

Mingxuan (Clark) Ju

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Education

University of Notre Dame <i>Ph.D. in Computer Science & Engineering</i> Advisor: Dr. Yanfang (Fanny) Ye Dissertation: Cost-effective Machine Learning Techniques for Graphs	Apr. 2020 – Nov. 2024 Notre Dame, IN
Case Western Reserve University <i>M.S. in Computer and Information Science</i>	Jun. 2019 – Mar. 2020 Cleveland, OH
Case Western Reserve University <i>B.S. in Computer Science</i>	Aug. 2015 – May 2019 Cleveland, OH

Professional Experiences

Research Scientist <i>Snap Research at Snap Inc., Manager: Dr. Neil Shah.</i> <ul style="list-style-type: none">Research and develop large-scale generative models to improve production recommender systems.Mentor research interns and produce research outcomes that deliver both internal product impact and academic publications.	Mar. 2024 - Present Bellevue, WA
Research Intern <i>Snap Research at Snap Inc., Supervisors: Dr. Tong Zhao and Dr. Neil Shah.</i> <ul style="list-style-type: none">Efficient GNNs for RecSys. Significant performance improvement (~10%) with only ~1% additional overheads. [S8]Performant multi-task GNNs for user modeling. Launched for embedding-based retrieval for friend recommendation. [W1]	Jun. 2023 – Oct. 2023 Seattle, WA
Graduate Research Assistant <i>University of Notre Dame, Supervisor: Dr. Fanny Ye.</i> <ul style="list-style-type: none">Multi-task self-supervised learning for GNNs to improve their generalization and applicability. [S6]Research on the adversarial robustness of GNNs through reinforcement learning. [S5]Open-domain question answering enhanced by entity relations from knowledge graphs. [S4]	Apr. 2020 – Feb. 2024 Notre Dame, IN
Undergraduate Research Assistant <i>Case Western Reserve University, Supervisor: Dr. Soumya Ray.</i> <ul style="list-style-type: none">Research on disease classification and won 3rd place in the FEMH cup at IEEE Big Data 2018. [C1]Development and deployment of disease pre-diagnosis framework at University Hospital. [J1]	May 2017 – Mar. 2020 Cleveland, OH

Selected Publications

- [S12] **Generative Recommendation with Semantic IDs: A Practitioner's Handbook**
In Proceedings of The 34th ACM International Conference on Information and Knowledge Management (CIKM 2025)
Mingxuan Ju, Liam Collins, Leonardo Neves, Bhuvish Kumar, Yufeng Wang, Tong Zhao, Neil Shah
- [S11] **Revisiting Self-Attention for Cross-Domain Sequential Recommendation.**
In Proceedings of The 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)
Mingxuan Ju, Leonardo Neves, Bhuvish Kumar, Liam Collins, Tong Zhao, Yuwei Qiu, Ching Dou, Sohail Nizam, Sen Yang, Neil Shah
- [S10] **Learning Universal User Representations Leveraging Cross-domain User Intent at Snapchat.**
In Proceedings of the International ACM SIGIR Conference on Research and Development in Information Retrieval 2025 (SIGIR 2025)
Mingxuan Ju, Leonardo Neves, Bhuvish Kumar, Liam Collins, Tong Zhao, Yuwei Qiu, Ching Dou, Yang Zhou, Sohail Nizam, Rengim Ozturk, Yvette Liu, Sen Yang, Manish Malik, Neil Shah
- [S9] **Understanding and Scaling Collaborative Filtering Optimization from the Perspective of Matrix Rank.**
In Proceedings of the ACM Web Conference 2025 (WWW 2025)
Donald Loveland, Xinyi Wu, Danai Koutra, Tong Zhao, Neil Shah, Mingxuan Ju
- [S8] **How Does Message Passing Improve Collaborative Filtering?**
In Proceedings of The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS 2024)
Mingxuan Ju, William Shiao, Zhichun Guo, Yanfang Ye, Yozen Liu, Neil Shah, Tong Zhao
- [S7] **GraphPatcher: Mitigating Degree Bias for Graph Neural Networks via Test-time Augmentation.**
In Proceedings of The Thirty-Seventh Annual Conference on Neural Information Processing Systems (NeurIPS 2023)
Mingxuan Ju, Tong Zhao, Wenhao Yu, Neil Shah, Yanfang Ye

