Xujiang Zhao, Ph.D.

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Employment History

2022 - Present **Researcher.** NEC Laboratories America.

2021 Summer **Research Intern.** NEC Laboratories America.

2019 Summer **Research Intern.** Alibaba Damo Academy.

Education

2019 – 2022 **Ph.D. University of Texas at Dallas** in Computer Science.
Advisor: Prof. Feng Chen
Thesis title: *Multidimensional Uncertainty Quantification for Deep Neural Networks.*

2014 – 2017 **M.Sc. University of Science and Technology of China** in Computer Science.

2010 – 2014 **B.S. Chongqing University** in Civil Engineering.

Research Interests

- Large Language Models: Reliable and Responsible LLM, Domain-Specific LLM, LLM Reasoning
- AI Safety: Uncertainty Quantification and Reasoning, Safe Alignment, Hallucination Detection
- TrustworthyAI: Fairness and Equity, Privacy-preserving, OOD Detection and Generalization
- AI4Science: Drug Discovery and Molecular Modeling, Uncertainty in Climate Projections

Research Project

- **Reliable and Responsible Large Language Models**
  Responsible and reliable LLMs are designed to generate safe, accurate, fair, and reliable outputs, particularly in scenarios where they may affect users' understanding or decision-making.

  Related Publication: ICLR 2025, NAACL 2024, ICLRW 2024, EMNLP 2024

- **Knowledge Enhanced Domain-Specific LLM**
  This project focuses on refining and adapting large language models (LLMs) to specialized domains through knowledge integration, model pruning, and structured reasoning.

  Related Publications: NAACL 2025, NAACL 2024, ACM Computing Survey'24, EMNLP 2023

- **Uncertainty Reasoning Machine Learning**
  This project emphasizes designing machine learning models that can provide and manage uncertainty in their predictions. By integrating mechanisms to quantify and respond to uncertainty, these models become more cautious and adaptable in unfamiliar scenarios, leading to safer and more reliable AI applications, particularly in high-stakes environments.

  Related Publication: SDM 2025, Frontiers in big Data 2024, ICASSP 2023, CIKM, 2022, ICDM 2022, ICASSP 2022, EMNLP 2021, NeurIPS 2020, Fusion 2019

- **Uncertainty Quantification and Decomposition in Machine Learning**
  This project aims to equip AI models with the ability to recognize and manage uncertainty in their predictions, enhancing their reliability and adaptability in dynamic environments.

  Related Publication: NeurIPS 2020 spotlight, AAAI 2021, AAAI 2019, IEEE Bidata 2019, IEEE Bidata 2018, ICDM 2018, MILCOM 2018

Research Publications

* : Denote equal contribution; *Students* : Denote students I supervise.

Journal Article

1. Ali Riahi Samani, **Xujiang Zhao**, Feng Chen. "*Distribution Shift, Generalization and OOD Challenge in Offline Reinforcement Learning: A comprehensive survey*." **Artificial Intelligence Review**, 2025.

2. Junji Jiang, *Chen Ling*, Hongyi Li, Guangji Bai, **Xujiang Zhao**, Liang Zhao. "*Quantifying Uncertainty in Graph Neural Network Explanations*." **Frontiers in big Data**, 2024.

3. Zhen Guo*, Zelin Wan*, Qisheng Zhang*, **Xujiang Zhao***, Feng Chen, Jin-Hee Cho, *et al., "A Survey on Uncertainty Reasoning and Quantification for Decision Making: Belief Theory Meets Deep Learning."* **Information Fusion** (Impact IF: 17.5), 2023.

Conference Proceedings

1. Jonathan Light, Yue Wu, Yiyou Sun, Wenchao Yu, Yanchi Liu, **Xujiang Zhao**, *et al.*, "*Scattered Forest Search: Smarter Code Space Exploration with LLMs*." In The Thirteenth International Conference on Learning Representations. **ICLR**, 2025.

2. Xinyuan Wang, Yanchi Liu, Wei Cheng, **Xujiang Zhao**, *et al.* "*MixLLM: Dynamic Routing in Mixed Large Language Models.*" In Proceedings of the 2025 Conference of the North American Chapter of the Association for Computational Linguistics. **NAACL**, 2025.

