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Xin Liu

Senior Applied Scientist, Amazon Search/A9

**Job Duties:** Research and Development on E-commerce Foundation Model and Agentic Capability

## Education

- Aug. 2018 - July 2023    📌 **Ph.D. Degree** at Department of Computer Science and Engineering, Hong Kong University of Science and Technology, Hong Kong SAR, supervised by [Prof. Yangqiu Song](#)
- Aug. 2014 - June 2018    📌 **B.E. Degree** at Department of Computer Science, Sun Yat-sen University, China, supervised by [Prof. Rong Pan](#)

## Experience

### Fulltime

- Aug. 2023 - Present    📌 **Applied Scientist – Senior Applied Scientist (Foundation Model)** [Manager: [Dr. Qingyu Yin](#)] Store Foundational AI, Amazon Search, Palo Alto, United States.
- Pre-training & Annealing: Architected the complete data recipes and training strategies for (dense & sparse) foundational models from scaling laws to the real scale, covering the full lifecycle from pre-training from scratch to continual pre-training and annealing.
  - Post-training & Alignment: Spearheaded alignment and fine-tuning processes during the post-training phase to refine instruction following, instruction decomposition, conversational flow, reasoning, and shopping missions, from the view of input structures, capability taxonomy, and data efficiency.
  - Generative AI Application: Played a pivotal role in developing Amazon's first generative AI model and application, Rufus, by designing and implementing its online prompting platform and the end-to-end debugging environment.
  - Development & Optimization: Managed data recipes and lr schedules to improve model stability and performance in pre-training and post-training, investigated the data curriculum, compositional instruction decomposition, prompt structures in alignment, optimized the generation efficiency by decomposition and caching in inference.

### Internship

- June 2022 - Dec. 2022    📌 **Research Intern (Search)** [Mentor: [Dr. Zheng Li](#)], Search Mission Understanding, Amazon Search, Palo Alto, United States.
- Jan. 2018 - July 2018    📌 **Research Assistant (Text Mining)** [Mentor: [Prof. Yangqiu Song](#)], Knowledge Computation Group, Hong Kong University of Science and Technology, Hong Kong SAR.
- June 2017 - Dec. 2017    📌 **Research Intern (Cloud Graph Database)** [Mentor: [Dr. Liang Jeff Chen](#)], Systems Research Group, Microsoft Research Asia, Beijing, China.

### Academic

- 📌 **Journal Reviewer:** DMKD'23 TKDE'22,'23
- 📌 **Program Committee Member:** CIKM'19,'21,'22,'23 IJCAI'21,'22,'23 AAAI'21,'22,'23,'24 NAACL'22 ACL ARR'22,'23,'24,'25 ICML'22,'24 SIGKDD'22,'23,'24 NeurIPS'22,'23,'24,'25 ICLR'24 COLM'24,'25
- 📌 **External Reviewer:** ACL'19 EMNLP'19 IJCAI'19,'20 SIGKDD'19,'20,'21

## Experience (continued)

■ Volunteer: Baidu World Conference'16 IJCAI'18,'19,'20 NAACL'19 SIGKDD'20

## Publications

\* means equal contribution.

### Journal Articles

- 1 Zhongwei Wan, **Xin Liu**, Benyou Wang, Jiezhong Qiu, Boyu Li, Ting Guo, Guangyong Chen and Yang Wang. 'Spatio-Temporal Contrastive Learning Enhanced GNNs for Session-based Recommendation', 2023.
- 2 Hongming Zhang\*, **Xin Liu\***, Haojie Pan\*, Haowen Ke, Jiefu Ou, Tianqing Fang and Yangqiu Song. 'ASER: Towards Large-scale Commonsense Knowledge Acquisition via Higher-order Selectional Preference over Eventualities'. *Artificial Intelligence (AIJ)*, 2022.