- [S6] **Multi-task Self-supervised Graph Neural Networks Enable Stronger Task Generalization.**
In Proceedings of The Eleventh International Conference on Learning Representations (ICLR 2023)
 Mingxuan Ju, Tong Zhao, Qianlong Wen, Wenhao Yu, Neil Shah, Yanfang Ye, Chuxu Zhang
- [S5] **Let Graph be the Go Board: Gradient-free Node Injection Attack for Graph Neural Networks via Reinforcement Learning.**
In Proceedings of The 37th AAAI Conference on Artificial Intelligence (AAAI 2023)
 Mingxuan Ju, Yujie Fan, Chuxu Zhang, Yanfang Ye
- [S4] **Grape: Knowledge Graph Enhanced Passage Reader for Open-domain Question Answering.**
In Findings of the Association for Computational Linguistics: EMNLP 2022 (Findings of EMNLP 2022)
 Mingxuan Ju*, Wenhao Yu*, Tong Zhao, Chuxu Zhang, Yanfang Ye
- [S3] **Adaptive Kernel Graph Neural Network.**
In Proceedings of The 36th AAAI Conference on Artificial Intelligence (AAAI 2022)
 Mingxuan Ju, Shifu Hou, Yujie Fan, Jianan Zhao, Liang Zhao, Yanfang Ye
- [S2] **Dr. Emotion: Disentangled Representation Learning for Emotion Analysis on Social Media to Improve Community Resilience in the COVID-19 Era and Beyond.**
In Proceedings of the Web Conference 2021 (WWW 2021) - Best Paper Award Shortlist
 Mingxuan Ju, Wei Song, Shiyu Sun, Yanfang Ye, Yujie Fan, Shifu Hou, Kenneth Loparo, Liang Zhao
- [S1] **Heterogeneous Temporal Graph Neural Network.**
In Proceedings of the 2022 SIAM International Conference on Data Mining (SDM 2022)
 Yujie Fan, Mingxuan Ju, Chuxu Zhang, Liang Zhao, Yanfang Ye

All Publications (Chronological Order)

Conference Papers *stands for equal contribution

- [C27] **A Pre-training Framework for Relational Data with Information-theoretic Principles**
In Proceedings of The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS 2025)
 Quang Truong, Zhikai Chen, Mingxuan Ju, Tong Zhao, Neil Shah, Jiliang Tang
- [C26] **MI4Rec: Pretrained Language Model based Cold-Start Recommendation with Meta-Item Embeddings**
In Proceedings of The 34th ACM International Conference on Information and Knowledge Management (CIKM 2025)
 Zaiyi Zheng, Yaochen Zhu, Haochen Liu, Mingxuan Ju, Tong Zhao, Neil Shah, Jundong Li
- [C25] **Generative Recommendation with Semantic IDs: A Practitioner's Handbook**
In Proceedings of The 34th ACM International Conference on Information and Knowledge Management (CIKM 2025)
 Mingxuan Ju, Liam Collins, Leonardo Neves, Bhuvish Kumar, Yufeng Wang, Tong Zhao, Neil Shah
- [C24] **Non-parametric Graph Convolution for Re-ranking in Recommendation Systems**
In Proceedings of The 19th ACM Conference on Recommender Systems (RecSys 25)
 Zhongyu Ouyang*, Mingxuan Ju*, Soroush Vosoughi, Yanfang Ye
- [C23] **On the Role of Weight Decay in Collaborative Filtering: A Popularity Perspective.**
In Proceedings of The 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)
 Donald Loveland, Mingxuan Ju, Tong Zhao, Neil Shah, Danai Koutra
- [C22] **Revisiting Self-Attention for Cross-Domain Sequential Recommendation.**
In Proceedings of The 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)
 Mingxuan Ju, Leonardo Neves, Bhuvish Kumar, Liam Collins, Tong Zhao, Yuwei Qiu, Ching Dou, Sohail Nizam, Sen Yang, Neil Shah
- [C21] **Learning Along the Arrow of Time: Hyperbolic Geometry for Backward-Compatible Representation Learning.**
In Proceedings of The Forty-Second International Conference on Machine Learning (ICML 2025)
 Ngoc Bui, Menglin Yang, Runjin Chen, Leonardo Neves, Mingxuan Ju, Rex Ying, Neil Shah, Tong Zhao
- [C20] **Learning Universal User Representations Leveraging Cross-domain User Intent at Snapchat.**
In Proceedings of the International ACM SIGIR Conference on Research and Development in Information Retrieval 2025 (SIGIR 2025)
 Mingxuan Ju, Leonardo Neves, Bhuvish Kumar, Liam Collins, Tong Zhao, Yuwei Qiu, Ching Dou, Yang Zhou, Sohail Nizam, Rengim Ozturk, Yvette Liu, Sen Yang, Manish Malik, Neil Shah
- [C19] **GraphHash: Graph Clustering Enables Parameter Efficiency in Recommender Systems.**
In Proceedings of the ACM Web Conference 2025 (WWW 2025)
 Xinyi Wu, Donald Loveland, Runjin Chen, Yozen Liu, Xin Chen, Leonardo Neves, Ali Jadbabaie, Mingxuan Ju, Neil Shah, Tong Zhao
- [C18] **Understanding and Scaling Collaborative Filtering Optimization from the Perspective of Matrix Rank.**
In Proceedings of the ACM Web Conference 2025 (WWW 2025)
 Donald Loveland, Xinyi Wu, Danai Koutra, Tong Zhao, Neil Shah, Mingxuan Ju
- [C17] **MOPI-HFRS: A Multi-objective Personalized Health-aware Food Recommendation System with LLM-enhanced Interpretation.**
In Proceedings of The 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2025)
 Zheyuan Zhang, Zehong Wang, Tianyi Ma, Varun Sameer Taneja, Sofia Nelson, Nhi Ha Lan Le, Keerthiram Murugesan, Mingxuan Ju, Nitesh V Chawla, Chuxu Zhang, Yanfang Ye

