

Zihao Jing

Western University

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I am a second-year Master’s student in the Department of Computer Science at Western University, supervised by Prof. Pingzhao Hu. My research interests focus on Large Language Models (LLMs) and multimodal reasoning, with a focus on improving LLM generalization and reliability for socially impactful domains and AI-for-Science. More broadly, I am open to other advanced LLM research across agent, efficient training, fairness, safety, and etc.

EDUCATION

Western University, M.Sc. in Computer Science, supervised by Prof. Pingzhao Hu Sep. 2024–Present
Beihang University, B.Eng. in Software Engineering, Beijing, China Sep. 2020–Aug. 2024

SELECTED PUBLICATIONS

Top-Tier Conferences

[1] **Zihao Jing**, Qiu hao Zeng, Ruiyi Fang, Yan Sun, Boyu Wang, Pingzhao Hu. *Entropy-Guided Dynamic Tokens for Graph-LLM Alignment in Molecular Understanding*. In **ICLR 2026**. [Code] [Paper] [Video][Slices]

- We propose EDT-Former with entropy-guided dynamic query to solve *structural information loss* in graph-LLM alignment, where fixed-length Q-Former queries collapse substructure context for variable-size entities.
- We propose a connector-only frozen-backbone alignment pipeline via a *Dynamic Query Transformer* to solve heavy LLM fine-tuning cost/overfitting in coarse multimodal fusion, enabling efficient training with the LLM frozen.
- Applied and achieves SOTA results on MoleculeQA and molecule-oriented Mol-Instructions benchmarks, and best accuracy on 10/10 MoleculeNet/TDC property benchmarks under matched settings.

[2] **Zihao Jing**, Yan Sun, Yan Yi Li, Sugitha Janarthanan, Alana Deng, Pingzhao Hu. *Structure-Aware Fusion with Progressive Injection for Multimodal Molecular Representation Learning*. In **NeurIPS 2025**. [Code] [Paper] [Video&Poster]

- We propose *MuMo*, a foundation-style multimodal fusion model to solve brittle token-structure alignment in multimodal representation learning, where unreliable 3D inputs make naive 1D-3D fusion unstable;
- We propose *asymmetric Progressive Injection* to solve modality collapse and feature domination under early fusion, progressively injecting the structural prior into the token stream while preserving modality-specific modeling; this enables stable training and scalable long-context dependency propagation with an efficient sequence backbone.
- Ranks 1st on 22/29 downstream tasks with a +2.7% average improvement over strong baselines.

[3] **Zihao Jing**, Qiu hao Zeng, Ruiyi Fang, Yan Yi Li, Yan Sun, Boyu Wang, Pingzhao Hu. *Scaling-Aware Adapter for Structure-Grounded LLM Reasoning*. **Under review**. [Code] [Paper]

- We propose *Scaling-Aware Patching* to solve fixed-length connector bottlenecks when grounding LLMs on variable-size spatial graphs, where constant query budgets over-compress large entities and over-allocate small ones; an instruction-conditioned gate selects anchors and grows soft patches so the structural token budget scales with input complexity.
- We propose a *Geometry Grounding Adapter* to solve structural hallucination in structure-conditioned generation, where sequence-style encodings lack verifiable spatial evidence;
- Achieves the best overall performance on 3 benchmark groups across both all-atom modality reasoning tasks.

Other Highlights

[4] Junqin Huang, Zhongjie Hu, **Zihao Jing**, Mengya Gao, Yichao Wu. *Piccolo2: General Text Embedding with Multi-Task Hybrid Loss Training*. **SenseTime Technical Report, 2024** [SenseNova] [Code] [Report]

- General-purpose text embedding model trained with an efficient multi-task hybrid loss across diverse tasks.
- Achieves top-1 performance on the CMTEB ranking in 2024.05, with scalable embedding dimensions via MRL training.

[5] **Zihao Jing**, Yuxi Long, Ganlin Feng. *Pruning for Generalization: A Transfer-Oriented Spatiotemporal Graph Framework*. **Under review at Workshop**. [Code] [Preprint]

- Transfer-oriented traffic forecasting framework to improve cross-city generalization under limited data.
- Entropy-based graph pruning removes boundary nodes dominated by external factors, improving MAE by over 13%.

[6] Yan Sun, Lianghong Chen, **Zihao Jing**, Yan Yi Li, Dongkyu Kim, et al. *Generative AI for the Design of Molecules: Advances and Challenges*. In **Journal of Chemical Information and Modeling**. [Paper]

- Comprehensive review of generative AI for biomolecular design, including diffusion and optimization-based approaches.
- Highlights key challenges such as multimodal integration, data scarcity, and autonomous AI for drug discovery.

RESEARCH INTERNSHIPS

SenseTime *LLM Research Intern* 2023.09–2024.06

- **Text embeddings (Piccolo2)**: Trained general-purpose embedding models with multi-task hybrid-loss objectives; built end-to-end training/evaluation pipelines and led iterative optimization of a generative embedding LLM; achieved top-1 ranking on C-MTEB (May 2024).
- **Domain LLM adaptation (100B)**: Fine-tuned a 100B-parameter LLM for vertical livestream marketing; drove data/recipe iteration and productionized the model for deployment at Sina Weibo.
- **LLM research, engineering & scaling**: Gained hands-on experience with large-scale pretraining/fine-tuning codebases (SenseNova series), hyperparameter tuning, experiment tracking, and reproducible training workflows on

multi-GPU infrastructure.

