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# KAIXIONG ZHOU

## CONTACT INFORMATION

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## EDUCATION

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<b>Rice University, Houston, USA</b> Ph.D. Student in Computer Science Department of Computer Science	<i>August 2021 - Now</i>  Advisor: Dr. Xia Hu
<b>Texas A&amp;M University, College Station, USA</b> Ph.D. Student in Computer Science (Transfer Out) Department of Computer Science and Engineering	<i>August 2018 - August 2021</i>  Advisor: Dr. Xia Hu
<b>University of Science and Technology of China, Hefei, China</b> Master of Science in Information and Communication Engineering Department of Information Science and Technology	<i>September 2015 - June 2018</i>  Advisor: Dr. Chen Gong and Zhengyuan Xu
<b>Sun Yat-Sen University, Guangzhou, China</b> Bachelor in Electronic Information Science and Technology School of Information Science and Technology	<i>September 2011 - June 2015</i>  Advisor: Dr. Lin Zhang and Ming Jiang
Double Major in Mathematics and Applied Mathematics Department of Mathematics	

## RESEARCH INTERESTS

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I am broadly interested in large-scale graph machine learning to advance the frontiers of graph data analysis, including deep graph neural networks, efficient graph representation learning, graph quantum computing, and their applications to science problems in biochemical informatics.

## PUBLICATIONS

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**\* indicates an equal contribution; 13 papers are published as the first or co-first author; 3 first-author papers are under peer review; and 1 book chapter is published.**

[Frontier' 22] **Kaixiong Zhou**, Xiao Huang, Qingquan Song, Rui Chen, and Xia Hu. "Auto-GNN: Neural Architecture Search of Graph Neural Networks", In *Frontiers in Big Data-Machine Learning and Artificial Intelligence*.

[QTML' 22] **Kaixiong Zhou**, Zhenyu Zhang, Shengyuan Chen, Tianlong Chen, Xiao Huang, Zhangyang Wang, and Xia Hu. "QuanGCN: Noise-Adaptive Training for Robust Quantum Graph Convolutional Networks", In *Quantum Techniques in Machine Learning*.

[NeurIPS' 22] Keyu Duan, Zirui Liu, Peihao Wang, Wenqing Zheng, **Kaixiong Zhou**, Tianlong Chen, Xia Hu, Zhangyang Wang. "A Comprehensive Study on Large-Scale Graph Training: Benchmarking and Rethinking", In *Conference on Neural Information Processing Systems*.

[CIKM' 22] **Kaixiong Zhou\***, Yili Wang\*, Rui Miao, Ninghao Liu, Xin Wang. "AdaGCL: Adaptive Subgraph Contrastive Learning to Generalize Large-scale Graph Training", In *ACM International Conference on Information and Knowledge Management*.

