Université Paris Dauphine - PSL (Paris Sciences & Lettres)

Paris, France

M.S. in Mathematics and Applications, MODO Track — *Sep. 2025 – Jun. 2026*

- Specialization: Modeling, Optimization, Decision, and Organization.

École Polytechnique - IP Paris

Paris, France

M.S. in Applied Mathematics and Statistics — *Sep. 2024 – Jul. 2025*

- GPA: Average Score: 16/20 (Ranked in the top 20%).
- Courses: Convex Optimization, Stochastic Processes, Functional Analysis, Mathematical Statistics, Python for Data Science, Introduction to Machine Learning, Markov Processes & Applications, Database Management Systems.

Sun Yat-sen University

Guangzhou, China

Dual B.A./B.S. in Philosophy (Logic) and Applied Mathematics — *Sep. 2018 – Jul. 2023*

- GPA: Average Score: 87/100 (Ranked in the top 10%).
- Core Courses: Game Theory, Cognitive Psychology, Real Analysis, Probability Theory, Linear Algebra, Database Systems.

Graduation Thesis

- **Looking inside the black-box: Logic-based explanations for machine learning**
  Institute of Logic and Cognition
- **Predicting Gene Expression from Promoter Sequences Based on Macaron Transformer Architecture**
  Department of Applied Mathematics

Experiences

Institute of Biology, Genetics and Bioinformatics, Université Paris-Saclay

Paris, France

Research Assistant — *May 2025 - Present*

- Engineered Hyperbolic Variational Autoencoders to learn data-efficient representations of complex clinical data in hyperbolic space.
- Validated the model on the large-scale MIMIC-IV dataset, achieving SOTA performance in multi-task sepsis analysis (onset, mortality) and outperforming baselines by **up to 10%**.
- Designed a novel fine-tuning strategy that significantly improved downstream task performance, boosting cell type classification accuracy compared to standard methods.
- **Publication:** Authored a first-author paper detailing the HVAE framework and its applications, submitted to top-tier AI conferences (ICLR, ML4H).

2025 Spark Cup: iFLYTEK Large Model Application Innovation Competition

China

Finalist & Sole Developer — *May 2025 - Present*

- Engineered "Industry-Academic Bridge," an intelligent system leveraging LLMs to analyze media content for misinformation and bias by benchmarking against academic literature.
- Designed and built a robust, multi-provider LLM framework (Spark AI, OpenAI) from scratch, incorporating advanced content filtering, caching, and automatic fallback mechanisms.
- **Competition Achievement:** Ranked **Top 50 globally** in the preliminary round among thousands of teams, advancing to the finals as an independent developer.
- Built a complete full-stack web application with responsive UI and sophisticated content extraction algorithms, currently optimizing the system for enhanced performance and expanding functionality for the upcoming final competition.

Haolan Information Technology Co., Ltd. *Guangzhou, China*

Algorithm Engineer *Jul. 2022 - Sep. 2022*

- Spearheaded the core algorithm development for an AI-powered medical imaging solution to enhance low-dose lung nodule CT scans to high-fidelity resolution.
- Architected a comprehensive evaluation pipeline using quantitative metrics (PSNR, SSIM) and a qualitative blind review protocol with radiologists to ensure clinical relevance.
- **Key Achievement:** The developed model achieved superior image enhancement, leading to its successful integration into the company's prototype Computer-Aided Diagnosis (CAD) system.

Department of Mathematics, Sun Yat-sen University *Guangzhou, China*

Research Assistant (Undergraduate Thesis) *Sep. 2023 - Jun. 2024*

- Led an independent research project to predict gene expression value from DNA promoter sequences, managing the entire lifecycle from model design to final validation.
- Innovated a novel deep learning model combining a Macaron-style CNN architecture with a Transformer, effectively capturing both local motifs and long-range dependencies in DNA.
- **Thesis Publication:** The research culminated in a comprehensive undergraduate thesis, which received an **A grade** for its novel methodology and significant findings.

Publications

[1] **Fu, W.**, Hamidi, M. (2025). Geometric Priors in Hyperbolic VAEs Unlock Data-Efficient Representation Learning. In submission to *ICLR 2026*. (First Author)

Skills

Languages	Chinese (Native), English (Fluent), French (Elementary)
Programming	Python, SQL
Technologies	Docker, Git, Pandas, PyTorch

Research Interests

Geometric Deep Learning: Hyperbolic representation learning, variational autoencoders, and data-efficient generative modeling.

Machine Learning for Healthcare: Predictive modeling for clinical outcomes, sepsis analysis, and gene expression inference.

Optimization and Statistical Learning: Convex and stochastic optimization methods for reliable model training in high-dimensional settings.

Objectives and Availability

Actively seeking a **Ph.D. position starting Fall 2026**, with interests in **AI for Healthcare / Medicine**, **Data-efficient Representation Learning**, **Optimization / Decision with Uncertainty**, or other related areas where my skills can make an impact. As part of my master's program, I am also required to complete a **6-month research internship in Spring 2026**, and I am eager to align this internship with a **potential Ph.D. lab** to facilitate an early start and ensure a strong mutual fit. **(Funding will not be my primary concern for this internship.)**