### Conference Publications

- 1 Weiqi Wang, Limeng Cui, **Xin Liu**, Sreyashi Nag, Wenju Xu, Chen Luo, Sheikh Muhammad Sarwar, Yang Li, Hansu Gu, Hui Liu et al. 'EcomScriptBench: A multi-task benchmark for e-commerce script planning via step-wise intention-driven product association'. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2025.
- 2 Fengran Mo, Yifan Gao, Chuan Meng, **Xin Liu**, Zhuofeng Wu, Kelong Mao, Zhengyang Wang, Pei Chen, Zheng Li, Xian Li et al. 'UniConv: Unifying Retrieval and Response Generation for Large Language Models in Conversations'. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2025.
- 3 Siqi Guo, Ilgee Hong, Vicente Balmaseda, Changlong Yu, Liang Qiu, **Xin Liu**, Haoming Jiang, Tuo Zhao and Tianbao Yang. 'Discriminative Finetuning of Generative Large Language Models without Reward Models and Human Preference Data'. In *Proceedings of the International Conference on Machine Learning (ICML)*. 2025.
- 4 Zhihan Zhang, Shiyang Li, Zixuan Zhang, **Xin Liu**, Haoming Jiang, Xianfeng Tang, Yifan Gao, Zheng Li, Haodong Wang, Zhaoxuan Tan et al. 'IHEval: Evaluating language models on following the instruction hierarchy'. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*. 2025.
- 5 Yuchen Zhuang, Jingfeng Yang, Haoming Jiang, **Xin Liu**, Kewei Cheng, Sanket Lokegaonkar, Yifan Gao, Qing Ping, Tianyi Liu, Binxuan Huang et al. 'Hephaestus: Improving Fundamental Agent Capabilities of Large Language Models through Continual Pre-Training'. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*. 2025.
- 6 Chunkit Chan, Cheng Jiayang, Yauwai Yim, Zheyang Deng, Wei Fan, Haoran Li, **Xin Liu**, Hongming Zhang, Weiqi Wang and Yangqiu Song. 'NegotiationToM: A Benchmark for Stress-testing Machine Theory of Mind on Negotiation Surrounding'. In *Findings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2024.
- 7 Baixuan Xu, Weiqi Wang, Haochen Shi, Wenxuan Ding, Huihao Jing, Tianqing Fang, Jiaxin Bai, **Xin Liu**, Changlong Yu, Zheng Li et al. 'MIND: Multimodal Shopping Intention Distillation from Large Vision-language Models for E-commerce Purchase Understanding'. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2024.
- 8 Wenxuan Ding, Weiqi Wang, Sze Kwok, Minghao Liu, Tianqing Fang, Jiaxin Bai, **Xin Liu**, Changlong Yu, Zheng Li, Chen Luo et al. 'IntentionQA: A Benchmark for Evaluating Purchase Intention Comprehension Abilities of Language Models in E-commerce'. In *Findings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2024.
- 9 Changlong Yu\*, **Xin Liu\***, Jefferson Maia, Tianyu Cao, Yang Li, Yifan Gao, Yangqiu Song, Rahul Goutam, Haiyang Zhang, Bing Yin and Zheng Li\*. 'COSMO: A large-scale e-commerce common sense knowledge generation and serving system at Amazon'. In *Proceedings of the ACM SIGMOD International Conference on Management of Data (SIGMOD)*. 2024.
- 10 Yilun Jin, Zheng Li, Chenwei Zhang, Tianyu Cao, Yifan Gao, Pratik Jayarao, Mao Li, **Xin Liu**, Ritesh Sarkhel, Xianfeng Tang et al. 'Shopping mmlu: A massive multi-task online shopping benchmark for large language models'. In *Conference on Neural Information Processing Systems, Datasets and Benchmarks Track (NeurIPS)*. 2024.
- 11 Chunkit Chan, Jiayang Cheng, **Xin Liu**, Yauwai Yim, Yuxin Jiang, Zheyang Deng, Haoran Li, Yangqiu Song, Ginny Wong and Simon See. 'Audience Persona Knowledge-Aligned Prompt Tuning Method for Online Debate'. In *Proceedings of the European Conference on Artificial Intelligence (ECAI)*. 2024.
- 12 Chunkit Chan, Jiayang Cheng, Weiqi Wang, Yuxin Jiang, Tianqing Fang, **Xin Liu** and Yangqiu Song. 'Exploring the potential of ChatGPT on sentence level relations: A focus on temporal, causal, and discourse relations'. In *Findings of the European Chapter of the Association for Computational Linguistics (EACL)*. 2024.