[C16] **How Does Message Passing Improve Collaborative Filtering?**

In Proceedings of The Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS 2024)

Mingxuan Ju, William Shiao, Zhichun Guo, Yanfang Ye, Yozen Liu, Neil Shah, Tong Zhao

[C15] **From Coarse to Fine: Enable Comprehensive Graph Self-supervised Learning with Multi-granular Semantic Ensemble.**

In Proceedings of The Forty-First International Conference on Machine Learning (ICML 2024)

Qianlong Wen, Mingxuan Ju, Zhongyu Ouyang, Chuxu Zhang, Yanfang Ye

[C14] **GraphPatcher: Mitigating Degree Bias for Graph Neural Networks via Test-time Augmentation.**

In Proceedings of The Thirty-Seventh Annual Conference on Neural Information Processing Systems (NeurIPS 2023)

Mingxuan Ju, Tong Zhao, Wenhao Yu, Neil Shah, Yanfang Ye

[C13] **Multi-task Self-supervised Graph Neural Networks Enable Stronger Task Generalization.**

In Proceedings of The Eleventh International Conference on Learning Representations (ICLR 2023)

Mingxuan Ju, Tong Zhao, Qianlong Wen, Wenhao Yu, Neil Shah, Yanfang Ye, Chuxu Zhang

[C12] **Generate rather than Retrieve: Large Language Models are Strong Context Generators.**

In Proceedings of The Eleventh International Conference on Learning Representations (ICLR 2023)

Wenhao Yu, Dan Iter, Shuohang Wang, Yichong Xu, Mingxuan Ju, Soumya Sanyal, Chengguang Zhu, Michael Zeng, Meng Jiang

[C11] **Chasing All-Round Graph Representation Robustness: Model, Training, and Optimization.**

In Proceedings of The Eleventh International Conference on Learning Representations (ICLR 2023)

Chunhui Zhang, Yijun Tian, Mingxuan Ju, Zheyuan Liu, Yanfang Ye, Nitesh Chawla, Chuxu Zhang

[C10] **Let Graph be the Go Board: Gradient-free Node Injection Attack for Graph Neural Networks via Reinforcement Learning.**

In Proceedings of The 37th AAAI Conference on Artificial Intelligence (AAAI 2023)

