

Zhuoning GUO

INFORMATION RETRIEVAL · MULTIMODAL LARGE LANGUAGE MODELS · AGENTS

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Educations

The Hong Kong University of Science and Technology (Guangzhou)

PH.D. IN ARTIFICIAL INTELLIGENCE, INFORMATION HUB

- Supervisor: Prof. Xiaowen Chu (IEEE Fellow)

Guangzhou, Guangdong, China

Sep. 2022 - Oct. 2026 (Expected)

Harbin Institute of Technology

B.E. IN SOFTWARE ENGINEERING

- GPA: 3.6/4.0 (Overall rank: Top 7%)

Harbin, Heilongjiang, China

Aug. 2018 - Jun. 2022

Internships

AllSpark, Xiaohongshu

ALGORITHM RESEARCH & DEVELOPMENT INTERN

- **Topics:** Search and multimodal agents
- **Contributions:**

- Led RedFlip, a generative search interface for visual-first experience-centric search. Built an end-to-end search agent pipeline including retrieval, multimodal organization, interface generation, click-intent understanding, and iterative interaction, enabling pixel-level search beyond text-only responses.
- Contributed to the production search agent for Xiaohongshu Dots (question answering and shopping). Built post-training data pipelines and synthesized agent trajectories for tool-augmented reasoning, exploring multi-turn reasoning and multimodal evidence aggregation.

Beijing, China

May 2026 -

Alibaba Tongyi Lab

RESEARCH INTERN

- **Topics:** Foundational embedding models for multimodal retrieval
- **Contributions:** Develop the open-source state-of-the-art multimodal video embedding model trained on 13M+ public data with 6.5+% improvement on universal video retrieval tasks, laying a foundation of Qwen3-VL-Embedding series for video retrieval abilities

Hangzhou, Zhejiang, China

Mar. 2025 - Jan. 2026

Baidu Recommendation Architecture Department

RESEARCH INTERN

- **Topics:** Information retrieval for web-scale recommender system
- **Contributions:** Propose an industrial training-inference co-designed retrieval framework with improvements of 20+% on ANNS, 1.0+% on ToP, and 0.5+% on DAU; This framework is deployed in 20+ applications for 100M+ video recommendations with 100M+ requests per second

Remote

Feb. 2024 - Feb. 2025

Baidu Research

RESEARCH INTERN

- **Topics:** Spatial-temporal modeling for business intelligence
- **Contributions:** Design a predictive and analytical framework for the nationwide labor market understanding, including forecasting models, scientific discoveries, and proprietary reports

Haidian, Beijing, China

Oct. 2021 - Aug. 2022

Tencent AI Lab

RESEARCH INTERN

- **Topics:** Graph learning for social science
- **Contributions:** Support research on non-pharmaceutical interventions in COVID-19 by modeling human mobility for contact reduction

Remote

May 2021 - Oct. 2021

Microsoft Research Asia (MSRA)

RESEARCH INTERN

- **Topics:** Computer vision and graphics for design intelligence
- **Contributions:** Support intelligent slides refinement suggestion via deep learning of layout autoencoder and aesthetic evaluator, back-end and front-end development of a plug-in in Microsoft PowerPoint

Haidian, Beijing, China

Nov. 2020 - Apr. 2021

Projects

Qwen3-VL-Embedding

RESEARCH INTERN

- Preliminary research on video embedding ability, including training, 10M+ data collection/processing/synthesis, and evaluation; Produce two academic papers about this topic
- Qwen3-VL-Embedding series has been downloaded 10M+ times on HuggingFace, which is the new state-of-the-art on video retrieval tasks after the GVE series

Alibaba Tongyi Lab

Mar. 2025-Jan. 2026

- Developed a campus AI agent for HKUST(GZ) students and staff, integrating planning, retrieval, and execution modules to support academic and administrative tasks, including enrollment recommendation, supervisor matching, policy clarification, and career planning
- Implemented hybrid retrieval with knowledge graph and hierarchical chunking, fusing public web data with private campus documents to handle both in-domain and out-of-domain queries; Deployed OpenClaw adapted to campus websites for conversational task execution (report submission, room scheduling, class enrollment), with memory constructed from secure scraping of user campus data

