College of Engineering and Computer Science
Office of the Dean
777 Glades Road, EE96, Room 308
Boca Raton, FL 33431
561.297.3400

Announces the Ph.D. Dissertation Defense of

Yufei Jin

for the degree of Doctor of Philosophy (Ph.D.)

TACKLING OVERSMOOTHING, HETEROGENEITY, AND LABEL DISTRIBUTIONS FOR ROBUST GRAPH LEARNING

July 27, 2026, 10:00 a.m.
Engineering East Building, EE405
777 Glades Road
Boca Raton, FL

https://fau-edu.zoom.us/j/5618090648?pwd=NScuzcL9kbKDL5lql8MB9oJNwtflnI.1

DEPARTMENT:
Department of Electrical Engineering and Computer Science

ADVISOR:

Xingquan (Hill) Zhu, Ph.D.

PH.D. SUPERVISORY COMMITTEE:
Laurent Cherubin, Ph.D.
Siddhartha Verma, Ph.D.
Yufei Tang, Ph.D.

ABSTRACT OF DISSERTATION

With the tremendous development of graph neural networks, graph learning has become a dominate solution applied to different applications naturally integrated with graph structures, including traffic networks, molecule networks, social networks, etc. While most existing graph learning solutions can handle homogeneous graphs (graphs with single node type and single edge type) and homophily graphs (graphs with node labels tend to be the same with their neighbors) on multi-class node classification downstream task well, in real world applications, graph structure can be more complex with heterogeneous graphs (graphs with multiple node types and edge types) or heterophilic graphs (graphs with node labels tend to vary with their neighbors) and more complex downstream tasks such as label distribution learning task. To allow graph learning to capture more complex graph topology and label space semantics, this dissertation focuses on homogeneous and heterogeneous graph label distribution learning tasks (rich label semantics under different graph topology complexity) and tackling oversmoothing for handling heterophilic graph learning (alleviating a major bottleneck that prevents graph learning on heterophilic graphs). Specifically, the following three problems will be studied: 1) We systematically study existing solution alleviating the oversmoothing problem that hurdles the heterophilic graph learning and present a new measure and new framework that alleviates oversmoothing problem; 2) We formulate a novel research problem homogeneous graph label distribution learning with label distribution learning put on homogeneous graph setting and present a new dual-GNN architecture to capture both label-label relation and node-node relation to reflect the more complex relations in the label space. 3) We extend the graph label distribution learning problem from homogeneous graph to heterogeneous graph setting and propose a scalable and efficient heterogeneous graph learning framework that unifies the different heterogeneous meta-paths before graph convolution layers to achieve a more efficient and accurate graph label distribution learning. Finally, For the heterophilic graph learning, we evaluated our proposed model and measure against existing state of the art baselines on various real-world datasets and benchmarks. For the newly formulated graph label distribution learning tasks, we

FLORIDA ATLANTIC UNIVERSITY

College of Engineering and Computer Science
Office of the Dean
777 Glades Road, EE96, Room 308
Boca Raton, FL 33431
561.297.3400

construct new benchmark datasets from existing real-world datasets and evaluated the effectiveness of our proposed frameworks with real-world datasets and benchmarks under standard label distribution learning evaluation metrics.

BIOGRAPHICAL SKETCH
Born in Suzhou, China
B.S., University of California, Santa Barbara, California, 2021
Ph.D., Florida Atlantic University, Boca Raton, Florida, 2026

CONCERNING PERIOD OF PREPARATION
& QUALIFYING EXAMINATION

Time in Preparation: 2021-2026

Qualifying Examination Passed: Fall 2022

Published Papers:

1. **Y. Jin and X. Zhu, "Predictive Masking for Semi-Supervised Graph Contrastive Learning," 2022 IEEE International Conference on Big Data (Big Data), Osaka, Japan, 2022, pp. 1266-1271, doi: 10.1109/BigData55660.2022.10020970.**
2. **Y. Jin and X. Zhu, "Graph Rhythm Network: Beyond Energy Modeling for Deep Graph Neural Networks", in Proceedings of the 2024 IEEE International Conference on Data Mining (ICDM), 2024, pp. 723–728.**
3. **Y. Jin, R. Gao, Y. He, and X. Zhu, "GLDL: Graph Label Distribution Learn- ing", in Proceedings of the AAAI Conference on Artificial Intelligence (AAAI), vol. 38, no. 11, pp. 12965-12974, Mar. 2024.**
4. **Y. Jin, H. Lian, Y. He, and X. Zhu, "HGDL: Heterogeneous Graph Label 10 Distribution Learning", in Proceedings of the Advances in Neural Information Processing Systems (NeurIPS), 2024, vol. 37, pp. 40792–40830.**
5. **Y. Jin and X. Zhu, "Oversmoothing alleviation in graph neural networks: a survey and unified view", Knowledge and Information Systems (KAIS), vol. 67, no. 12, pp. 11259–11285, Dec. 2025.**
6. **Y. Jin and X. Zhu, "A Systematic Study and Analysis of Graph Neural Networks under Noise", ACM Trans. Knowl. Discov. Data (TKDD), 19, 6, Article 113 (July 2025), 20 pages. https://doi.org/10.1145/3733605**
7. **J. Shen, Y. Jin, K. Feng, Y. He, and X. Zhu, "HGEN: heterogeneous graph ensemble networks", In Proceedings of the Thirty-Fourth International Joint Conference on Artificial Intelligence (IJCAI), 2025, Article 685, 6156–6163. https://doi.org/10.24963/ijcai.2025/685**
8. **J. Shen, Y. Jin, Y. He, and X. Zhu, "LHGEL: Large Heterogeneous Graph Ensemble Learning using Batch View Aggregation", in Proceedings of the 2025 IEEE International Conference on Data Mining (ICDM), 2025, pp. 713-722.**
9. **J. Shen, Y. Jin, and X. Zhu, "FAGEL: Fast and Accurate Graph Ensemble Learning using Staged Training and Diversified Sampling", in Proceedings of the 2026 European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), Sep 7-11, 2026.**