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1 https://imczq.com
update date: July 30, 2024

Zhiqian Chen

Research Interests

Application Dynamics on Graphs including epidemiology, info propagation, traffic, supply chain, finacial network, etc

Method Spectral Graph, Combinatorial Optimization, Higher-order Analysis, Uncertainty Quantification

Employment History

2020-now Assistnat Professor, Computer Science and Engineering, Mississippi State University.

Education

- 2014–2020 Ph.D., Computer Science, Virginia Tech, Falls Church, Virginia, United States.
- 2010–2013 M.E., Software Engineering, Peking University, China.
- 2005–2009 B.E., Software Engineering / B.A., Japanese Language, Huazhong Univ. of Sci. & Tech., China.

Grants

Personal Credits: \$1,054,782 / Total External: \$10,645,244

- NSF [CNS] MSI: RCBP: III: Advancing Speech Detection: A Hybrid Approach Using Large Language Models and Graph Neural Networks (#2431176),
 - Co-PI, \$400,000 (33% credit, MS State share \$259,948.00), 1/2025-12/2026
- NSF [CNS] CIRC: Planning-C: Synergistic Graph Flow Analytics: An Integrated Infrastructure for Bridging Complexity, Fragmentation, and Interdisciplinary Gaps (#2345921),
 - PI, \$99,998 (60% credit), 7/2024-6/2025
- NSF [III] CRII: Interpretable Influence Propagating and Blocking on Graphs (#2153369), PI, \$174,004 (100% credit), 5/2022-11/2024
- **USDA** [ARS] Developing Detection and Modeling Tools for the Geospatial and Environmental Epidemiology of Animal Disease (#58-6064-3-017)
 - Co-PI, \$3,073,602 (5% credit), 10/2023-08/2028
- USDA [ARS] Advancing Agricultural Research through High Performance Computing (#58-0200-0-002) Co-PI, \$5,690,689 (5% credit), 10/2022-08/2024
 - NSF [EDU] ITEST: Learning to create Intelligent Solutions with Machine Learning and Computer Vision: A Pathway to AI Careers for Diverse High School Students (#2342574)
 - Co-PI, \$1,192,951 (20% credit), 09/2024-08/2027
 - NSF [III] REU Supplementary, PI, \$14,000 (100% credit)

Total Internal \$ 14,100

- MS State PI, Global Development Seed Grant Award, International Institute \$6,000
- MS State PI, Working Group in Graph AI, Bagley College of Engineering \$4,100
- MS State PI/Co-PI, Undergraduate Research Program, ORED, 2022 (PI, \$2,000), 2023 (Co-PI, \$1,500), 2024 (PI, \$2,000)

Award & Honor

- Award Best Paper Award at ACM SIGSPATIAL 2020 Entrys://www.sigspatial.org/people/award-recipients/
- Award Best Paper Award at GISTAM 2015 Entrys://gistam.scitevents.org/PreviousAwards.aspx
- Award Outstanding Contribution Award, 2016, Intern at Toyota Research Institute, North America (TRI-NA)
- Honor Editor's Choice Article, www.mdpi.com/journal/sensors/editors_choice
- Honor Top 50 Chemistry and Material Sciences Articles in Nature Communications 2019.

 The www.nature.com/collections/giacagiaca

 | Waterial | Sciences | Articles | In Nature | Communications | 2019.
- Honor Excellent Reviewer, IEEE Transactions on Network Science and Engineering Journal, 2024

Mentoring (as Major Advisor)

Graduate **Ph.D.**: Zonghan Zhang, Zijian Zhang, Amin George, Josh Waldbieser, Jiashan Wu, Rocker D'Antonio, Peter Dinh, Josh Dowdy. **Master**: Ramyasri Veerapaneni

Undergrad Reid Sewell, Jason Weeks.

Alumnus **Graduate**: Samuel Prabhakar, Rajeev Jogi, Piero Bracamonte, Suman Adhikari; **Undergrad**: Ben Moore, Jack Maloney, Ethan Rogers, Prathyusha Mustiyala, Andrew McBride, Aalok Uprety, Mason Fisher.