Publications

- [1] **Towards Universal Video Retrieval: Generalizing Video Embedding via Synthesized Multimodal Pyramid Curriculum** [Paper] [Page]
Zhuoning Guo, Mingxin Li, Yanzhao Zhang, Dingkun Long, Pengjun Xie, Xiaowen Chu
 Proceedings of the 34th ACM International Conference on Multimedia 2026
- [2] **Demystifying Spatial-temporal Scaling Laws of Multimodal Video Embeddings**
Zhuoning Guo, Tingyu Song, Mingxin Li, Yanzhao Zhang, Dingkun Long, Pengjun Xie, Xiaowen Chu
 arXiv preprint
- [3] **GPU-accelerated Multi-relational Parallel Graph Retrieval for Web-scale Recommendations** [Paper]
Zhuoning Guo, Guangxing Chen, Qian Gao, Xiaochao Liao, Jianjia Zheng, Lu Shen, Hao Liu
 Proceedings of the ACM on Web Conference 2026
- [4] **HiFGL: A Hierarchical Framework for Cross-silo Cross-device Federated Graph Learning** [Paper]
Zhuoning Guo, Duanyi Yao, Qiang Yang, Hao Liu
 Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2024 (Oral)
- [5] **Talent Demand-Supply Joint Prediction with Dynamic Heterogeneous Graph Enhanced Meta-Learning** [Paper]
Zhuoning Guo, Hao Liu, Le Zhang, Qi Zhang, Hengshu Zhu, Hui Xiong
 Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2022 (Oral)
- [6] **Labor Migration Modeling through Large-scale Job Query Data** [Paper]
Zhuoning Guo, Le Zhang, Hengshu Zhu, Weijia Zhang, Hui Xiong, Hao Liu
 Advances in Knowledge Discovery and Data Mining: 28th Pacific-Asia Conference on Knowledge Discovery and Data Mining 2025 (Oral)
- [7] **Against Multifaceted Graph Heterogeneity via Asymmetric Federated Prompt Learning** [Paper]
Zhuoning Guo, Ruiqian Han, Hao Liu
 ECML-PKDD 2026
- [8] **Discrepant Homophily Co-Preserved Graph Convolutional Network for Labor Migration Forecasting** [Paper]
Zhuoning Guo, Le Zhang, Hengshu Zhu, Weijia Zhang, Hui Xiong, Hao Liu
 Workshop of Talent Management Computing (TMC) at SIGKDD 2024
- [9] **Convergence-aware Clustered Federated Graph Learning Framework for Collaborative Inter-company Labor Market Forecasting** [Paper]
Zhuoning Guo, Hao Liu, Le Zhang, Qi Zhang, Hengshu Zhu, Hui Xiong
 arXiv preprint
- [10] **Rethinking Composed Image Retrieval Evaluation: A Fine-Grained Benchmark from Image Editing** [Paper]
Tingyu Song, Yanzhao Zhang, Mingxin Li, Zhuoning Guo, Dingkun Long, Pengjun Xie, Siyue Zhang, Yilun Zhao, Shu Wu
 Proceedings of the 64th Annual Meeting of the Association for Computational Linguistics 2026
- [11] **VimRAG: Navigating Massive Visual Context in Retrieval-Augmented Generation via Multimodal Memory Graph** [Paper] [Code]
Qiuchen Wang, Shihang Wang, Yu Zeng, Qiang Zhang, Fanrui Zhang, Zhuoning Guo, Bosi Zhang, Wenxuan Huang, Lin Chen, Zehui Chen, Pengjun Xie, Ruixue Ding
 Proceedings of the 43rd International Conference on Machine Learning 2026
- [12] **Human Mobility Modeling During the COVID-19 Pandemic via Deep Graph Diffusion Infomax** [Paper]
Yang Liu, Yu Rong, Zhuoning Guo, Nuo Chen, Tingyang Xu, Fuguee Tsung, Jia Li
 Proceedings of the Thirty-Seventh AAAI Conference on Artificial Intelligence 2023