3. Xianjun Yang, Wei Cheng, **Xujiang Zhao**, *et al.*, "*Position Really Matters: Towards a Holistic Approach for Prompt Tuning*." in Findings of the Association for Computational Linguistics. **NAACL**, 2025.

4. *Ruomeng Ding*, **Xujiang Zhao**, Chen Zhao, *et al. "Evidence-Based Out-of-Distribution Detection on Multi-Label Graphs."* In Proceedings of the 2025 SIAM International Conference on Data Mining. **SDM**, 2025.

5. *Chen Ling*, **Xujiang Zhao**, Xuchao Zhang, *et al.* "*Uncertainty Quantification for In-Context Learning of Large Language Models.*" In Proceedings of the 2024 Conference of the North American Chapter of the Association for Computational Linguistics. **NAACL**, 2024.

6. Nan Zhang, Yanchi Liu, **Xujiang Zhao**, *et al., "Pruning as a Domain-Specific LLM Extractor,"* in Findings of the Association for Computational Linguistics. **NAACL**, 2024.

7. Yijia Xiao, Yiqiao Jin, Yushi Bai, Yue Wu, Xianjun Yang, Xiao Luo, Wenchao Yu, **Xujiang Zhao**, *et al.* "*Large Language Models Can be Good Privacy Protection Learners*." in Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing. **EMNLP**, 2024

8. Lin, Yujie, Chen Zhao, Minglai Shao, Baoluo Meng, **Xujiang Zhao**, and Haifeng Chen. "*Towards counterfactual fairness-aware domain generalization in changing environments.*" **IJCAI**, 2024.

9. Lin, Yujie, Chen Zhao, Minglai Shao, **Xujiang Zhao**, and Haifeng Chen. "*Adaptation Speed Analysis for Fairness-aware Causal Models.*" In Proceedings of the 32nd ACM International Conference on Information and Knowledge Management, **CIKM**, 2023.

10. *Shi, Weili*, *Xueying Yang*, **Xujiang Zhao**, Haifeng Chen, Zhiqiang Tao, and Sheng Li. "*Calibrate Graph Neural Networks under Out-of-Distribution Nodes via Deep Q-learning*." In Proceedings of the 32nd ACM International Conference on Information and Knowledge Management, **CIKM**, 2023.

11. *Chen Ling*, Xuchao Zhang, **Xujiang Zhao**, *et al., "Open-Ended Commonsense Reasoning with Unrestricted Answer Candidates,"* in Findings of the Association for Computational Linguistics: **EMNLP**, 2023

12. **Xujiang Zhao**, Xuchao Zhang, Chen Zhao, etc. *"Multi-Label Temporal Evidential Neural Networks for Early Event Detection."* In IEEE International Conference on Acoustics, Speech and Signal Processing, **ICASSP**, 2023.

13. **Xujiang Zhao***, Krishnateja Killamsetty*, Rishabh Iyer, Feng Chen. *"How Out-of-Distribution Data Hurts Semi-Supervised Learning."* In 2022 IEEE International Conference on Data Mining, **ICDM**, 2022

14. Xueying Yang, Jiamian Wang, **Xujiang Zhao**, Zhiqiang Tao. *"Calibrate Automated Graph Neural Network via Hyperparameter Uncertainty."* In Proceedings of the 31st ACM International Conference on Information and Knowledge Management, **CIKM**, 2022.

15. **Xujiang Zhao**, Xuchao Zhang, Wei Cheng, *et al.*. *"SEED: Sound Event Early Detection via Evidential Uncertainty"*. In IEEE International Conference on Acoustics, Speech and Signal Processing, **ICASSP**, 2022.

16. Haoliang Wang, Chen Zhao, **Xujiang Zhao**, Feng Chen. *"Layer Adaptive Deep Neural Networks for Out-of-distribution Detection"*. In Pacific-Asia Conference on Knowledge Discovery and Data Mining, **PAKDD**, 2022.

17. Krishnateja Killamsetty, **Xujiang Zhao**, Feng Chen, Rishabh Iyer. *"RETRIEVE: Corset Selection for Efficient and Robust Semi-Supervised Learning"*. In Advances in neural information processing systems, **NeurIPS**, 2021.

