Chen Ling

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PRINCIPAL INTERESTS

My research focuses on data mining and applying machine learning techniques to handle real-world problems. More concretely, my works can be divided into two streams. *1) Data Mining on Graphs:* Deep Graph Generation, Graph Representation Learning, and Graph Inverse Problem; *2)* Large Language Model: Customizing large language models into domain-specific applications; and *3) Neural Machine Reasoning:* Analogical Reasoning, Case-based Reasoning, and Commonsense Reasoning.

ACADEMIC BACKGROUND

Ph.D. Computer Science 2020 - present
Emory University, Atlanta, GA

- Ph.D. research in graph data mining under supervision of Professor Liang Zhao.
- Conducted research in *graph data mining* and *neural machine reasoning* with demonstrated publication history in top-tier conferences, including ICML, KDD, ICLR, EMNLP, theWebConf, ICDM, SDM, and ECML-PKDD.

M.Sc. Computer Sciences 2018 - 2020
University of Delaware, Newark, DE

- Conducted research in the area of social network analysis and time series analysis with demonstrated publication in top-tier conferences.

B.Sc. Computer Science 2014 - 2017
University of Vermont, Burlington, VT

- Recipient of Global Gateway Academic Achievement Scholarship, 2015
- Recipient of International Student Accomplishment Scholarship, 2014

SPECIAL ACHIEVEMENTS

Awards and Invited Talks

- *Student Travel Award.* SDM 2024
- *Professional Development Funding.* $2,500, Emory University
- *ICDM Student Travel/Attendance Award.* 2021, 2022.
- *National Science Foundation Student Travel Award.* 2022.
- *ICDM Best Paper Candidate*, for "Deep Generation of Heterogeneous Networks", 21st IEEE International Conference on Data Mining, 2021.
- SIGNET Seminar at the University of Delaware, *NesTPP: Modeling Thread Dynamics in Online Discussion Forums*, Newark, DE, 2019.
- *Dean's List of Computer Science Department*, for "students achieved top-10% GPA", the University of Vermont, 2015, 2016.
- *Global Gateway Achievement Scholarship* for "Campus-wide Academic Achievement", $30,000 for three consecutive years, the University of Vermont, 2015.
- *International Student Accomplishment Scholarship* for "Academic Achievement", $10,000, the University of Vermont, 2014.

Academic Service

- **Organizer**: LLM4Bio at AAAI 2024

- **Reviewer**: KDD (2022, 2023, 2024), NeurIPS (2022, 2023), EMNLP (2023), NAACL (2024), WSDM (2024)
- **Program Committee**: DLG-KDD (2020, 2021, 2022), DLG-AAAI (2021, 2022, 2023), UDM-AAAI (2023), ECML-PKDD (2022)

SELECTED PUBLICATIONS

A full list is available at my Google Scholar page.