[13]

A Cross-View Hierarchical Graph Learning Hypernetwork for Skill Demand-Supply Joint Prediction
*Wen Shuo Chao, Zhaopeng Qiu, Likang Wu, **Zhuoning Guo**, Zhi Zheng, Hengshu Zhu, Hao Liu*
Proceedings of the Thirty-Eighth AAAI Conference on Artificial Intelligence 2024 **(Oral)**

[Paper]

[14]

Aesthetics++: Refining Graphic Designs by Exploring Design Principles and Human Preference
*Wenyuan Kong, Zhaoyun Jiang, Shizhao Sun, **Zhuoning Guo**, Weiwei Cui, Ting Liu, Jian-Guang Lou, Dongmei Zhang*
IEEE Transactions on Visualization & Computer Graphics

[Paper]

Visits

The Hong Kong University of Science and Technology	<i>Hong Kong, China</i>
VISITING PH.D. STUDENT	<i>Jan. 2024 - Aug. 2024</i>
• Affiliated to the Department of Computer Science and Engineering during the visiting period	
University of Cambridge	<i>Cambridge, England, UK</i>
VISITING UNDERGRADUATE	<i>Jan. 2020 - Feb. 2020</i>
• Supported by the scholarship from Harbin Institute of Technology (HIT) for the undergraduate visiting program	

Awards

2014.11	First Award, Junior High School, National Olympiad in Informatics in Provinces (NOIP) , Independent Recruitment Admission Qualification of Fuzhou No.1 High School	<i>Fujian, China</i>
2016.11	First Award, Senior High School, National Olympiad in Informatics in Provinces (NOIP) , Independent Recruitment Admission Qualification of Harbin Institute of Technology	<i>Fujian, China</i>
2020.03	Finalist (Top 1%), Mathematical Contest in Modeling (MCM) , Team Leader	<i>International</i>
2020.08	Special Award (Top 4), National IoT Competition (Northeast Region) , Team Leader	<i>Northeast China</i>
2019.10	First Award, Contemporary Undergraduate Mathematical Contest in Modeling , Team Leader	<i>China</i>

Honors

2025	Outstanding Reviewer , SIGKDD 2025	<i>International</i>
2019	Outstanding CLP Member , Harbin Institute of Technology	<i>University</i>
2020	Outstanding Student Cadre , Harbin Institute of Technology	<i>University</i>

Services

2025	Session Chair , SIGKDD 2025	<i>International</i>
2022-2025	Conference Reviewer , SIGKDD, NeurIPS, ICLR, ICML, WebConf, IJCAI, ICDM	<i>International</i>
2024-2025	Journal Reviewer , TOIS, TCSVT, Information Science	<i>International</i>
2023	Teaching Assistant , AIAA 5028: Machine Learning on Graphs at HKUST(GZ)	<i>University</i>
2026	Teaching Assistant , UFUG 2602: Data Structure and Algorithm Design at HKUST(GZ)	<i>University</i>
2020-2022	Chairman , HIT Massive Data Club	<i>Laboratory</i>
2020-2022	Captain , The Football Team of the Faculty of Computing	<i>Department</i>
2019-2022	President , HIT Chess Club	<i>Organization</i>

Volunteers

The Innovation & Entrepreneurship Education Alliance of China	<i>Harbin, Heilongjiang, China</i>
CONFERENCE VOLUNTEER	<i>Oct. 2019</i>
• Supported the annual national conference hosted by Harbin Institute of Technology, engaging with academic and industry stakeholders.	
Rural Primary School	<i>Shangri-La, Yunnan, China</i>
TEACHING VOLUNTEER	<i>Jan. 2019 - Feb. 2019</i>
• Delivered foundational lessons to students in an underserved rural community, emphasizing clarity and accessibility in knowledge transfer.	

Skills

Languages (English)	IELTS 6.5 (5.5) at Aug. 2021
Programming Languages	Python (Recently), C/C++, Java, Bash, C#
Frameworks & Tools	PyTorch (-Lightning), Transformers, Deepspeed, vLLM, Pandas, DGL, PyG, NetworkX, ...