Jina AI

AI Research Intern

2023.04–2023.09

- **LLM engineering:** Improved RunGPT interface and contributed solutions to the **Llama** open-source ecosystem.
- **Applied LLM analytics:** Implemented LLM-based denoising and sentiment pipeline for Budweiser public-opinion analysis; reduced operational cost by >13%.
- **Model commercialization:** Led evaluation/tuning of a super-resolution model; executed performance testing and produced pricing recommendations.

HONORS AND AWARDS

- **Silver Prize**, Feng Ru Cup Science and Innovation Competition (University-level) 2023
- **Third Prize**, 13th National Undergraduate Mathematics Competition (National-level) 2021
- **Third Prize**, 32nd Beijing Undergraduate Mathematics Competition (Province-level) 2021
- **Outstanding Student Leader Award** (University-level) 2022
- **Outstanding Student Leader Award** (Department-level) 2021
- **Third Prize**, Physics Academic Competition (University-level) 2021
- **Honorable Mention (H Prize)**, Mathematical Contest In Modeling 2020

ACADEMIC SERVICE

Conference Reviewer ICLR 2026 (5 papers), ICML 2026 (6 papers)

Workshop Reviewer Time Series in the Age of Large Models (TSALM), ICLR 2026

Journal Reviewer ACM Transactions on Knowledge Discovery from Data (TKDD)

TECHNICAL SKILLS

Skills Narrative. 2020-2022 I Trained in Software Engineering and developed strong full-stack programming foundation. Industry projects, including production management systems in Beijing and the Shanghai Highway (G60) AI monitor/prediction platform, strengthened my engineering practice in maintenance, high-throughput, and containerized workflows with Kubernetes.

2023-2024, I shifted toward AI through an internship at Jina AI, developing applied models (e.g., segmentation and sentiment analysis) while consolidating modern ML engineering skills (NumPy, PyTorch, Transformers) and collaborative practices. **I then joined SenseTime as an intern**, working on LLM training (SenseNova series), with hands-on experience in pretraining, fine-tuning, and optimization.

2025-2026, I have focused on LLMs and reasoning, further strengthening large-scale training (multi-GPU/node), HPC, and container-based experimentation. My technical skills are summarized as follows.

- **Large Language Models.** Pretraining and fine-tuning; multimodal fine-tuning/alignment (e.g., EDT-Former, Cuttlefish); training/evaluation pipelines.
- **HPC & Systems.** Linux administration; Slurm; containerization (Docker, Singularity); parallel computing.
- **Distributed Training.** PyTorch DDP/FSDP; multi-GPU/multi-node training; DeepSpeed; profiling/monitoring.
- **Full-Stack Engineering.** C/C++, Java, Python, MATLAB; SQL; Linux shell; HTML5/CSS, JavaScript; front-end/back-end development (websites, applications, mini-programs).
- **Collaboration.** Git; clean/modular code; reproducible workflows (environment/version pinning); documentation.

MENTORSHIP

Teaching Assistant, COMPSCI 3305 Operating System 25 Winter and 26 Winter Term

Teaching Assistant, COMPSCI 2211 Software Tools and Systems Programming 24 Fall and 25 Fall

- I enjoy mentoring junior students, inspired by the mentorship I received from my advisor and senior peers, and find strong fulfillment in teaching and guiding others.

SELECTED TALKS AND PRESENTATIONS

- [1]Demystifying Large Language Models, From Pretrain to Adaptation UWORCS 2025
- [2]Advanced Attention Mechanism in Transformers UWO Journal Club Seminar 2025
- [3]Deepseek vs. ChatGPT, Advanced Reinforcement Learning Approaches UWO Journal Club Seminar 2025
- [4]AlphaFolds and All-Atom Foundation Models Bio-Informatics Journal Club 2026

ACADEMIC MENTORS

Prof. Pingzhao Hu, Western University: “Write a paper such that reviewers neither can nor need to ask questions.”

Prof. Boyu Wang, Western University: “Read 20+ related papers before discussing ideas with me.”

Yifu Ding, PhD in CS, Beihang University: “A paper should present clear, well-aligned challenges and novelties.”

Qiu hao Zeng, Postdoc in CS, University of Toronto: “If you dig one direction deeper, you will always uncover novelty.”

*Prof. Pingzhao Hu and Boyu Wang will write recommendation letters for my PhD application.

Leadership

Class Representative (Middle School–Undergraduate): Organized 100+ activities and events. Most notably, organized a large-scale university event in the main auditorium and served as host, conducting an on-stage interview with Xiaoqian Wang from CCTV. Received both department- and university-level Outstanding Student Leader Awards. **Master’s Program:** Organized 5+ seminars. Highly willing and confident in leading events such as workshops.