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- [RecSys’ 22] Huiyuan Chen, Xiaoting Li, **Kaixiong Zhou**, Xia Hu, Chin-Chia Michael Yeh, Yan Zheng, Hao Yang. “TinyKG: Memory-Efficient Training Framework for Knowledge Graph Neural Recommender Systems”, In *ACM Recommender Systems Conference*.
- [KDD’ 22] **Kaixiong Zhou\***, Mingchen Sun\*, Xin He, Ying Wang, and Xin Wang. “GPPT: Graph Pre-training and Prompt Tuning to Generalize Graph Neural Networks”, In *ACM SIGKDD Conference on Knowledge Discovery and Data Mining*.
- [TPAMI’ 22] **Kaixiong Zhou\***, Tianlong Chen\*, Keyu Duan, Wenqing Zheng, Peihao Wang, Xia Hu, Zhangyang Wang. “Bag of Tricks for Training Deeper Graph Neural Networks: A Comprehensive Benchmark Study”, In *IEEE Transactions on Pattern Analysis and Machine Intelligence*.
- [IJCAI’ 22] **Kaixiong Zhou**, Zirui Liu, Rui Chen, Li Li, Soo-Hyun Choi, and Xia Hu. “Table2Graph: Transforming Tabular Data to Unified Weighted Graph”, In *Proceedings of International Joint Conference on Artificial Intelligence*.
- [AutoML-Conf’ 22] Duc N.M Hoang, **Kaixiong Zhou**, Tianlong Chen, Xia Hu, and Zhangyang Wang. “AutoCoG: A Unified Data-Model Co-Search Framework for Graph Neural Networks”, In *International Conference on Automated Machine Learning*.
- [SIGIR’ 22] Huiyuan Chen, **Kaixiong Zhou**, Kwei-Herng Lai, Xia Hu, Fei Wang, and Hao Yang. “Adversarial Graph Perturbations for Recommendations at Scale” (short paper), In *International ACM SIGIR Conference on Research and Development in Information Retrieval*.
- [GLB’ 22] Keyu Duan, Zirui Liu, Wenqing Zheng, Peihao Wang, **Kaixiong Zhou**, Tianlong Chen, Zhangyang Wang, and Xia Hu. “Benchmarking Large-Scale Graph Training Over Effectiveness And Efficiency”, In *Workshop of the Graph Learning Benchmarks of The Web Conference*.
- [ICLR’ 22] Zirui Liu, **Kaixiong Zhou**, Fan Yang, Li Li, Rui Chen, and Xia Hu. “EXACT: Scalable Graph Neural Networks Training via Extreme Activation Compression”, In *International Conference on Learning Representation*.
- [ICLR’ 22] Zhimeng Jiang, **Kaixiong Zhou**, Zirui Liu, Li Li, Rui Chen, Soo-Hyun Choi, and Xia Hu. “An Information Fusion Approach to Learning with Instance-Dependent Label Noise”, In *International Conference on Learning Representation*.
- [SDM’ 22] Daochen Zha, Kwei-Herng Lai, **Kaixiong Zhou**, and Xia Hu. “Towards Similarity-Aware Time-Series Classification with Graph Neural Networks”, In *Proceedings of SIAM International Conference on Data Mining*.
- [AAAI’ 22] Kai Guo, **Kaixiong Zhou**, Xia Hu, Yu Li, Yi Chang, Xin Wang. “Orthogonal Graph Neural Networks”, In *AAAI Conference on Artificial Intelligence*.
- [NeurIPS’ 21] **Kaixiong Zhou**, Xiao Huang, Daochen Zha, Rui Chen, Li Li, Soo-Hyun Choi, and Xia Hu. “Dirichlet Energy Constrained Learning for Deep Graph Neural Networks”, In *Conference on Neural Information Processing Systems*.
- [ICCV’ 21] Zirui Liu, Haifeng Jin, Ting-Hsiang Wang, **Kaixiong Zhou**, and Xia Hu. “DivAug: Plug-in Automated Data Augmentation with Explicit Diversity Maximization”, In *International Conference on Computer Vision*.
- [TNNLS’ 21] Yuening Li, Zhengzhang Chen, Daochen Zha, **Kaixiong Zhou**, Haifeng Jin, Haifeng Chen, and Xia Hu. “AutoAD: Automated Anomaly Detection via Curiosity-guided Search and Self-imitation Learning”, In *IEEE Transactions on Neural Networks and Learning Systems*.