Talks

Tutorial Unifying Spectral and Spatial Graph Neural Network

SIAM MDS 2024, Oct 23, Atlanta, GA, U.S.

https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=80791

Tutorial Unifying Spectral and Spatial Graph Neural Network

CVPR 2024, June 18, Seattle, Washington, U.S. Thttps://cvpr.thecvf.com/virtual/2024/tutorial/23726

Paper Early forecasting of the impact of traffic accidents using a single shot observation

SIAM Data Mining 2022, April, Minneapolis, Minnesota, U.S.

Tutorial Studying spread patterns of covid-19 based on spatiotemporal data

SIAM Data Mining 2021, April, Online

Teaching

Split-level CSE 4633/6633 Artificial Intelligence, CSE 4693/6693 Intro to Machine Learning

Graduate CSE 8673 Machine Learning, CSE 8990 Graph Machine Learning

Service

Reviewer International Conference on Machine Learning (ICML), 2021-2024. International Conference on Learning Representations (ICLR), 2022-2023. Neural Information Processing System (NeurIPS), 2020-2022. AAAI conference on Artificial Intelligence (AAAI), 2021-2023. International Joint Conference on Artificial Intelligence (IJCAI), 2022-2024. ACM SIG on Knowledge Discovery and Data Mining (KDD), 2020-2024. ACM SIG on Information Retrieval (SIGIR), 2020, 2022, 2023. IEEE Transactions on Knowledge and Data Engineering (TKDE), 2020. ACM Transactions on Knowledge Discovery from Data (TKDD), 2021, 2024

Editorial Frontiers in Big Data - Data Science, Frontiers in Big Data - Data Mining and Management, Frontier Topic

Board Editor, 2022-present

Co-Chair IEEE BigData 2024, Bigdata Cup Challenges

Panelist NSF Panel, 2021, 2023, 2024

Publications

- [1] Zijian Zhang, Zonghan Zhang, and Zhiqian Chen. Flowgpt: How long can llms trace back and predict the trends of graph dynamics?
- [2] Taoran Ji, Nathan Self, Kaiqun Fu, Zhiqian Chen, Naren Ramakrishnan, and Chang-Tien Lu. Citation forecasting with multi-context attention-aided dependency modeling. ACM Transactions on Knowledge Discovery from Data, 2024.
- [3] Zirui Yuan, Minglai Shao, and Zhiqian Chen. Graph bayesian optimization for multiplex influence maximization. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 38, pages 22475–22483, 2024.
- [4] Zonghan Zhang, Zijian Zhang, and Zhiqian Chen. Multiple-source localization from a single-snapshot observation using graph bayesian optimization. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 38, pages 22538–22546, 2024.
- [5] Kourosh T Baghaei, Amirreza Payandeh, Pooya Fayyazsanavi, Zhiqian Chen, Somayeh Bakhtiari Ramezani, and Shahram Rahimi. Deep representation learning: Fundamentals, technologies, applications, and open challenges. *IEEE Access*, 2023.
- [6] Subhodip Biswas, Fanglan Chen, Zhiqian Chen, Chang-Tien Lu, and Naren Ramakrishnan. Memetic algorithms for spatial partitioning problems. *ACM Transactions on Spatial Algorithms and Systems*, 9(1):1–31, 2023.
- [7] Fanglan Chen, Subhodip Biswas, Zhiqian Chen, Shuo Lei, Naren Ramakrishnan, and Chang-Tien Lu.