Mingxuan Ju, Yujie Fan, Chuxu Zhang, Yanfang Ye

[C9] **Self-Supervised Graph Structure Refinement for Graph Neural Networks.**

In Proceedings of The 16th ACM International Conference on Web Search And Data Mining (WSDM 2023)

Jianan Zhao, Qianlong Wen, Mingxuan Ju, Yanfang Ye

[C8] **Leveraging Comment Retrieval for Code Summarization.**

In Proceedings of The 45th European Conference on Information Retrieval (ECIR 2023)

Shifu Hou, Lingwei Chen, Mingxuan Ju, Yanfang Ye

[C7] **Grape: Knowledge Graph Enhanced Passage Reader for Open-domain Question Answering.**

In Findings of the Association for Computational Linguistics: EMNLP 2022 (Findings of EMNLP 2022)

Mingxuan Ju*, Wenhao Yu*, Tong Zhao, Chuxu Zhang, Yanfang Ye

[C6] **Heterogeneous Temporal Graph Neural Network.**

In Proceedings of the 2022 SIAM International Conference on Data Mining (SDM 2022)

Yujie Fan, Mingxuan Ju, Chuxu Zhang, Liang Zhao, Yanfang Ye

[C5] **Adaptive Kernel Graph Neural Network.**

In Proceedings of The 36th AAAI Conference on Artificial Intelligence (AAAI 2022)

Mingxuan Ju, Shifu Hou, Yujie Fan, Jianan Zhao, Liang Zhao, Yanfang Ye

[C4] **Dr. Emotion: Disentangled Representation Learning for Emotion Analysis on Social Media to Improve Community Resilience in the COVID-19 Era and Beyond.**

In Proceedings of the Web Conference 2021 (WWW 2021)-Best Paper Award Shortlist

Mingxuan Ju, Wei Song, Shiyu Sun, Yanfang Ye, Yujie Fan, Shifu Hou, Kenneth Loparo, Liang Zhao

[C3] **Heterogeneous Temporal Graph Transformer: An Intelligent System for Evolving Android Malware Detection.**

In Proceedings of The 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2021)

Yujie Fan, Mingxuan Ju, Shifu Hou, Yanfang Ye, Wenqiang Wan, Kui Wang, Yinming Mei, Qi Xiong

[C3] **Disentangled Representation Learning in Heterogeneous Information Network for Large-scale Android Malware Detection in the COVID-19 Era and Beyond.**

In Proceedings of The 35th AAAI Conference on Artificial Intelligence (AAAI 2021)

Shifu Hou, Yujie Fan, Mingxuan Ju, Yanfang Ye, Wenqiang Wan, Kui Wang, Yinming Mei, Qi Xiong, Fudong Shao

[C2] **Community Mitigation: A Data-driven System for COVID-19 Risk Assessment in a Hierarchical Manner.**

In Proceedings of The 30th ACM International Conference on Information and Knowledge Management (CIKM 2021)

Yanfang Ye, Yujie Fan, Shifu Hou, Yiming Zhang, Yiyue Qian, Shiyu Sun, Qian Peng, Mingxuan Ju, Wei Song, Kenneth Loparo

[C1] **A Multi-representation Ensemble Approach to Classifying Vocal Diseases.**

In Proceedings of 2018 IEEE International Conference on Big Data (BigData 2018)

Mingxuan Ju, Zhengkai Jiang, Yufan Chen, Soumya Ray

Journal Papers

[J4] **Node Duplication Improves Cold-start Link Prediction.**

Transactions on Machine Learning Research (TMLR)

Zhichun Guo, Tong Zhao, Yozen Liu, Kaiwen Dong, William Shiao, Mingxuan Ju, Neil Shah, Nitesh Chawla

[J3] **Exploring Contrast Consistency of Open-domain Question Answering Systems on Minimally Edited Questions.**

Transactions of the Association for Computational Linguistics (TACL)

Zhihan Zhang, Wenhao Yu, Ning Zheng, Mingxuan Ju, Meng Jiang

[J2] **a-Satellite: An AI-Driven System and Benchmark Datasets for Dynamic COVID-19 Risk Assessment in the United States**

Journal of Biomedical and Health Informatics (JBHI)

Yanfang Ye, Yujie Fan, Shifu Hou, Yiming Zhang, Yiyue Qian, Shiyu Sun, Qian Peng, Mingxuan Ju, Wei Song, Kenneth Loparo

