Yu Wang

CONTACT INFORMATION

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Twitter: https://twitter.com/YuWVandy
Google Scholar: https://scholar.google.com/citations?user=XPCmiz4AAAAJ

EDUCATION

Vanderbilt University

Doctor of Philosophy (Ph.D.) in Computer Science — Aug 2019-Summer 2024

- 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

Harbin Institute of Technology

Bachelor of Engineering (B.E.) — May 2019

- First-class People's Scholarship×4, National Scholarship×2, Rank 1/40
- Cumulative GPA: 4.0 / 4.0

RESEARCH EXPERIENCE

Network and Data Science Lab, Vanderbilt University
Ph.D. student — Jan 2021 – Present

- 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

Document Intelligence Team, Adobe Research
Research Scientist/Engineer Intern — May 2023 – Current

- 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

Recommendation Data Science Team, The Home Depot
Research Data Scientist — May 2022 – Aug 2022

- 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

Hiba Baroud Research Group, Vanderbilt University
Ph.D. student — Aug 2019 – Jan 2021

- 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

Taciroglu Research Group, UCLA-CSST
Undergraduate Summer Researcher — Jul 2019 – Sep 2019

- Project: Designing a modeling analysis tool for automatic bridge generation [poster]
- Mentors: Dr. Ertugrul Taciroglu, Dr. Barbaros Cetiner

Qingfei Gao Research Group, Harbin Institute of Technology
Undergraduate Summer Researcher — Oct 2018 – Jul 2019

- Project: Improving the existing percolation-based algorithm for bridge crack detection [paper]
- Mentors: Dr. Qingfei Gao

PUBLICATIONS

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

*	denotes co-first authors
†	denotes *graduate student mentored* by Yu Wang
††	denotes *undergraduate researcher/intern mentored* by Tyler Derr

Conference Papers (acceptance based on peer review of full paper)

• 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][Poster][Slides] (Acceptance Rate 19.2%)

• 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%)

• Yunchao "Lance" 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%)

• 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, USA, October 17-21, 2022.[Paper][Code](Acceptance rate 27.51%)

• 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, August 14-18, 2022. [Paper][Code](Acceptance rate 14.9% (research track))

• 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, August 14-18, 2022. [Paper][Code](Acceptance rate 25.9% (applied data science track))

• 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]

• 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%)

• 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]

• Yu Wang, Jin-Zhu Yu, and Hiba Baroud. "Quantifying the Interdependency Strength Across Critical Infrastructure Systems Using a Dynamic Network Flow Redistribution Model." ESREL 2020 PSAM 15, 2020.

Book Chapters

• Yu Wang, Wei Jin, and Tyler Derr. "Graph Neural Networks: Self-supervised Learning." In Graph Neural Networks: Foundations, Frontiers, and Applications (Eds. Lingfei Wu, Peng Cui, Jian Pei, and Liang Zhao). Springer, (2021). [Paper]

Journal Papers

• 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]

• 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.

Preprints and Submissions

• 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]

• 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]

• 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]

• 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]

• Yu Wang, Amin Javari, Janani Balaji, Walid Shalaby, Tyler Derr, Xiquan Cui "Multiplex Graph-Based Sequential Recommendation with Session-Adaptive Heterogeneous Propagation." 2023. (Submission in WSDM'24).

• Yu Wang, Charu Aggarwal, Tyler Derr. "Distance-wise Prototypical Graph Neural Network in Node Imbalance Classification." 2022. (Preprint) [Paper][Code]

• Yu Wang, Jin-Zhu Yu, Hiba Baroud. "A Bayesian Approach to Reconstructing Interdependent Infrastructure Networks from Cascading Failures ." 2022. (Preprint) [Paper]

SYMPOSIUMS / WORKSHOPS

• 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]

• Yu Wang. "Overcoming data quality issues of Graph Neural Networks." International Conference on Data Mining (SDM) Doctoral Forum, SIAM, Poster, 2022.

• 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]

• 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.

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

- 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/Workshop on Mining and Learning with Graphs (MLG)
- 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

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, and accelerated M.S. Computer Science Dec 2020 – May 2023
  - 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

TUTORIALS

Data Quality-Aware Graph Machine Learning 2023
- **Yu Wang**, Yijun Tian, Tong Zhao, Xiaorui Liu, Jian Kang, and Tyler Derr.
- Submission in SIAM International Conference on Data Mining (SDM24)

TEACHING EXPERIENCE

Vanderbilt University

Teaching Assistant, Department of Computer Science Jan 2021 – Now
- 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)

Teaching Assistant, Department of Civil and Environmental Engineering Aug 2019 – Jan 2021
- CE3300: Risk, Reliability and Resilience Engineering (Undergraduate Level, Spring 20)
- CE2101-01: Civil Engineering Information Systems (Undergraduate Level, Fall 19)

OTHER WORK EXPERIENCE

Adobe Research, Sanjose, CA, USA
Research Scientist/Engineer Intern — May 2023 – Present
- Project-1: Knowledge Graph Prompting for Multi-Document Question Answering [paper][demo]
- Project-2: Fairness in GNNs [paper]
- Project-3: Graph Verbalization via Topological-aware Positional Encoding [ongoing]
- Project-4: Collect Personalized-interaction with PDF-Document Data
- Mentors: Nedim Lipka, Ryan Rossi, Alexa Siu, Ruiyi Zhang, Manager: Tong Sun

HomeDepot Recommendation Data Science Team, Atlanta, Georgia, USA
Research Data Scientist Intern — May 2022 – Aug 2022
- Milestone-1: Knowledge Graph-enhanced Session Recommendation [paper]
- Milestone-2: Prototype the Designed Knowledge Graph-enhanced Session Recommendation Framework in A/B test.
- Mentors: Amin Javari, Walid Shalaby, Manager: Xiquan Cui

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

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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

[*CV compiled on 2023-10-12*]