

Yu Wang

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	E-mail: yu.wang.1@vanderbilt.edu	
EDUCATION	Vanderbilt University Doctor of Philosophy (Ph.D.) in Computer Science • Advisor: Dr. Tyler Derr • Research areas: Data-centric Graph Machine Learning, Data-Quality-aware Graph Neural Networks, Graph Machine Learning for Science/Infrastructure/Recommender System/Information Retrieval • Cumulative GPA: 3.95 / 4.00 Aug 2019–Summer 2024	
	Harbin Institute of Technology Bachelor of Engineering (B.E.) • First-class People's Scholarship×4, National Scholarship×2, Rank 1/40 • Cumulative GPA: 4.0 / 4.0 May 2019	
RESEARCH EXPERIENCE	Network and Data Science Lab, Vanderbilt University Ph.D. student • Research Interests: Data mining, Machine Learning, Network Analysis, Graph Neural Networks Data-centric graph ML, Data-quality-aware GNNs: Topology/Imbalance/Bias/Weak Graph-ML for Chemistry/Infrastructure/Recommender Systems/Information Retrieval • Publications: KDD×3/WWW×1/AAA×2/WSDM×1/CIKM×2/ICDMW×1/LOG×1/Book-Chapter×1 Jan 2021 – Present	
	Document Intelligence Team, Adobe Research Research Scientist/Engineer Intern • Project-1: Knowledge Graph Prompting for Multi-Document Question Answering [paper][demo][news] • Project-2: Fairness in GNNs [paper] • Project-3: Graph Verbalization via Topological-aware Positional Encoding [ongoing] • Project-4: Collecting Personalized-interaction Data with PDF-Document • Mentors: Dr. Nedim Lipka, Dr. Ryan Rossi, Dr. Alexa Siu, Dr. Ruiyi Zhang, Manager: Dr. Tong Sun May 2023 – Current	
	Recommendation Data Science Team, The Home Depot Research Data Scientist • Project-1: Knowledge Graph-enhanced Session Recommendation [paper] • Project-2: Prototyping the Knowledge Graph-enhanced Session Recommendation Framework in A/B test. • Mentors: Dr. Amin Javari, Dr. Walid Shalaby, Manager: Dr. Xiquan Cui May 2022 – Aug 2022	
	Hiba Baroud Research Group, Vanderbilt University Ph.D. student • Research Interests: Graph Theory, Machine Learning, Statistical Network Analysis Resilience and Risk Smart Urban Systems • Publications: IEEE System Journal/ESREL/SMC2020 Data Competition [news] • Mentors: Dr. Hiba Baroud, Dr. Jinzhu Yu Aug 2019 – Jan 2021	
	Tacıroglu Research Group, UCLA-CSST Undergraduate Summer Researcher • Project: Designing a modeling analysis tool for automatic bridge generation [poster] • Mentors: Dr. Ertugrul Taciroglu, Dr. Barbaros Cetiner Jul 2019 – Sep 2019	
	Qingfei Gao Research Group, Harbin Institute of Technology Undergraduate Summer Researcher • Project: Improving the existing percolation-based algorithm for bridge crack detection [paper] • Mentors: Dr. Qingfei Gao Oct 2018 – Jul 2019	

PUBLICATIONS Please note the following symbols below to signify certain author types in the below lists:

* † ††	denotes co-first authors denotes <i>graduate student mentored</i> by Yu Wang denotes <i>undergraduate researcher/intern mentored</i> by Yu Wang
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Conference Papers (acceptance based on peer review of full paper)