- Exploring tradeoffs in automated school redistricting: Computational and ethical perspectives. In *Proceedings* of the AAAI Conference on Artificial Intelligence, volume 37, pages 15912–15920, 2023.
- [8] Zhiqian Chen, Fanglan Chen, Lei Zhang, Taoran Ji, Kaiqun Fu, Liang Zhao, Feng Chen, Lingfei Wu, Charu Aggarwal, and Chang-Tien Lu. Bridging the gap between spatial and spectral domains: A unified framework for graph neural networks. *ACM Computing Surveys*, 56(5):42, 2023.
- [9] Nisha Pillai, Bindu Nanduri, Michael J Rothrock, Zhiqian Chen, and Mahalingam Ramkumar. Towards optimal microbiome to inhibit multidrug resistance. In 2023 IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB), pages 1–9. IEEE, 2023.
- [10] Lei Zhang, Zhiqian Chen, Chang-Tien Lu, and Liang Zhao. Fast and adaptive dynamics-on-graphs to dynamics-of-graphs translation. *Frontiers in big Data*, 6, 2023.
- [11] Lei Zhang, Qisheng Zhang, Zhiqian Chen, Yanshen Sun, Chang-Tien Lu, and Liang Zhao. Infinitely deep graph transformation networks. In 2023 IEEE International Conference on Data Mining (ICDM), pages 778–787. IEEE Computer Society, 2023.
- [12] Zijian Zhang, Zonghan Zhang, and Zhiqian Chen. Xflow: Benchmarking flow behaviors over graphs. arXiv preprint arXiv:2308.03819, 2023.
- [13] Zonghan Zhang and Zhiqian Chen. Accelerating simulation-based influence maximization via bayesian optimization. 2023.
- [14] Zonghan Zhang and Zhiqian Chen. Understanding influence maximization via higher-order decomposition. In *Proceedings of the 2023 SIAM International Conference on Data Mining (SDM)*, pages 766–774. Society for Industrial and Applied Mathematics, 2023.
- [15] Subhodip Biswas, Fanglan Chen, Zhiqian Chen, Chang-Tien Lu, and Naren Ramakrishnan. Sampling-based techniques for designing school boundaries. arXiv preprint arXiv:2206.03703, 2022.
- [16] Zhiqian Chen and Zonghan Zhang. Demystifying graph convolution with a simple concatenation. arXiv preprint arXiv:2207.12931, 2022.
- [17] Guangyu Meng, Qisheng Jiang, Kaiqun Fu, Beiyu Lin, Chang-Tien Lu, and Zhqian Chen. Early forecasting of the impact of traffic accidents using a single shot observation. In *Proceedings of the 2022 SIAM International Conference on Data Mining (SDM)*, pages 100–108. Society for Industrial and Applied Mathematics, 2022.
- [18] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Machine learning for computer scientists and data analysts: From an applied perspective, 2022.
- [19] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Adversarial machine learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 305–328. Springer International Publishing Cham, 2022.
- [20] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Applied machine learning for cloud resource management. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 405–427. Springer International Publishing Cham, 2022.
- [21] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. A brief review of probability theory and linear algebra. *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 35–79, 2022.
- [22] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Graph learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 277–304. Springer International Publishing Cham, 2022.
- [23] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Online learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 235–256. Springer International Publishing Cham, 2022.
- [24] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Recommender learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 257–276. Springer International Publishing Cham, 2022.
- [25] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Reinforcement learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 217–232. Springer International Publishing Cham, 2022.