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- [SIGIR’ 21] Huachi Zhou, Qiaoyu Tan, Xiao Huang, **Kaixiong Zhou**, and Xiaoling Wang. “Temporal Augmented Graph Neural Networks for Session-Based Recommendations” (short paper), In *International ACM SIGIR Conference on Research and Development in Information Retrieval*.
- [NeurIPS’ 20] **Kaixiong Zhou**, Xiao Huang, Yuening Li, Daochen Zha, Rui Chen, and Xia Hu. “Towards Deeper Graph Neural Networks with Differentiable Group Normalization”, In *Conference on Neural Information Processing Systems*.
- [NeurIPS’ 20] Zirui Liu, Qingquan Song, **Kaixiong Zhou**, Ting-Hsiang Wang, Xia Hu. “Detecting Interactions from Neural Networks via Topological Analysis”, In *Conference on Neural Information Processing Systems*.
- [ICDE’ 20] Yuening Li, Zhengzhang Chen, Daochen Zha, **Kaixiong Zhou**, Haifeng Jin, Haifeng Chen, and Xia Hu. “Neural Architecture Search for Outlier Detction” (short paper), In *International Conference on Data Engineering*.
- [KDD’ 20] Kwei Herng Lai, Daochen Zha, **Kaixiong Zhou**, and Xia Hu. “Aggregation Optimization for Graph Neural Networks”, In *ACM SIGKDD Conference on Knowledge Discovery and Data Mining*.
- [IJCAI’ 20] **Kaixiong Zhou**, Qingquan Song, Xiao Huang, Daochen Zha, Na Zou, Xia Hu. “Multi-Channel Graph Convolutional Networks”, In *International Joint Conference on Artificial Intelligence*.
- [SDM’ 20] Fan Yang, Ninghao Liu, Mengnan Du, **Kaixiong Zhou**, Shuiwang Ji, and Xia Hu. “Deep Neural Networks with Knowledge Instillation”, In *SIAM International Conference on Data Mining*.
- [IJCAI’ 19] Daochen Zha, Kwei-Herng Lai, **Kaixiong Zhou**, and Xia Hu. “Experience Replay Optimization”, In *International Joint Conference on Artificial Intelligence*.
- [JOCN’ 17] **Kaixiong Zhou**, Chen Gong, Nan Wu, and Zhengyuan Xu. “Distributed Channel Allocation and Rate Control for Hybrid FSO/RF Vehicular Ad Hoc Networks”, In *IEEE/OSA Journal of Optical Communications and Networking*.
- [JLT’ 17] **Kaixiong Zhou**, Chen Gong, and Zhengyuan Xu. “Color Planning and Inter-Cell Interference Coordination for Multi-Color Visible Light Communication Networks”, In *IEEE/OSA Journal of Lightwave Technology*.
- [WCSP’ 17] Mian Zeng, **Kaixiong Zhou**, Chen Gong, Shun Lou, and Zhengyuan Xu. “Design and Demonstration of Indoor Visible Light Communication Network with Dynamic User Access and Resource Allocation”, *IEEE International Conference on Wireless Communication and Signal Processing*.
- [GlobalSIP’ 16] **Kaixiong Zhou**, Chen Gong, Qian Gao, and Zhengyuan Xu. “Inter-Cell Interference Coordination for Multi-Color Visible Light Communication Networks”, In *IEEE Global Conference on Signal and Information Processing*.
- [ICCC’ 15] **Kaixiong Zhou**, Lin Zhang, and Ming Jiang. “Enhanced Effective SNR Prediction for LTE Downlink”, In *IEEE International Conference in Communication in China*.

## PREPRINTS AND UNDER REVIEW

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- [Under review] **Kaixiong Zhou**, Ninghao Liu, Fan Yang, Zirui Liu, Rui Chen, Li Li, Soo-Hyun Choi, and Xia Hu. “Adaptive Label Smoothing To Regularize Large-Scale Graph Training”.
- [Under review] **Kaixiong Zhou**, Xiao Huang, Zirui Liu, Rui Chen, Li Li, Soo-Hyun Choi, and Xia Hu. “Graph isolated training towards efficient graph neural networks”.
- [Under review] **Kaixiong Zhou\***, Cameron Diao\*, Xiao Huang, and Xia Hu. “Molcpt: Molecule continuous prompt tuning to generalize molecular representation learning”.

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## BOOK CHAPTER

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**Kaixiong Zhou**, Zirui Liu, Keyu Duan, and Xia Hu. “Graph Neural Networks: AutoML”, In *Graph Neural Networks: Foundations, Frontiers, and Applications*.