- [PC1] **Yu Wang**, Yuying Zhao[†], Yi Zhang[†], and Tyler Derr. “Collaboration-aware Graph Convolutional Networks for Recommender Systems.” In Proceedings of the ACM Web Conference (TheWebConf), Austin, TX, USA, April 30 - May 4, 2023. [\[Paper\]](#)[\[Code\]](#)[\[Slides\]](#)(Acceptance Rate 19.2%, **Top-10 most influential paper in WWW’23**)
- [PC2] Yuying Zhao[†], **Yu Wang** and Tyler Derr. “Fairness and Explainability: Bridging the Gap Towards Fair Model Explanations.” The 37th AAAI Conference on Artificial Intelligence (AAAI), Washington, DC, USA, February 7-14, 2023. [\[Paper\]](#)[\[Code\]](#)(Acceptance Rate 19.6%)
- [PC3] Yunchao Liu[†], **Yu Wang**, Oanh Vu, Rocco Moretti, Bobby Bodenheimer, Jens Meiler and Tyler Derr. “Interpretable Chirality-Aware Graph Neural Network for Quantitative Structure-Activity Relationship Modeling in Drug Discovery.” The 37th AAAI Conference on Artificial Intelligence (AAAI), Washington, DC, USA, February 7-14, 2023. [\[Paper\]](#) [\[Code\]](#)(Acceptance Rate 19.6%)
- [PC4] **Yu Wang**, Yuying Zhao[†], Neil Shah, and Tyler Derr. “Imbalanced Graph Classification via Graph Neural Networks on Graph of Graphs.” In Proceedings of the 31th ACM International Conference on Information and Knowledge Management (CIKM), Atlanta, GA, 2022. [\[Paper\]](#)[\[Code\]](#)(Acceptance rate 27.51%, **Top-10 most influential paper in CIKM’22**)
- [PC5] **Yu Wang**, Yuying Zhao[†], Yushun Dong, Huiyuan Chen, Jundong Li and Tyler Derr. “Improving Fairness in Graph Neural Networks via Mitigating Sensitive Attribute Leakage.” Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), Washington D.C., USA, 2022. [\[Paper\]](#)[\[Code\]](#)(Acceptance rate 14.9% (research track))
- [PC6] Benedek Rozemberczki, Charles Tapley Hoyt, Anna Gogleva, Piotr Grabowski, Klas Karis, Andrej Lamov, Andriy Nikolov, Sebastian Nilsson, Michael Ughetto, **Yu Wang**, Tyler Derr, Benjamin M Gyori. “ChemicalX: A Deep Learning Library for Drug Pair Scoring.” Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), Washington D.C., USA, 2022. [\[Paper\]](#)[\[Code\]](#)(Acceptance rate 25.9% (applied data science track))
- [PC7] **Yu Wang**. “Fair Graph Representation Learning with Imbalanced and Biased Data.” Proceedings of the Fifteenth ACM International Conference on Web Search and Data Mining (WSDM), 2022.[\[Paper\]](#)
- [PC8] **Yu Wang** and Tyler Derr. “Tree Decomposed Graph Neural Network.” In Proceedings of the 30th ACM International Conference on Information and Knowledge Management (CIKM), Virtual Conference, November 1-5, 2021.[\[Paper\]](#)[\[Code\]](#)(Acceptance rate 21.7%)
- [PC9] Ao Qu^{††}, **Yu Wang**, Yue Hu, Yanbing Wang, and Hiba Baroud. “A Data-Integration Analysis on Road Emissions and Traffic Patterns.” Smoky Mountains Computational Sciences and Engineering Conference. Springer, 2020. **Best Paper Award** [\[Paper\]](#)

Book Chapters

- [PB1] **Yu Wang**, Wei Jin, and Tyler Derr. “Graph Neural Networks: Self-supervised Learning.” In Graph Neural Networks: Foundations, Frontiers, and Applications. Springer, (2021). [\[Paper\]](#)

Journal Papers

- [PJ1] **Yu Wang**, Jin-Zhu Yu, and Hiba Baroud. “Generating Synthetic Systems of Interdependent Critical Infrastructure Networks.” IEEE System Journals (2021) Generating Synthetic Systems of Interdependent Critical Infrastructure Networks. [\[Paper\]](#)
- [PJ2] Qingfei Gao, **Yu Wang**, Jun Li, Kejian Sheng, and Chenguang Liu. “An Enhanced Percolation Method for Automatic Detection of Cracks in Concrete Bridges.” Advances in Civil Engineering, 2020. [\[Paper\]](#)