- [26] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Sensornet: An educational neural network framework for low-power multimodal data classification. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 331–357. Springer International Publishing Cham, 2022.
- [27] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Supervised learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 81–162. Springer International Publishing Cham, 2022.
- [28] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Transfer learning in mobile health. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 359–382. Springer International Publishing Cham, 2022.
- [29] Setareh Rafatirad, Houman Homayoun, Zhiqian Chen, and Sai Manoj Pudukotai Dinakarrao. Unsupervised learning. In *Machine Learning for Computer Scientists and Data Analysts: From an Applied Perspective*, pages 163–216. Springer International Publishing Cham, 2022.
- [30] Jason Wang, Kaiqun Fu, Zhiqian Chen, and Chang-Tien Lu. Augmentation of chinese character representations with compositional graph learning (student abstract). In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 36, pages 13075–13076, 2022.
- [31] Lei Zhang, Zhiqian Chen, Chang-Tien Lu, and Liang Zhao. From "dynamics on graphs" to "dynamics of graphs": An adaptive echo-state network solution (student abstract). In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 36, pages 13111–13112, 2022.
- [32] Zonghan Zhang, Subhodip Biswas, Fanglan Chen, Kaiqun Fu, Taoran Ji, Chang-Tien Lu, Naren Ramakrishnan, and Zhiqian Chen. Blocking influence at collective level with hard constraints (student abstract). In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 36, pages 13115–13116, 2022.
- [33] Zhiqian Chen, Lei Zhang, Gaurav Kolhe, Hadi Mardani Kamali, Setareh Rafatirad, Sai Manoj Pudukotai Dinakarrao, Houman Homayoun, Chang-Tien Lu, and Liang Zhao. Deep graph learning for circuit deobfuscation. Frontiers in big Data, 4:608286, 2021.
- [34] Kaiqun Fu, Taoran Ji, Nathan Self, Zhiqian Chen, and Chang-Tien Lu. A hierarchical attention graph convolutional network for traffic incident impact forecasting. In 2021 IEEE International Conference on Big Data (Big Data), pages 1619–1624. IEEE, 2021.
- [35] Taoran Ji, Nathan Self, Kaiqun Fu, Zhiqian Chen, Naren Ramakrishnan, and Chang-Tien Lu. Dynamic multi-context attention networks for citation forecasting of scientific publications. In *Proceedings of the* AAAI Conference on Artificial Intelligence, volume 35, pages 7953–7960, 2021.
- [36] Guoming Li, Yanbo Huang, Zhiqian Chen, Gary D Chesser Jr, Joseph L Purswell, John Linhoss, and Yang Zhao. Practices and applications of convolutional neural network-based computer vision systems in animal farming: A review. *Sensors*, 21(4):1492, 2021.
- [37] Guoming Li, Xue Hui, Zhiqian Chen, Gary D Chesser Jr, and Yang Zhao. Development and evaluation of a method to detect broilers continuously walking around feeder as an indication of restricted feeding behaviors. *Computers and electronics in agriculture*, 181:105982, 2021.
- [38] Beiyu Lin, Xiaowei Jia, and Zhiqian Chen. Sdm 21 tutorial: Studying spread patterns of covid-19 based on spatiotemporal data. In SIAM Data Mining 2021, 2021.
- [39] Padmaksha Roy, Shailik Sarkar, Subhodip Biswas, Fanglan Chen, Zhiqian Chen, Naren Ramakrishnan, and Chang-Tien Lu. Deep diffusion-based forecasting of covid-19 by incorporating network-level mobility information. In *Proceedings of the 2021 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, pages 168–175, 2021.
- [40] Subhodip Biswas, Fanglan Chen, Zhiqian Chen, Chang-Tien Lu, and Naren Ramakrishnan. Incorporating domain knowledge into memetic algorithms for solving spatial optimization problems. In *Proceedings of the 28th International Conference on Advances in Geographic Information Systems*, pages 25–35, 2020.
- [41] Subhodip Biswas, Fanglan Chen, Andreea Sistrunk, Sathappan Muthiah, Zhiqian Chen, Nathan Self, Chang-Tien Lu, and Naren Ramakrishnan. Geospatial clustering for balanced and proximal schools. In *Proceedings of the AAAI Conference on Artificial Intelligence*, volume 34, pages 13358–13365, 2020.
- [42] Fanglan Chen, Zhiqian Chen, Subhodip Biswas, Shuo Lei, Naren Ramakrishnan, and Chang-Tien Lu. Graph convolutional networks with kalman filtering for traffic prediction. In *Proceedings of the 28th international conference on advances in geographic information systems*, pages 135–138, 2020.