- 13 Zizheng Lin, Chunkit Chan, Yangqiu Song and **Xin Liu**. ‘Constrained reasoning chains for enhancing theory-of-mind in large language models’. In *Pacific Rim International Conference on Artificial Intelligence (PRICAI)*. Springer Nature Singapore Singapore, 2024.
- 14 Jiaxin Bai, Yicheng Wang, Tianshi Zheng, Yue Guo, **Xin Liu** and Yangqiu Song. ‘Advancing Abductive Reasoning in Knowledge Graphs through Complex Logical Hypothesis Generation’. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 15 Zhaowei Wang, Wei Fan, Qing Zong, Hongming Zhang, Sehyun Choi, Tianqing Fang, **Xin Liu**, Yangqiu Song, Ginny Y. Wong and Simon See. ‘AbsInstruct: Eliciting Abstraction Ability from LLMs through Explanation Tuning with Plausibility Estimation’. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 16 Haoran Li, Dadi Guo, Donghao Li, Wei Fan, Qi Hu, **Xin Liu**, Chunkit Chan, Duanyi Yao and Yangqiu Song. ‘PrivLM-Bench: A Multi-level Privacy Evaluation Benchmark for Language Models’. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 17 Weiqi Wang, Tianqing Fang, Chunyang Li, Haochen Shi, Wenxuan Ding, Baixuan Xu, Zhaowei Wang, Jiaxin Bai, **Xin Liu**, Cheng Jiayang, Chunkit Chan and Yangqiu Song. ‘CANDLE: Iterative Conceptualization and Instantiation Distillation from Large Language Models for Commonsense Reasoning’. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 18 Zhaowei Wang, Haochen Shi, Weiqi Wang, Tianqing Fang, Hongming Zhang, Sehyun Choi, **Xin Liu** and Yangqiu Song. ‘AbsPyramid: Benchmarking the Abstraction Ability of Language Models with a Unified Entailment Graph’. In *Findings of the Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)*. 2024.
- 19 Jiayang Cheng, Lin Qiu, Chunkit Chan, **Xin Liu**, Yangqiu Song and Zheng Zhang. ‘EventGround: Narrative Reasoning by Grounding to Eventuality-centric Knowledge Graphs’. In *Proceedings of the International Conference on Computational Linguistics (COLING)*. 2024.
- 20 Chunkit Chan, Jiayang Cheng, Weiqi Wang, Yuxin Jiang, Tianqing Fang, **Xin Liu** and Yangqiu Song. ‘ChatGPT Evaluation on Sentence Level Relations: A Focus on Temporal, Causal, and Discourse Relations’. In *Findings of the European Chapter of the Association for Computational Linguistics (EACL)*. 2024.
- 21 Weiqi Wang\*, Tianqing Fang\*, Wenxuan Ding, Baixuan Xu, **Xin Liu**, Yangqiu Song and Antoine Bosselut. ‘CAR: Conceptualization-Augmented Reasoner for Zero-Shot Commonsense Question Answering’. In *Findings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2023.
- 22 Haochen Shi\*, Weiqi Wang\*, Tianqing Fang, Baixuan Xu, Wenxuan Ding, **Xin Liu** and Yangqiu Song. ‘QaDynamics: Training Dynamics-Driven Synthetic QA Diagnostic for Zero-Shot Commonsense Question Answering’. In *Findings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2023.
- 23 Zheyang Deng, Weiqi Wang, Zhaowei Wang, **Xin Liu** and Yangqiu Song. ‘Gold: A Global and Local-aware Denoising Framework for Commonsense Knowledge Graph Noise Detection’. In *Conference on Neural Information Processing Systems (NeurIPS)*. 2023.
- 24 **Xin Liu**, Zheng Li, Yifan Gao, Jingfeng Yang, Tianyu Cao, Zhengyang Wang, Bing Yin and Yangqiu Song. ‘Enhancing User Intent Capture in Session-Based Recommendation with Attribute Patterns’. In *Conference on Neural Information Processing Systems (NeurIPS)*. 2023.
- 25 Jiaxin Bai, **Xin Liu**, Weiqi Wang, Chen Luo and Yangqiu Song. ‘Complex Eventuality Reasoning with Implicit Logical Constraints’. In *Conference on Neural Information Processing Systems (NeurIPS)*. 2023.
- 26 Hejie Cui, Xinyu Fang, Zihan Zhang, Ran Xu, Xuan Kan, **Xin Liu**, Yue Yu, Manling Li, Yangqiu Song and Carl Yang. ‘Open Visual Knowledge Extraction via Relation-Oriented Multimodality Model Prompting’. In *Conference on Neural Information Processing Systems (NeurIPS)*. 2023.
- 27 Chunkit Chan, **Xin Liu**, Tsz Ho Chan, Jiayang Cheng, Yangqiu Song, Ginny Y. Wong and Simon See. ‘Self-Consistent Narrative Prompts on Abductive Natural Language Inference’. In *Proceedings of the Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics (AACL)*. 2023.
- 28 Chunkit Chan\*, **Xin Liu**\*, Jiayang Cheng, Zihan Li, Yangqiu Song, Ginny Y. Wong and Simon See. ‘DiscoPrompt: Path Prediction Prompt Tuning for Implicit Discourse Relation Recognition’. In *Findings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2023.
- 29 Changlong Yu, Weiqi Wang, **Xin Liu**, Jiaxin Bai, Yangqiu Song, Zheng Li, Yifan Gao, Tianyu Cao and Bing Yin. ‘FolkScope: Intention Knowledge Graph Construction for Discovering E-commerce Commonsense’. In *Findings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2023.
- 30 Huiru Xiao, **Xin Liu**, Yangqiu Song, Ginny Y. Wong and Simon See. ‘Complex Hyperbolic Knowledge Graph Embeddings with Fast Fourier Transform’. In *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2022.

