YIFENG LIU(LEWIS)

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EDUCATION

Tsinghua University — Beijing, China
Bachelor in Computer Science (Yao Class) — Sept. 2020 – June 2024

- **GPA: 3.93/4.00 (Rank 12/76)**; admitted on basis of performance on national college admissions exam (5/113,900, science track) as well as 36th Chinese Physics Olympiad Finals (Gold Medal).
- Selected awards: **Outstanding Winner** of The Mathematical Contest in Modeling/Interdisciplinary Contest in Modeling 2022 (top 0.12% of 8,181 participants on Problem E); **Comprehensive Scholarship** of Tsinghua University in 2021, 2022 and 2023; Xiao Shutie Scholarship for Applied Mathematics; **Excellent graduate** of Tsinghua University and **outstanding graduate** of IIIS (10 out of 76)
- Selected to Tsinghua Xuetang Talents Program (Top 10% as well as outstanding performance in scientific contests) and Academic Research Promotion Plan for College Students of Tsinghua University.
- Visiting student to University of Washington.

University of California, Los Angeles — Los, Angeles, United States
Ph.D. in Computer Science — Sept. 2024 – Ongoing

- Research in the field of optimization and architecture of Large Language Models.
- Receive Amazon Trainium Scholarship for 2025

PUBLICATIONS

1. Liu. Y., Yuan A., Gu, Q., MARS-M: When Variance Reduction Meets Matrices, arXiv in submission.
2. Fan Z, Liu Y, Zhao Q, et al. Robust Layerwise Scaling Rules by Proper Weight Decay Tuning[J]. arXiv preprint arXiv:2510.15262, 2025.
3. Zhang, Y.*, Liu, Y.*, Yuan, H., Yuan, Y., Gu, Q., & Yao, A. C. C. (2025). On the Design of KL-Regularized Policy Gradient Algorithms for LLM Reasoning. *arXiv preprint arXiv: 2505.17508*.
4. Liu. Y. and Team K, Du A, Gao B, et al. Kimi k1. 5: Scaling reinforcement learning with llms[J]. arXiv preprint arXiv:2501.12599, 2025.
5. Zhang, Y.*, Liu, Y.*, Yuan, H., Qin, Z., Yuan, Y., Gu, Q., & Yao, A. C. C. (2025). Tensor Product Attention Is All You Need. *arXiv preprint arXiv:2501.06425*. (**NeurIPS 2025 Spotlight**)
6. Yuan H*, Liu Y*, Wu S, et al. MARS: Unleashing the Power of Variance Reduction for Training Large Models[C]. *Forty-second International Conference on Machine Learning*. (**Accepted by ICML 2025**, avg. score: 4.25)
7. Tangqi Fang*, Yifeng Liu*, Addie Woicik*, Minsi Lu, Anupama Jha, Xiao Wang, Gang Li, Borislav Hristov, Zixuan Liu, Hanwen Xu, William S Noble, Sheng Wang, Enhancing Hi-C contact matrices for loop detection with Capricorn: a multiview diffusion model, **Bioinformatics**, Volume 40, Issue Supplement_1, July 2024, Pages i471–i480, https://doi.org/10.1093/bioinformatics/btae211 (Accepted by **ISMB 2024**)
8. Liu Y*, Xu H*, Fang T, et al. T-Rex: Text-assisted Retrosynthesis Prediction[J]. arXiv preprint arXiv:2401.14637, 2024.
9. X. Qian, K. Hu, J. Wang, Y. Liu, X. Pan, J. Cao, and M. Wang. 2022. *The VolcTrans System for WMT22 Multilingual Machine Translation Task.* In Proceedings of the Seventh Conference on Machine Translation (WMT), pages 1068–1075, Abu Dhabi, United Arab Emirates (Hybrid). Association for Computational Linguistics.
10. Y. Liu, X. Zheng, P. Tian. *Forestry for Carbon Sequestration*[J]. UMAP Journal, 2022, 43(3).