- [43] Zhiqian Chen, Gaurav Kolhe, Setareh Rafatirad, Chang-Tien Lu, Sai Manoj PD, Houman Homayoun, and Liang Zhao. Estimating the circuit de-obfuscation runtime based on graph deep learning. In 2020 Design, Automation & Test in Europe Conference & Exhibition (DATE), pages 358–363. IEEE, 2020.
- [44] Zhao Ding, Zhiqian Chen, Tianyi Ma, Chang-Tien Lu, Wenhui Ma, and Leon Shaw. Predicting the hydrogen release ability of libh4-based mixtures by ensemble machine learning. *Energy Storage Materials*, 27:466–477, 2020.
- [45] Zhao Ding, Shaoyuan Li, Yang Zhou, Zhiqian Chen, Weijie Yang, Wenhui Ma, and Leon Shaw. Libh4 for hydrogen storage-new perspectives. *Nano Materials Science*, 2(2):109–119, 2020.
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- [47] Subhodip Biswas, Fanglan Chen, Zhiqian Chen, Andreea Sistrunk, Nathan Self, Chang-Tien Lu, and Naren Ramakrishnan. Regal: A regionalization framework for school boundaries. In *Proceedings of the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems*, pages 544–547, 2019.
- [48] Taoran Ji, Zhiqian Chen, Nathan Self, Kaiqun Fu, Chang-Tien Lu, and Naren Ramakrishnan. Patent citation dynamics modeling via multi-attention recurrent networks. In *Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI-19)*, 2019.
- [49] Ying Zhang, Xingfeng He, Zhiqian Chen, Qiang Bai, Adelaide M Nolan, Charles A Roberts, Debasish Banerjee, Tomoya Matsunaga, Yifei Mo, and Chen Ling. Unsupervised discovery of solid-state lithium ion conductors. *Nature communications*, 10(1):5260, 2019.
- [50] Zhiqian Chen, Feng Chen, Rongjie Lai, Xuchao Zhang, and Chang-Tien Lu. Rational neural networks for approximating graph convolution operator on jump discontinuities. In 2018 IEEE International Conference on Data Mining (ICDM), pages 59–68. IEEE, 2018.
- [51] Kaiqun Fu, Zhiqian Chen, and Chang-Tien Lu. Streetnet: preference learning with convolutional neural network on urban crime perception. In *Proceedings of the 26th ACM SIGSPATIAL international conference on advances in geographic information systems*, pages 269–278, 2018.
- [52] Manu Shukla, Zhiqian Chen, and Chang-Tien Lu. Dimpl: a distributed in-memory drone flight path builder system. *Journal of Big Data*, 5:1–29, 2018.
- [53] Bingsheng Wang, Zhiqian Chen, Arnold P Boedihardjo, and Chang-Tien Lu. Virtual metering: An efficient water disaggregation algorithm via nonintrusive load monitoring. ACM Transactions on Intelligent Systems and Technology (TIST), 9(4):1–30, 2018.
- [54] Xuchao Zhang, Liang Zhao, Zhiqian Chen, and Chang-Tien Lu. Distributed self-paced learning in alternating direction method of multipliers. arXiv preprint arXiv:1807.02234, 2018.
- [55] Zhiqian Chen, Chih-Wei Wu, Yen-Cheng Lu, Alexander Lerch, and Chang-Tien Lu. Learning to fuse music genres with generative adversarial dual learning. In 2017 IEEE International Conference on Data Mining (ICDM), pages 817–822. IEEE, 2017.
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- [58] Xuchao Zhang, Liang Zhao, Zhiqian Chen, Arnold P Boedihardjo, Jing Dai, and Chang-Tien Lu. Trendi: Tracking stories in news and microblogs via emerging, evolving and fading topics. In 2017 IEEE International Conference on Big Data (Big Data), pages 1590–1599. IEEE, 2017.
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- [60] Manu Shukla, Ziqian Chen, and Chang-Tien Lu. Difpl: Distributed drone flight path builder system. In 2015 1st International Conference on Geographical Information Systems Theory, Applications and Management (GISTAM), pages 1–10. IEEE, 2015.

[61]	Zhiqian Chen International	and Wenya Conference	Feng. Detection Tools with	ng impolite cr Artificial Int	awler by using elligence, page	time series an es 123–126. IE	alysis. In <i>2013</i> EE, 2013.	$\it IEEE~25th$