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Xin Liu

Applied Scientist, Amazon.com

**Research Interests:** Machine Learning and Large Language Model Reasoning

## 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](#) GPA:3.9/4.3
- Aug. 2014 - June 2018    🎓 **B.E. Degree** at Department of Computer Science, Sun Yat-sen University, China, supervised by [Prof. Rong Pan](#) GPA:4.2/5.0

## 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 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 Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 2 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 Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 3 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 Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 4 Weiqi Wang, Tianqing Fang, Chunyang Li, Haochen Shi, Wenxuan Ding, Baixuan Xu, Zhaowei Wang et al. 'CANDLE: Iterative Conceptualization and Instantiation Distillation from Large Language Models for Commonsense Reasoning'. In *Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL)*. 2024.
- 5 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 2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics (Findings of NAACL)*. 2024.
- 6 Jiayang Cheng, Lin Qiu, Chunkit Chan, **Xin Liu**, Yangqiu Song and Zheng Zhang. 'EventGround: Narrative Reasoning by Grounding to Eventuality-centric Knowledge Graphs'. In *International Conference on Computational Linguistics (COLING)*. 2024.
- 7 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 European Chapter of the Association for Computational Linguistics (Findings-EACL)*. 2024.
- 8 Changlong Yu\*, **Xin Liu**\*, Jefferson Maia, Tianyu Cao, Yang Li, Yifan Gao, Yangqiu Song et al. 'COSMO: A large-scale e-commerce common sense knowledge generation and serving system at Amazon'. In *ACM SIGMOD International Conference on Management of Data (SIGMOD)*. 2024.
- 9 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 Association for Computational Linguistics (Findings of EMNLP)*. 2023.

- 10 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 Association for Computational Linguistics (Findings of EMNLP)*. 2023.
- 11 Zheyue 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.
- 12 **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.
- 13 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.
- 14 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.
- 15 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 *Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics (AACL)*. 2023.
- 16 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 Annual Meeting of the Association for Computational Linguistics (Findings of ACL)*. 2023.
- 17 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 Annual Meeting of the Association for Computational Linguistics (Findings of ACL)*. 2023.
- 18 Huiru Xiao, **Xin Liu**, Yangqiu Song, Ginny Y. Wong and Simon See. ‘Complex Hyperbolic Knowledge Graph Embeddings with Fast Fourier Transform’. In *Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP)*. 2022.
- 19 **Xin Liu**, Jiayang Cheng, Yangqiu Song and Xin Jiang. ‘Boosting Graph Structure Learning with Dummy Nodes’. In *Proceedings of International Conference on Machine Learning (ICML)*. 2022.
- 20 **Xin Liu** and Yangqiu Song. ‘Graph Convolutional Networks with Dual Message Passing for Subgraph Isomorphism Counting and Matching’. In *Proceedings of AAAI Conference on Artificial Intelligence (AAAI)*. 2022.
- 21 **Xin Liu**, Jiefu Ou, Yangqiu Song and Xin Jiang. ‘Exploring Discourse Structures for Argument Impact Classification’. In *Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL)*. 2021.
- 22 **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.
- 23 **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 International Joint Conference on Artificial Intelligence (IJCAI)*. 2020.
- 24 Hongming Zhang\*, **Xin Liu**\*, Haojie Pan\*, Yangqiu Song and Cane Wing-Ki Leung. ‘ASER: A Large-scale Eventuality Knowledge Graph’. In *The Web Conference (WWW)*. 2020.
- 25 Huiru Xiao, **Xin Liu** and Yangqiu Song. ‘Efficient Path Prediction for Semi-Supervised and Weakly Supervised Hierarchical Text Classification’. In *The Web Conference (WWW)*. 2019.
- 26 Jie Huang, **Xin Liu** and Yangqiu Song. ‘Hyper-Path-Based Representation Learning for Hyper-Networks’. In *Proceedings of ACM International Conference on Information and Knowledge Management (CIKM)*. 2019.
- 27 Yan Liang, **Xin Liu**, Jianwen Zhang and Yangqiu Song. ‘Relation Discovery with Out-of-Relation Knowledge Base as Supervision’. In *Proceedings of Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.
- 28 Ziqian Zeng, Wenxuan Zhou, **Xin Liu** and Yangqiu Song. ‘A Variational Approach to Weakly Supervised Document-Level Multi-Aspect Sentiment Classification’. In *Proceedings of Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies (NAACL)*. 2019.
- 29 Ziqian Zeng\*, **Xin Liu**\* and Yangqiu Song. ‘Biased Random Walk based Social Regularization for Word Embeddings’. In *Proceedings of International Joint Conference on Artificial Intelligence (IJCAI)*. 2018.

## Preprints and Manuscripts

- 1 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'. 2024.
- 2 **Xin Liu**, Weiqi Wang, Jiaxin Bai and Yangqiu Song. 'Towards Subgraph Isomorphism Counting with Graph Kernels'. 2023.
- 3 Chunkit Chan, **Xin Liu**, Jiayang Cheng, Yuxin Jiang, Yangqiu Song, Ginny Wong and Simon See. 'Persona Knowledge-Aligned Prompt Tuning Method for Online Debate'. 2023.

## 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

## Experience

### Fulltime

Aug. 2023 - Present ■ **Applied Scientist (Foundation)** [Manager: [Dr. Qingyu Yin](#)], Store Foundational AI, Amazon Search, Palo Alto, United States.

### 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](#)], Cloud & Mobile 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 ICML'22,24 SIGKDD'22,23,24 NeurIPS'22,23,24 ICLR'24 COLM'24
- **External Reviewer:** ACL'19 EMNLP'19 IJCAI'19,20 SIGKDD'19,20,21
- **Volunteer:** Baidu World Conference'16 IJCAI'18,19,20 NAACL'19 SIGKDD'20

## Projects

2022 ■ FolkScope (open-source version on [GitHub](#)) and improved COSMO: the first commonsense knowledge graph for Amazon built upon co-purchase data (during the internship at Amazon Search)

2017 ■ GraphView (open-source version on [GitHub](#)): the first distributed graph database, which is an important part of Microsoft Azure (during the internship at MSRA)