Preprints and Submissions

- [PP1] Yuying Zhao[†], Minghua Xu, Huiyuan Chen, Yuzhong Chen, Yiwei Cai, Rashidul Islam, **Yu Wang**, Tyler Derr. “Can One Embedding Fit All? A Multi-interest Learning Paradigm Towards Improving User Interest Diversity Fairness.” 2023. (Submission in WWW’24)
- [PP2] **Yu Wang**, Tong Zhao, Yuying Zhao[†], Yunchao Liu[†], Xueqi Cheng[†], Neil Shah, Tyler Derr. “A Topological Perspective on Demystifying GNN-based Link Prediction Performance.” 2023. (Submission in ICLR’24)[[Paper](#)]
- [PP3] **Yu Wang**, Nedim Lipka, Ryan Rossi, Alexa Siu, Ruiyi Zhang, Tyler Derr “Knowledge Graph Prompting for Multi-Document Question Answering” 2023. (Submission in AAAI’24) [[Paper](#)][[Demo](#)]
- [PP4] Yuying Zhao[†], **Yu Wang**, Yunchao Liu[†], Xueqi Cheng[†], Charu Aggarwal, Tyler Derr “Fairness and Diversity in Recommender Systems: A Survey” 2023. (Submission in TIST journal) [[Paper](#)]
- [PP5] April Chen, Ryan A. Rossi, Namyong Park, Puja Trivedi, **Yu Wang**, Tong Yu, Sungchul Kim, Franck Dernoncourt, Nesreen K. Ahmed “Fairness-Aware Graph Neural Networks: A Survey” 2023. (Submission in TKDD) [[Paper](#)]
- [PP6] **Yu Wang**, Amin Javari, Janani Balaji, Walid Shalaby, Tyler Derr, Xiquan Cui “Multiplex Graph-Based Sequential Recommendation with Session-Adaptive Heterogeneous Propagation.” (Submission in WSDM’24).
- [PP7] Yunchao Liu[†], Rocco Moretti, **Yu Wang**, Bobby Bodenheimer, Tyler Derr, Jens Meiler, Integrating Expert Knowledge with Deep Learning Improves QSAR Models for CADD Modeling. (Submission in JCBC)
- [PP8] **Yu Wang**, Charu Aggarwal, Tyler Derr. “Distance-wise Prototypical Graph Neural Network in Node Imbalance Classification.” 2022. (Preprint) [[Paper](#)][[Code](#)]
- [PP9] **Yu Wang**, Jin-Zhu Yu, Hiba Baroud. “A Bayesian Approach to Reconstructing Interdependent Infrastructure Networks from Cascading Failures.” 2022. (Preprint) [[Paper](#)]

Workshops

- [PW1] Yuying Zhao[†], **Yu Wang**, Yi Zhang, Pamela Wisniewski, Charu Aggarwal, and Tyler Derr. “Fair Online Dating Recommendations for Sexually Fluid Users via Leveraging Opposite Gender Interaction Ratio.” 19th International Workshop on Mining and Learning with Graphs, Long Beach, CA, USA, 2023. [[Paper](#)]
- [PW2] **Yu Wang** and Tyler Derr. “Degree-Related Bias in Link Prediction.” IEEE International Conference on Data Mining Workshops, Orlando, FL, USA, November 28, 2022. [[Paper](#)]
- [PW3] **Yu Wang**. “Overcoming data quality issues of Graph Neural Networks.” International Conference on Data Mining (SDM) Doctoral Forum, SIAM, Poster, 2022.
- [PW4] **Yu Wang**, Charu Aggarwal, and Tyler Derr. “Distance-wise Prototypical Graph Neural Network in Node Imbalance Classification.” 17th International Workshop on Mining and Learning with Graphs. [[Paper](#)][[Code](#)]
- [PW5] **Yu Wang** and Tyler Derr. “Tackling Over-smoothing in Graph Neural Networks via Higher-order Neighborhood Disentanglement.” International Conference on Data Mining (SDM) Doctoral Forum, SIAM, Poster, 2021.