## WORK EXPERIENCE

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<b>Google Research.</b> Title: Research Scientist Intern.	<i>May 2022-August 2022</i>
<b>Visa Research.</b> Title: Research Scientist Intern.	<i>May 2021-August 2021</i>
<b>Samsung Research America.</b> Title: Research Scientist Intern.	<i>May 2020-August 2020</i>

## TEACHING EXPERIENCE

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<b>Teaching Assistant</b> , Department of Computer Science, Rice University COMP 680 Statistics for Computing and Data Science	<i>Fall 2022</i>
<b>Guest Lecturer</b> , School of Information, University of Texas at Austin The Basic and Advance of Graph Neural Networks	<i>Fall 2022</i>

## SELECTED MENTORSHIP

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- Cameron Diao, Undergraduate at Rice University. “Molecular representation learning”, submission.
- Aditi Khandelwal, Undergraduate at Indian Institute of Technology. “Causal learning”, ongoing.
- Keyu Duan, Ph.D. at National University of Singapore. “Large-scale graph training”, NeurIPS 2022.
- Duc N.M Hoang, Ph.D. at University of Texas at Austin. “Automated GNNs”, AutoML-Conf 2022.
- Yucheng Shi, Ph.D. at University of Georgia. “Graph data augmentation”, in submission.
- Zhimeng Jiang, Ph.D. at Texas A&M University, “Noise mitigation”, ICLR 2022.
- Zirui Liu, Ph.D. at Rice University. “Graph representation quantization”, ICLR 2022.
- Mingchen Sun, Ph.D. at Jilin University. “Graph meta learning”, KDD 2022.
- Yili Wang, Ph.D. at Jilin University. “Graph contrastive learning”, CIKM 2022.
- Kai Guo, Ph.D. at Jilin University. “Deep graph neural networks”, AAAI 2022.

## RESEARCH PROPOSAL WRITING

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**Amazon Research Award: Towards Sequential Recommendation Systems with Dynamic Sparse-Interest Memor**

PI: Xia Hui

*October 2022*

Led the effort and wrote the full proposal.

**Visa Research Award: Scalable Representation Learning Frameworks To Model Sophisticated Interactions In Large-Scale Graph And Tabular Data**

PI: Xia Hui

*August 2021*

Led the effort and wrote the full proposal.

**NSF FAI: Towards Fairness in Deep Neural Networks with Learning Interpretation**

PI: Xia Hu; Co-PI: James Caverlee, Na Zou, Chaitanya Lakkimsetti

*September 2021*

Contributed to the proposal writing in one of the research objectives of “Enhancing Fairness via Feature Interpretation”.

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## RESEARCH EXPERIENCE

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**Ph.D., Rice University**

*August 2021-Now*

Large-scale graph training, graph quantum computing, graph machine learning systems.

**Ph.D., Texas A&M University**

*August 2018-August 2021*

Automated graph neural networks, deep graph neural networks, biochemical molecule analysis.

**Master, University of Science and Technology of China**

*September 2015 - June 2018*

Medium access control and channel coding for wireless visible light communication.

**Bachelor, Sun Yat-Sen University**

*2013 - June 2015*

Medium access control for wireless communication.

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## ACADEMIC SERVICES

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**Program Committee Member:** CIKM' 20, AAAI' 21, ICML' 21, NeurIPS' 21, SIGKDD' 21, AAAI' 22, ICLR' 22, SIGKDD' 22, ICML' 22, IJCAI' 22, NeurIPS 2022.

**Journal Reviewer:** TPAMI.

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## HONORS, AWARDS, & FELLOWSHIPS

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- Student Travel Grant, CIKM 2022.
- Student Travel Award, KDD 2022.
- Excellent Graduates in Anhui Province, China, 2018.
- Outstanding Graduates Awards, USTC, 2018.
- National Scholarship for Outstanding Graduate Student, 2017.
- First Prize of Excellent Student Scholarship of SYSU, 2012,2013 (top 5%).