Conference Publications

19. [**NeurIPS 2024**] Guangji Bai, Yijiang Li, **Chen Ling**, Kibaek Kim, and Liang Zhao. SparseLLM: Towards Global Pruning of Pre-trained Language Model. *Thirty-eighth Annual Conference on Neural Information Processing Systems.* Vancouver, Canada, 2024.
18. [**NeurIPS 2024**] Zhuofeng Li, Zixing Gou, Xiangnan Zhang, Zhongyuan Liu, Sirui Li, Yuntong Hu, **Chen Ling**, Zheng Zhang, and Liang Zhao. TEG-DB: A Comprehensive Dataset and Benchmark of Textual-Edge Graphs. *Thirty-eighth Annual Conference on Neural Information Processing Systems.* Vancouver, Canada, 2024.
17. [**ICDM 2024**] Mingchen Li, **Chen Ling**, Rui Zhang and Liang Zhao. A Condensed Transition Graph Framework for Zero-shot Link Prediction with Large Language Models. *The 24th IEEE International Conference on Data Mining.* Abu Dhabi, UAE, 2024.
16. [**KDD 2024**] **Chen Ling**, Tanmoy Chowdhury, Jie Ji, Sirui Li, Andreas Zufle, Liang Zhao. Source Localization for Cross Network Information Diffusion. *The 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining.* Barcelona, Spain, 2024.
15. [**ACL 2024**] Yifei Zhang, Bo Pan, **Chen Ling**, Yuntong Hu, Liang Zhao. ELAD: Explanation-Guided Large Language Models Active Distillation. *The 62nd Annual Meeting of the Association for Computational Linguistics.* Bangkok, Thailand, 2024.
14. [**NAACL 2024**] **Chen Ling**, Xujiang Zhao, Wei Cheng, Yanchi Liu, Yiyou Sun, Xuchao Zhang, Takao Osaki, Katsushi Matsuda, Liang Zhao, Haifeng Chen. Uncertainty Decomposition and Quantification for In-Context Learning of Large Language Models. *2024 Annual Conference of the North American Chapter of the Association for Computational Linguistics.* Mexico City, 2024.
13. [**AISTATS 2024**] Nguyen Do, Tanmoy Chowdhury, **Chen Ling**, Liang Zhao, My T. Thai. MIM-Reasoner: Learning with Theoretical Guarantees for Multiplex Influence Maximization. *The 27th International Conference on Artificial Intelligence and Statistics.* Valencia, Spain, 2024.
12. [**SDM 2024**] Junruo Gao, **Chen Ling**, Carl Yang, Liang Zhao. Helper Recommendation with Seniority Control in Online Health Community. *2024 SIAM International Conference on Data Mining.* Houston, TX, 2023.
11. [**EMNLP 2023**] **Chen Ling**, Xuchao Zhang, Xujiang Zhao, Yanchi Liu, Wei Cheng, Takao Osaki, Haifeng Chen, Liang Zhao. Open-ended Commonsense Reasoning with Unrestricted Answer Candidates. *The 2023 Conference on Empirical Methods in Natural Language Processing.* Singapore, 2023.
10. [**ICML 2023**] **Chen Ling**, Junji Jiang, Junxiang Wang, My Thai, Lukas Xue, James Song, Meikang Qiu, Liang Zhao. Deep Graph Representation Learning and Optimization for Influence Maximization. *Fortieth International Conference on Machine Learning.* Hawaii, 2023.

9. [**ICLR 2023**] **Chen Ling***, Guangji Bai*, Liang Zhao. Temporal Domain Generalization with Drift-Aware Dynamic Neural Networks. *The Eleventh International Conference on Learning Representations.* Kigali, Rwanda, 2023. [**Oral Presentation**: Top-5% among all accepted papers.]
8. [**SDM 2023**] Guangji Bai, **Chen Ling**, Yuyang Gao, Liang Zhao. Saliency-Augmented Memory Completion for Continual Learning. *2023 SIAM International Conference on Data Mining.* Minneapolis, MN, 2023.
7. [**ICDM 2022**] **Chen Ling**, Tanmoy Chowdhury, Junji Jiang, Junxiang Wang, Xuchao Zhang, Haifeng Chen, and Liang Zhao. DeepGAR: Deep Graph Learning for Analogical Reasoning. *The 22nd IEEE International Conference on Data Mining..* Orlando, FL, 2022.
6. [**ECML-PKDD 2022**] **Chen Ling**, Henning Cao, and Liang Zhao. STGEN: Deep Continuous-time Spatiotemporal Graph Generation. *The 2022 European Conference on Machine Learning and Principles Discovery in Databases..* Grenoble, France, 2022.
5. [**KDD 2022**] **Chen Ling**, Junji Jiang, Junxiang Wang, and Liang Zhao. SL-VAE: Variational Autoencoder for Source Localization in Graph Information Diffusion. *The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining.* Washington, D.C., 2022.
4. [**ICDM 2021**] **Chen Ling**, Carl Yang, and Liang Zhao. Deep Generation of Heterogeneous Networks. *The 21st IEEE International Conference on Data Mining.* Online, 2021. [**Best Paper Candidate**]
3. [**WWW 2021**] Liming Zhang, Liang Zhao, Shan Qin, Dieter Pfoser, and **Chen Ling**. TG-GAN: Continuous-time Temporal Graph Deep Generative Models with Time-Validity Constraints. *The 30th International World Wide Web Conference.* Online, 2021.
2. [**ICME 2021**] **Chen Ling**, Di Cui, Guangmo Tong, and Jianmin Zhu. On Forecasting Dynamics in Online Discussion Forums. *The 21st IEEE Multimedia and Expo.* Online, 2021.
1. [**HT 2020**] **Chen Ling**, Mozi Chen, and Guangmo Tong. NesTPP: Modeling Information Diffusion in Online Discussion Forum. *The 31st ACM Hypertext.* Online, 2020.