- 31 **Xin Liu**, Jiayang Cheng, Yangqiu Song and Xin Jiang. ‘Boosting Graph Structure Learning with Dummy Nodes’. In *Proceedings of the International Conference on Machine Learning (ICML)*. 2022.
- 32 **Xin Liu** and Yangqiu Song. ‘Graph Convolutional Networks with Dual Message Passing for Subgraph Isomorphism Counting and Matching’. In *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*. 2022.
- 33 **Xin Liu**, Jiefu Ou, Yangqiu Song and Xin Jiang. ‘Exploring Discourse Structures for Argument Impact Classification’. In *Proceedings of the Annual Meeting of the Association for Computational Linguistics (ACL)*. 2021.
- 34 **Xin Liu**, Haojie Pan, Mutian He, Yangqiu Song, Xin Jiang and Lifeng Shang. ‘Neural Subgraph Isomorphism Counting’. In *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*. 2020.
- 35 **Xin Liu**, Jiefu Ou, Yangqiu Song and Xin Jiang. ‘On the Importance of Word and Sentence Representation Learning in Implicit Discourse Relation Classification’. In *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*. 2020.
- 36 Hongming Zhang\*, **Xin Liu**\*, Haojie Pan\*, Yangqiu Song and Cane Wing-Ki Leung. ‘ASER: A Large-scale Eventuality Knowledge Graph’. In *Proceedings of The Web Conference (WWW)*. 2020.
- 37 Huiru Xiao, **Xin Liu** and Yangqiu Song. ‘Efficient Path Prediction for Semi-Supervised and Weakly Supervised Hierarchical Text Classification’. In *Proceedings of The Web Conference (WWW)*. 2019.
- 38 Jie Huang, **Xin Liu** and Yangqiu Song. ‘Hyper-Path-Based Representation Learning for Hyper-Networks’. In *Proceedings of the ACM International Conference on Information and Knowledge Management (CIKM)*. 2019.
- 39 Yan Liang, **Xin Liu**, Jianwen Zhang and Yangqiu Song. ‘Relation Discovery with Out-of-Relation Knowledge Base as Supervision’. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.
- 40 Ziqian Zeng, Wenxuan Zhou, **Xin Liu** and Yangqiu Song. ‘A Variational Approach to Weakly Supervised Document-Level Multi-Aspect Sentiment Classification’. In *Proceedings of the Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.
- 41 Ziqian Zeng\*, **Xin Liu**\* and Yangqiu Song. ‘Biased Random Walk based Social Regularization for Word Embeddings’. In *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI)*. 2018.

## Awards

2022	■ HKUST RedBird Academic Excellence Award
2020	■ HKUST SENG Academic Award
	■ HKUST CSE Professor Samuel Chanson Best Teaching Assistant Award
2018	■ SYSU Outstanding Graduate
	■ SYSU Outstanding Graduate Thesis
	■ The First Prize, Guangdong Collegiate Programming Contest
2017	■ Meritorious Winner, Mathematical Contest in Modeling / Interdisciplinary Contest in Modeling
2015, 2016, 2017	■ National Scholarship ×3