TUTORIALS

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| Data Quality-Aware Graph Machine Learning | 2023 |
| <ul style="list-style-type: none"> • Yu Wang, Yijun Tian, Tong Zhao, Xiaorui Liu, Jian Kang, and Tyler Derr. • Submission in SIAM International Conference on Data Mining (SDM24) • Comprehensively review Graph data-quality issues, including topological/imbalanced/biased/noisy/weak data issues. | |
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OPEN SOURCE PROJECTS	ChemicalX: A Deep Learning Library for Drug Pair Scoring [Github]	2022
	<ul style="list-style-type: none"> • Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD) • A deep learning library for drug-drug interaction, polypharmacy side effects, and synergy prediction. • Received 600+ Github stars. 	
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TALKS	Intern Presentations:	
	[IP1] Knowledge Graph Prompt Learning for Multi-Document QA Document Intelligence Team, Adobe Research Adobe Inc., SanJose, CA	Aug 2023
	[IP2] Knowledge Graph-based Session Recommendation Online Recommendation Data Science Team The Home Depot, Atlanta, GA	Aug 2022
	Guest Lectures:	
	[GT1] Scalability of Graph Neural Networks (GNNs) Social Network Analysis, Computer Science Department Vanderbilt University, Nashville, TN	Nov 2023
	[GT2] Measuring Node Centrality in Social Network Analysis Social Network Analysis, Computer Science Department Vanderbilt University, Nashville, TN	Oct 2021
	Conference/Workshop Presentations:	
	[CP1] Collaboration-aware Graph Convolutional Networks for Recommender Systems. WWW 2023, Austin, Texas	May 2023
	[CP2] Degree-Related Bias in Link Prediction. ICDMW 2022, Orlando, FL	Nov 2022
	[CP3] Imbalanced Graph Classification via Graph Neural Networks on Graph of Graphs CIKM 2022, Atlanta, GA	Nov 2022
	[CP4] Improving Fairness in GNNs via Mitigating Sensitive Attribute Leakage KDD 2022, Washington D.C.	Aug 2022
	[CP5] ChemicalX: A Deep Learning Library for Drug Pair Scoring KDD 2022, Washington D.C.	Aug 2022
	[CP6] Distance-wise Prototypical Graph Neural Network in Node Imbalance Classification. KDD 2022, Washington D.C.	Aug 2022
	[CP7] Overcoming data quality issues of Graph Neural Networks SDM Doctoral Forum 2022, Virtual	Apr 2022
	[CP8] Fair Graph Representation Learning with Imbalanced and Biased Data. WSDM Doctoral Consortium 2022, Virtual	Feb 2022
	[CP9] Tackling Over-smoothing in GNNs via Higher-order Neighbor Disentanglement SDM Doctoral Forum 2021, Virtual	Apr 2021
	[CP10] Tree Decomposed Graph Neural Network. CIKM 2021, Virtual	Nov 2021
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HONORS & AWARDS	• Vanderbilt Graduate Leadership Anchor Award	May 2023
	• Vanderbilt's C.F.Chen Best Paper Runner-up Award (as co-author)	May 2023
	• American Bureau of Shipping Scholarship Award	Jan 2023
	• ICDM'22 Student Travel Award	Nov 2022
	• CIKM'22 Student Travel Award	Nov 2022

- KDD'22 Student Travel Award Jun 2022
- **Vanderbilt's C.F.Chen Best Paper Award** Apr 2022
- IJCAI'21 Volunteers & Grants Program Aug 2021
- SDM'21 Student Travel Award Mar 2021
- IJCAI'20 Volunteers & Grants Program Jan 2020
- Vanderbilt University Graduate School Travel Grant Oct 2020 Nov 2022
- **Best Paper Award in 2020 Smoky Mountain Data Challenge Competition by ORNL** Sep 2020
- Outstanding Research and Presentation Skills Award by UCLA-CSST Program Aug 2018
- First-class People's Scholarship×4 Sep 2016 Apr 2017 Sep 2017 Apr 2018
- National Scholarship×2 Sep 2016 Sep 2017
- Second Prize in the National College Student Mathematics Competition Sep 2017

**MENTORING
IN NDS LAB**
Network and Data Science Lab, Vanderbilt University**Ph.D. Students**

- Anne Tumlin, Ph.D. Computer Science Fall 2023 – Present
 - Research topic: balancing fairness and robustness in machine learning models
- Bo Ni, Ph.D. Computer Science Fall 2023 – Present
 - Research topic: Deep learning on graphs, knowledge graphs, deep generative models
- Xueqi Cheng, Ph.D. Computer Science Fall 2023 – Present
 - Research topic: Deep Learning on Complex Graphs, out of distribution and imbalanced learning on graphs
 - Awarded Vanderbilt IBM Fellowship Award
 - Project: Imbalanced Edge Classification by Topological Reweighting
- Yuying Zhao, Ph.D. Computer Science Fall 2021 – Present
 - Research topic: Data science for social good, beyond utility metrics,
 - Awarded Vanderbilt IBM Fellowship Award
 - Awarded Vanderbilt's C.F. Chen Best Paper Runner-Up Award in Computer Science in 2023
 - Co-authored Publications: AAAI'23/MloG at KDD'23
- Yunchao (Lance) Liu, Ph.D. Computer Science Spring 2021 – Present
 - Research topic: Computer-aided drug discovery, geometric deep learning, self-supervised learning, molecular representation learning
 - Co-authored Publications: AAAI'23