18. Liyan Xu, Xuchao Zhang, **Xujiang Zhao**, *et al.*, *"Boosting Cross-Lingual Transfer via Self-Learning with Uncertainty Estimation"*. In Proceedings of 2021 Conference on Empirical Methods in Natural Language Processing, **EMNLP**, 2021.

19. Zhuoyi Wang, Chen Zhao, Yuqiao Chen, Hemeng Tao, Yu Lin, **Xujiang Zhao**, *et al.*, *"CLEAR: Contrastive-Prototype Learning with Drift Estimation for Resource Constrained Stream Mining."* In Proceeding of TheWebConf 2021, **WWW**, 2021.

20. Yibo Hu, Yuzhe Ou, **Xujiang Zhao**, Feng Chen. *"Multidimensional Uncertainty-Aware Evidential Neural Networks."* In Proceeding of the Thirty-fifth AAAI Conference on Artificial Intelligence, **AAAI**, 2021.

21. **Xujiang Zhao**, Feng Chen, Shu Hu, Jin-Hee Cho. *"Uncertainty Aware Semi-Supervised Learning on Graph Data."* In Advances in neural information processing systems, **NeurIPS**, 2020, **(Spotlight; Acceptance rate: 4%)**.

22. Weishi Shi, **Xujiang Zhao**, Qi Yu, Feng Chen. *"Multifaceted Uncertainty Estimation for Label-Efficient Deep Learning."* In Advances in neural information processing systems, **NeurIPS**, 2020.

23. Adil Alim, **Xujiang Zhao**, Jin-Hee Cho, Feng Chen. *"Uncertainty-Aware Opinion Inference Under Adversarial Attacks."* In 2019 IEEE International Conference on Big Data, **Big Data**, 2019.

24. **Xujiang Zhao**, Shu Hu, Jin-Hee Cho, and Feng Chen. *"Uncertainty-based Decision Making using Deep Reinforcement Learning."* In 2019 22nd International Conference on Information Fusion , **FUSION**, 2019.

25. **Xujiang Zhao**, Feng Chen, and Jin-Hee Cho. *"Deep Learning for Predicting Dynamic Uncertain Opinions in Network Data."* In 2018 IEEE International Conference on Big Data, **Big Data** 2018.

26. **Xujiang Zhao**, Feng Chen, and Jin-Hee Cho. "D*eep Learning based Scalable Inference of Uncertain Opinions.*" In 2018 IEEE International Conference on Data Mining, **ICDM** 2018. (Full paper; Acceptance rate: 8.86%)

27. **Xujiang Zhao**, Feng Chen, and Jin-Hee Cho. *"Uncertainty-Based Opinion Inference on Network Data Using Graph Convolutional Neural Networks."* In IEEE Military Communications Conference , **MILCOM**, 2018.

Preprint

1. *Qiwei Zhao*, **Xujiang Zhao**, Yanchi Liu, *et al.* "SAUP: Situation Awareness Uncertainty Propagation on LLM Agent." arXiv preprint arXiv:2412.01033 (2024).

2. Lin, Minhua, Zhengzhang Chen, Yanchi Liu, **Xujiang Zhao**, *et al. "Decoding Time Series with LLMs: A Multi-Agent Framework for Cross-Domain Annotation."* arXiv preprint arXiv:2410.17462 (2024).

3. Chenyuan Deng, Zhengzhang Chen, **Xujiang Zhao**, *et al., "RIO-CPD: A Riemannian Geometric Method for Correlation-Aware Online Change Point Detection, "*, Presented at the **ICML 2024 Workshop** on Geometry-grounded Representation Learning and Generative Modeling (GRaM), 2024

4. *Chen Ling*, **Xujiang Zhao**, Xuchao Zhang, *et al., "Improving Open Information Extraction with Large Language Models: A Study on Demonstration Uncertainty"*, Presented at the **ICLR 2024 Workshop** on Reliable and Responsible Foundation Models, 2024

5. *Chen Ling*, **Xujiang Zhao**, Jiaying Lu, et al., "*Domain Specialization as The Key to Make Large Language Models Disruptive: A Comprehensive Survey*", 2023. arXiv: 2305.18703.