RESEARCH EXPERIENCE

Tsinghua University (IIIS) — Beijing, China
Research Assistant to Professor Zhilin Yang — Feb. 2022 – Feb. 2023
CodeGeeX

- Developed a code generation model with more diverse functions than existing models, including code translation and explanation;
- Provided the idea of soft-score hierarchy for training, so as it would be more model-friendly in the beginning of the training procedure, and assisted in the collection of the high-quality training data;
- Outperformed the existing models including InCoder-6.7B and CodeGen-Multi-16B in terms of pass@k (k=1,10,100) on the HumanEval-X benchmark;

- Published in KDD 2023 paper: *CodeGeeX: A Pre-Trained Model for Code Generation with Multilingual Evaluations on HumanEval-X.*

University of Washington (Paul G. Allen School of Computer Science and Engineering & Department of Genome Sciences) Seattle, USA

Research Assistant to Professor William Noble and Professor Sheng Wang Feb. 2023 – Aug. 2023

Hi-C Resolution Enhancement

- Development of a new tool for Hi-C resolution enhancement which incorporates high-order chromatin features as additional views of the count matrix and leverages a diffusion probability model backbone as an iterative enhancement step;
- Provided the idea of the weighted average of input channels including original Hi-C matrix, o/e normalized data, TAD score and HiCCUPs score rather than different loss items to improve HiCCUPs score and MSE simultaneously;
- Outperformed existing models including HiCARN, HiCNN and HiCSR in cross-chromosome and cross-cell-line settings;
- Liu Y, Fang T, Woicik A, et al. Enhancing Hi-C contact matrices for loop detection with Capricorn: a multiview diffusion model[J]. Bioinformatics, 2024, 40(Supplement_1): i471-i480. (Accepted by ISMB 2024)

ByteDance & UCLA Beijing, China & Los Angeles, United States

ByteDance Seed Team & UCLA AI Lab June. 2024 – Aug. 2024

Variance Reduced Adaptive Gradient Algorithm

- Development of a new optimization architecture, MARS, integrating the variance reduction with adaptive gradient approaches;
- Outperforms existing optimization methods including AdamW and Muon for Large Language Models and Computer Vision tasks.
- Yuan H, Liu Y, Wu S, et al. MARS: Unleashing the Power of Variance Reduction for Training Large Models[J]. arXiv preprint arXiv:2411.10438, 2024. (Accepted by ICML 2025)

SELECTED AWARDS AND HONORS

- Gold medal for the 36th Chinese Physics Olympiad Finals 2019
- Outstanding Winner of The Mathematical Contest in Modeling/Interdisciplinary Contest in Modeling (Top 0.12% of 8,181 participants on Problem E) 2022
- Comprehensive Scholarship of Tsinghua University (Top 20%) in 2021, 2022 and 2023 2021-2023
- Xiao Shutie Scholarship for Applied Mathematics 2022
- Tsinghua Xuetang Talents Program Scholarship (top 10% as well as outstanding performance in scientific contests) 2020-2023
- Excellent graduate of Tsinghua University 2024
- Outstanding graduate of IIIS, Tsinghua University 2024
- Amazon Trainium Scholarship 2025

WORK EXPERIENCE

ByteDance Beijing, China

Research Internship, AI Lab July 2022 – Sept. 2022

- Research and development of the Volcano Machine Translation system on Word Sense Deduction;
- Assistance in composition of WMT22 paper: "The VolcTrans System for WMT22 Multilingual Machine Translation Task".

Moonshot AI Beijing, China

Research Internship, Alignment Department Dec. 2023 – June 2024

- Research and development on the alignment of the Kimi Chat model for the abilities in mathematics and composition;
- Research and development on the multi-model ability of Kimi Chat;
- Author of *Kimi k1. 5: Scaling reinforcement learning with llms*.

ByteDance Beijing, China

Research Internship, Seed Team June 2024 – Aug. 2024

- Research in the optimizer and long-context performance of Doubao Large Language Model;
- Development of MARS optimizer for integrating variance reduction and adaptive learning methods.

ByteDance San Jose, USA

Research Internship, Seed Team   June 2025 – Sept. 2025
- Research in the pretraining, optimizing and scaling of Doubao Large Language Model with thousands of GPUs;
- Regularly and one-to-one report to Yonghui Wu, the manager of Seed Team in ByteDance;
- Several works are too important to be published.

ADDITIONAL INFORMATION

Additional Professional and Extracurricular Experiences
- Reviewer of RECOMB 2024, ICML 2025 ES-FoMo, NeurIPS 2025 MATH-AI and ICLR 2026.
- Monitor of Yao class organizing several class and grade activities and winning the A-level class of Tsinghua University, from June 2021 to June 2022.
- Volunteer in giving review lessons on physics to Yao Class, from 2021 to 2022.

Computer and Language Skills
- Programming Languages: C++, Python, HTML5/CSS, MATLAB, Verilog.