B.S. Students

- Macharia Kanyatte, B.S. Electrical and Computer Engineering Nov 2022 – Present
 - Tennessee Louis Stokes Alliance Program
 - Preprocessing signed network datasets and basic network analysis toolkit
 - Georgia Tech REU program during Summer'23
- Benjamin Van Sleen, B.S. Computer Engineering, B.S. Economics, Dec 2020 – May 2023
 - and accelerated M.S. Computer Science
 - 2021 Data Science Institute Summer Research Program (DSI-SRP) Fellow
 - Project: "Voices of Identity: Analyzing Language Use in Autism Communities on Reddit"
 - Next Position: Business Analyst at McKinsey & Company
- Ao Qu, B.S. Computer Science, B.S. Economics, B.S. Mathematics Aug 2020 – Jun 2022
 - Project: "Adaptive views in contrastive learning for GNNs"
 - **Co-authored Publication won the best paper award in fourth annual Smoky Mountain Computational Sciences and Engineering Conference**
 - Next Position: Ph.D. student at Massachusetts Institute of Technology

High School Students

- Xinran Pan Jun 2021 – May 2022
 - Mentor the Project on Social Good and Simpson's Paradox
 - Next position: Undergraduate Student at Carnegie Mellon University
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TEACHING EXPERIENCE	Vanderbilt University	
	Teaching Assistant, Department of Computer Science <ul style="list-style-type: none"> • CS4260: Artificial Intelligence (Undergraduate/Graduate Level, Spring 2023) • DS5720: Social Network Analysis (Graduate Level, Fall 2022) • CS3891/5891-03: Social Network Analysis (Undergraduate/Graduate Level, Fall 2021) 	Jan 2021 – Now
	Teaching Assistant, Department of Civil and Environmental Engineering <ul style="list-style-type: none"> • CE3300: Risk, Reliability and Resilience Engineering (Undergraduate Level, Spring 20) • CE2101-01: Civil Engineering Information Systems (Undergraduate Level, Fall 19) 	Aug 2019 – Jan 2021
EXTERNAL SERVICES	Program Committee Member	
	• Association for the Advancement of Artificial Intelligence (AAAI)	2024
	• SIAM International Conference on Data Mining(SDM)	2024
	• ACM International Conference on Web Search and Data Mining (WSDM)	2024
	• SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2023
	• ACM International Conference on Web Search and Data Mining (WSDM)	2023
	• Association for the Advancement of Artificial Intelligence (AAAI)	2022
	• SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2022
	Conference Sub-Reviewer	
	• Association for the Advancement of Artificial Intelligence (AAAI)	2023
	• ACM International Conference on Web Search and Data Mining (WSDM)	2023
	• International Conference on Machine Learning (ICML)	2023
	• International Conference on Web and Social Media (ICWSM)	2023
	• SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2022
	• Neural Information Processing Systems (NeurIPS)	2022
	• SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)	2021
	• Conference on Information and Knowledge Management (CIKM)	2021
	• Advances in Social Networks Analysis and Mining (ASONAM)	2021
	• SIAM International Conference on Data Mining(SDM)	2021
	• International ACM Conference on Web Science (WebSci)	2021
	• The Web Conference (WWW)	2021
	Journal Reviewer	
	• ACM Transactions on Knowledge Discovery from Data (TKDD)	2023 – Present
	• Neural Networks	2023 – Present
	• IEEE Transactions on Knowledge and Data Engineering (TKDE)	2022 – Present
	• Data Mining and Knowledge Discovery (DAMI)	2022 – Present
	• Journal of Combinatorial Optimization (JOCO)	2022 – Present
VOLUNTEERING	Conference Volunteering	
	• Session chair at ICDM 2022 for “Graph Mining and Embedding”	2022
	• Volunteer at ICDM 2022	2022
	• Volunteer at CIKM 2022	2022
	• Volunteer at KDD 2022	2022
	• Session chair at KDD 2021 for “Recommender System”	2021
	• Volunteer at IJCAI 2021	2021
	• Volunteer at IJCAI 2020	2020