6. Tanmoy Chowdhury, *Chen Ling*, **Xujiang Zhang**, et al., Knowledge-enhanced neural machine reasoning: A review, 2023, arXiv: 2302.02093.

7. Lin, Yujie, Chen Zhao, Minglai Shao, Baoluo Meng, **Xujiang Zhao**, and Haifeng Chen. "*Pursuing counterfactual fairness via sequential autoencoder across domains.*" arXiv preprint arXiv:2309.13005 (2023).

8. *Ruomeng Ding*, **Xujiang Zhao**, Chen Zhao, Minglai Shao, *"Detecting Multi-Label Out-of-Distribution Nodes on Graphs"*, Presented at the **AAAI 2023 Workshop** on Uncertainty Reasoning and Quantification in Decision Making, 2023

9. **Xujiang Zhao**, Yuzhe. Ou, Lance. Kaplan, Feng. Chen, and Jin-Hee. Cho. *"Quantifying Classification Uncertainty using Regularized Evidential Neural Networks."* accepted to **AAAI 2019 Fall Symposium Series**, Artificial Intelligence in Government and Public Sector.

Invited Talks

Feb 2025	Uncertainty Quantification in LLMs, **Seminar Talk** at Brigham Young University.
Dec 2024	Uncertainty Quantification in LLMs, **Keynote** at IEEE BigData 2024 RobustMLDS Workshop.
Dec 2020	Uncertainty Aware Semi-Supervised Learning on Graph Data, **Spotlight Presentation** at NeurIPS 2020.
Nov 2018	Deep Learning-based Scalable Inference of Uncertain Opinions, **Keynote** at Institute of Information Engineering, Chinese Academy of Sciences (CAS).

Teaching Experience

Guest Lecturer
- CS7301 Recent Advances in Computing, 2020 Spring
- CS6364 Artificial Intelligence, 2020 Fall, 2021 Fall

Mentoring Experience

Thesis Committee

Chen Ling
- Ph.D. from *Emory University*, 2024
- EMNLP 2023, ICLR2024, NAACL 2024, Frontiers in Big Data 2024, LLM survey paper

Interns

Qiwei Zhao
- Ph.D. student from *University of North Carolina at Chapel Hill*, 2024 Summer
- ACL 2025 (Submitted), TMLR (Submitted)

Mentoring Experience (continued)

Ruomeng Ding
- Master student from *Georgia Institute of Technology*, 2023 Summer
- AAAI 2023, SDM 2025

Professional Activities

Program Chair

2024
- 3rd KDD Workshop on Uncertainty Reasoning and Quantification in Decision Making.

2023
- 2nd KDD Workshop on Uncertainty Reasoning and Quantification in Decision Making.
- 1st AAAI Workshop on Uncertainty Reasoning and Quantification in Decision Making.

Journal Reviewer

- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on Services Computing
- ACM Transactions on Knowledge Discovery from Data
- Frontiers in Big Data
- Neurocomputing

Program Committee Member / Reviewer

2022-2025
- International Conference on Learning Representations (ICLR)

2022-2024
- International Conference on Machine Learning (ICML)

2021-2024
- Conference on Neural Information Processing Systems (NeurIPS)

2022-2025
- AAAI Conference on Artificial Intelligence (AAAI)

2020-2024
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)

2022-2024
- Association for Computational Linguistics (ACL) Rolling Review (ARR)

2022
- SIAM International Conference on Data Mining (SDM)

2022-2023
- IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)

2022
- ACM International Conference on Web Search and Data Mining (WSDM)

HONORS & Awards

2024
- Our survey paper on Domain Specialization of LLMs is honorably mentioned by The 2024 Economic Report of the President from the White House.

2020
- NeurIPS 2020 Student Travel Award.

2018
- ICDM 2018 Student Travel Award.

2014
- Outstanding Graduate Award of Chongqing University.
- First-class College Scholarship at Chongqing University.

2013
- National Scholarship.

2012
- First Prize in The National Drawing Skills and Advanced Technology .