[J1] **Development and Validation of a Machine Learning Algorithm for Predicting Response to Anticholinergic Medications for Overactive Bladder Syndrome.**

Obstetrics & Gynecology

David Sheyn, Mingxuan Ju, Sixiao Zhang, Caleb Anyaeche, Adonis Hijaz, Jeffrey Mangel, Sangeeta Mahajan, Britt Conroy, Sherif El-Nashar, Soumya Ray

Workshop Papers

[W2] **Improving Out-of-Vocabulary Handling in Recommendation Systems.**

REL workshop at International World Wide Web Conference (WWW), 2025.

William Shiao, Mingxuan Ju, Zhichun Guo, Xin Chen, Evangelos Papalexakis, Tong Zhao, Neil Shah, Yozen Liu

[W1] **Robust Training Objectives Improve Embedding-based Retrieval in Industrial Recommendation Systems.**

RobustRecSys workshop at ACM Conference on Recommender Systems (RecSys), 2024.

Matthew Kolodner, Mingxuan Ju, Zihao Fan, Tong Zhao, Elham Ghazizadeh, Yan Wu, Neil Shah, Yozen Liu

Awards and Services

Awards:

- Notre Dame CSE 2025 Outstanding Research Assistant Award May 2025
- Notre Dame 2025 Eli J. and Helen Shaheen Award Nominee Apr. 2025
- NeurIPS 2023 Student Scholar Dec. 2023
- AAAI 2023 Student Scholar Jan. 2023
- WWW 2021 Best Paper Award Shortlist Mar. 2021
- 3rd Place Award at IEEE Big Data 2018 FEMH Cup Jan. 2019
- Receiver of Support of Undergraduate Research and Creative Endeavors Nov. 2018

Services:

- Organizer of Learning on Graph (LoG) conference mid-north meetup.
- Conference Reviewer/PC Member: ICLR 24/25; NeurIPS 23/24/25; ICML 24/25; AAAI 22/23/24/25; KDD 22/23/24/25; WWW 24; SDM 23/24/25; WSDM 22; ICDM 21/22; AISTATS 25.

Mentorship

- Ms. Xueying Ding (PhD student at Carnegie Mellon University & Research Intern at Snap Inc., 2025)
- Ms. Yunzhu Pan (Master student at University of California San Diego & Research Intern at Snap Inc., 2025)
- Ms. Nidhi Hegde (Master student at Carnegie Mellon University & Applied Science Intern at Snap Inc., 2025)
- Mr. Geon Lee (PhD student at Korea Advanced Institute of Science & Technology (KAIST), Research Intern at Snap Inc., 2025)
- Mr. Donald Loveland (PhD student at University of Michigan at Ann Arbor, 2024-2025; Research Intern at Snap Inc., 2024)
- Ms. Jing Zhu (PhD student at University of Michigan at Ann Arbor, 2024-2025; Research Intern at Snap Inc., 2024-2025)
- Mr. Ngoc Bui (PhD student at Yale University, 2024-2025; Research Intern at Snap Inc., 2024)
- Mr. Haitao Mao (PhD student at Michigan State University, 2024-2025; Research Intern at Snap Inc., 2024-2025)
- Mr. Jingzhe Liu (PhD student at Michigan State University, 2024-2025 & Research Intern at Snap Inc., 2025)
- Mr. Zaiyi Zheng (PhD student at University of Virginia, 2024-2025, Research Intern at Snap Inc., 2025)
- Ms. Runjin Chen (PhD student at University of Texas at Austin, 2024; Research Intern at Snap Inc., 2024)
- Ms. Xinyi Wu (PhD student at Massachusetts Institute of Technology, 2024; Research Intern at Snap Inc., 2024)
- Mr. Dimosthenis Antypas (PhD student at Cardiff University, 2024; Research Intern at Snap Inc., 2024)
- Mr. Norman Knyazev (PhD student at Radboud University, 2024; Research Intern at Snap Inc., 2024)
- Mr. Zheyuan Zhang (PhD student at University of Notre Dame, 2023-2024)
- Ms. Zhongyu Ouyang (PhD student at University of Notre Dame, 2023-2024)