Journal Publications

3. (**Neural Network**) Tanmoy Chowdhury, **Chen Ling**, Junji Jiang, Junxiang Wang, My T. Thai, Liang Zhao. Deep graph representation learning influence maximization with accelerated inference. *Neural Network*, Volume 180, 2024, 106649.
2. (**FBD**) Junji Jiang, **Chen Ling**, Hongyi Li, Guangji Bai, Xujiang Zhao, Liang Zhao. Quantifying Uncertainty in Graph Neural Network Explanations. *Frontiers in Big Data*, 2024, Accepted.
1. (**KAIS**) **Chen Ling**, Carl Yang, Liang Zhao. Motif-guided Heterogeneous Graph Deep Generation. *Knowledge and Information Systems*, 65.7 (2023): 3099-3124.

EMPLOYMENT HISTORY

Applied Scientist Intern 2024
Amazon Web Service, Security Analytics and AI Research, New York, NY

- Worked with Applied Scientists to design novel prompt techniques to generate security controls for AWS services. With GenAI, I successfully reduced the development time by 90% (from 247 days to 25 days).
- Collaborated with Security Engineers to design a set of rubrics to evaluate the quality of the generated security controls. I further developed an LLM-agent system to automatically make the evaluation.

Research Associate 2022, 2023
NEC Labs America, Data Science & System Security Group, Princeton, NJ

- Participated as a remote research contractor for various publication-oriented long-term projects. Mentor: Xuchao Zhang, Xujiang Zhao, Haifeng Chen
- Proposed to design a prompt-based natural language reasoning framework for commonsense QA tasks.
- Designed a Graph Neural Network-based framework with a customized optimization method for analogical reasoning.

Research Assistant 2020 - Present
Emory University, Atlanta, GA

- Leveraged deep generative models to generate complex structured data, including heterogeneous graph generation, temporal graph generation, and spatiotemporal graph generation.
- Leveraged deep graph representation learning to conduct network behavior analysis, including information diffusion source localization and influence maximization on social networks.
- Led several undergraduate computer science courses (Advanced Algorithm Analysis and Intro to Java Programming) as graduate TA and co-instructor.

Research Assistant 2018 - 2020
University of Delaware, Newark, DE

- Worked on several research projects in the area of social network rumor containment and information diffusion function modeling.
- Leveraged data-driven approaches to capture complex correlations between social cascades, and the results are published at ACM HT'20 entitled with *Nestpp: Modeling thread dynamics in online discussion forums.*
- Designed structure-preserving models with provable performance guarantees in social network dynamics prediction, and the results are published at IEEE ICME'21 entitled with *On Forecasting Dynamics In Online Discussion Forums.*

Research Intern 2018
iFLYTEK, Anhui, CHINA

- Worked as a Natural Language Processing (NLP) associate researcher at iFLYTEK's Research platform.
- Performed creation and optimization of machine & deep learning models for multi-label classification, label distribution prediction of MOOC test questions, and text similarity calculation. Increased classification accuracy of the multi-label classification from 66% to 89%.
- Organized weekly Paper Reading Club that includes more than 20 undergraduate and graduate students for sharing innovative research ideas and presenting state-of-the-art research papers.

Cognitive Solution Developer 2016
IBM, Burlington, VT

- Participated in a full-stack team to develop a cloud-based tone analyzer for image sentiment analysis using Watson Cognitive Cloud.
- Assisted senior software engineers in designing API interfaces in the development of the Watson Business Mobile App.
- Created and presented a computer vision project – Human Face Recognition using IBM Watson API in IBM's worldwide IBM Intern Conference.