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update date: June 7, 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–present **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

Total External Credits: $ 864,808.75 / **Total External: $ 10,145,246**

NSF CRII: Interpretable Influence Propagating and Blocking on Graphs (#2153369),
PI, **$174,004** (100% credit), 5/2022-11/2024

USDA 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 Advancing Agricultural Research through High Performance Computing (#58-0200-0-002)
Co-PI, **$5,690,689** (5% credit), 10/2022-08/2024

NSF 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 REU Supplementary, PI, **$14,000** (100% credit)

Total Internal Credits $ 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 https://www.sigspatial.org/people/award-recipients/

Award Best Paper Award at GISTAM 2015

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. www.nature.com/collections/giacagiaca

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.

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

[46] Jianfeng He, Xuchao Zhang, Shuo Lei, Zhiqian Chen, Fanglan Chen, Abdulaziz Alhamadani, Bei Xiao, and ChangTien Lu. Towards more accurate uncertainty estimation in text classification. In *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pages 8362–8372, 2020.

[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.

[56] Zhiqian Chen, Xuchao Zhang, Arnold P Boedihardjo, Jing Dai, and Chang-Tien Lu. Multimodal storytelling via generative adversarial imitation learning. In *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence (IJCAI-17)*, 2017.

[57] Xuchao Zhang, Zhiqian Chen, Liang Zhao, Arnold P Boedihardjo, and Chang-Tien Lu. Traces: Generating twitter stories via shared subspace and temporal smoothness. In *2017 IEEE International Conference on Big Data (Big Data)*, pages 1688–1693. IEEE, 2017.

[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.

[59] Xuchao Zhang, Zhiqian Chen, Weisheng Zhong, Arnold P Boedihardjo, and Chang-Tien Lu. Storytelling in heterogeneous twitter entity network based on hierarchical cluster routing. In *2016 IEEE International Conference on Big Data (Big Data)*, pages 1522–1531. IEEE, 2016.

[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 and Wenya Feng. Detecting impolite crawler by using time series analysis. In *2013 IEEE 25th International Conference on Tools with Artificial Intelligence*, pages 123–126. IEEE, 2013.