

Hua Wei

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CURRENT POSITION **Assistant Professor, Arizona State University** Aug. 2023 - Present
School of Computing and Augmented Intelligence

EDUCATION **Pennsylvania State University** Aug. 2017 - Dec. 2020
Ph.D., College of Information Sciences and Technology, Pennsylvania State University
• Advisor: [Dr. Zhenhui \(Jessie\) Li](#)

RESEARCH INTERESTS Reinforcement learning, data mining, simulation.

PUBLICATIONS

Refereed Journal Publications

- [J1]: Hao Mei*, Xiaoliang Lei, Longchao Da, Bin Shi, **Hua Wei**. 2023. LibSignal: An Open Library for Traffic Signal Control. Machine Learning (MLJ, IF: 7.5). Springer, 2023.
- [J2]: Wenlu Du, Ankan Dash, Jing Li, Hua Wei, Guiling Wang. 2023. Safety in Traffic Management Systems: A Comprehensive Survey. Designs, 2023, 7(4): 100..
- [J3]: Zhiyuan Feng*, Kai Qi, Bin Shi, Hao Mei, Qinghua Zheng, **Hua Wei**. Deep Evidential Learning in Diffusion Convolutional Recurrent Neural Network. Electronic Research Archive 2023, 31(4).
- [J4]: Longchao Da*, **Hua Wei**. CrowdGAIL: a Spatiotemporal Aware Method for Agent Navigation. Electronic Research Archive 2023, 31(2).
- [J5]: **Hua Wei**, Guanjie Zheng, Vikash Gayah, Zhenhui Li. Recent Advances in Reinforcement Learning for Traffic Signal Control: A Survey of Models and Evaluation, in ACM SIGKDD Explorations Newsletter, Dec 2020.
- [J6]: Yuandong Wang, Xuelian Lin, **Hua Wei**, Tianyu Wo, Zhou Huang, Yong Zhang, Jie Xu. A Unified Framework with Multi-source Data for Predicting Passenger Demands of Ride Services. ACM Transactions on Knowledge Discovery from Data (TKDD), 2019 Oct 15;13(6):1-24.

Refereed Conference Publications (* represents students mentored by me)

- [C1]: Hao Mei*, Junxian Li, Zhiming Liang, Guanjie Zheng, Bin Shi, **Hua Wei**. 2023. Uncertainty-aware Traffic Prediction under Missing Data. In Proceedings of the 2023 IEEE International Conference on Data Mining (**ICDM 2023**). Dec 2023.
- [C2]: Longchao Da*, Hao Mei, Romir Sharma, **Hua Wei**. 2023. Uncertainty-aware Grounded Action Transformation towards Sim-to-Real Transfer for Traffic Signal Control. In Proceedings of 62nd IEEE Conference on Decision and Control (**CDC 2023**), Dec 2023.
- [C3]: Shuya Li*, Hao Mei, Jianwei Li, **Hua Wei**, Dongkuan Xu. 2023. Toward Efficient Traffic Signal Control: Smaller Network Can Do More. In Proceedings of 62nd IEEE Conference on Decision and Control (**CDC 2023**), Dec 2023.

- [C4]: Yuefei Wu, Bin Shi, Jiarun Chen, Yuhang Liu, Bo Dong, Qinghua Zheng, **Hua Wei**. 2023. Rethinking Sentiment Analysis under Uncertainty. In Proceedings of 32nd ACM International Conference on Information and Knowledge Management (**CIKM 2023**), Nov 2023.
- [C5]: Longchao Da*, Hao Mei, Romir Sharma, **Hua Wei**. 2023. Sim2Real Transfer for Traffic Signal Control. In Proceedings of the 19th IEEE International Conference on Automation Science and Engineering (**CASE 2023**), Aug 2023.
- [C6]: Zhanyu Liu, Chunming Liang, Guanjie Zheng, **Hua Wei**. FDTI: Fine-grained Deep Traffic Inference with Roadnet-enriched Graph. In Proceedings of European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECML-PKDD 2023**), Sep 2023.
- [C7]: Jiaxing Zhang*, Dongsheng Luo, **Hua Wei**. MixupExplainer: Generalizing Explanations for Graph Neural Networks with Data Augmentation. In Proceedings of the 29th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD 2023**), Aug 2023.
- [C8]: Hao Mei*, Junxian Li, Bin Shi, **Hua Wei**. Reinforcement Learning Approaches for Traffic Signal Control under Missing Data. In Proceedings of the 32nd International Joint Conference on Artificial Intelligence (**IJCAI 2023**), Aug 2023.
- [C9]: Wanpeng Xu*, **Hua Wei**. Learning to Calibrate Hybrid Hyperparameters: a Study on Traffic Simulation. In Proceedings of the ACM SIGSIM International Conference on Principles of Advanced Discrete Simulation (**SIGSIM-PADS'23**), June 2023.
- [C10]: Wenlu Du*, Junyi Ye, Jingyi Gu, Jing Li, **Hua Wei**, Guiling Wang. SafeLight: A Reinforcement Learning Method toward Collision-free Traffic Signal Control. In Proceedings of the Thirty-Seventh AAAI Conference on Artificial Intelligence (**AAAI 2023**).
- [C11]: **Hua Wei**, Jingxiao Chen, Xiyang Ji, Hongyang Qin, Minwen Deng, Siqin Li, Liang Wang, Weinan Zhang, Yong Yu, Lin Liu, Lanxiao Huang, Deheng Ye, Qiang Fu, Wei Yang. Honor of Kings Arena: an Environment for Generalization in Competitive Reinforcement Learning. In Proceedings of the 26th Conference on Neural Information Processing Systems (**NeurIPS 2022**).
- [C12]: Xiaoliang Lei*, Hao Mei*, Bin Shi, **Hua Wei**. Modeling Network-level Traffic Flow Transitions on Sparse Data. In Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD 2022**), Aug 2022.
- [C13]: Porter Jenkins, **Hua Wei**, Stockton Jenkins, Zhenhui Li. Bayesian Model-based Offline Reinforcement Learning for Product Allocation. The Thirty-Fourth Annual Conference on Innovative Applications of Artificial Intelligence (**IAAI'22**), Jan 2022.
- [C14]: **Hua Wei**, Deheng Ye, Zhao Liu, Hao Wu, Bo Yuan, Bo Yuan, Qiang Fu, Wei Yang, Zhenhui Li. Boosting Offline Reinforcement Learning with Residual Generative Modeling. In Proceedings of The 30th International Joint Conference on Artificial Intelligence (**IJCAI'21**), Aug 2021.
- [C15]: Guanjie Zheng, Chang Liu, **Hua Wei**, Porter Jenkins, Chacha Chen, Tao Wen, Zhenhui Li. Knowledge-based Residual Learning. In Proceedings of The 30th International Joint Conference on Artificial Intelligence (**IJCAI'21**), Aug 2021.

- [C16]: **Hua Wei**, Junjie Liang, Dongkuan Xu, Zhenhui Li. How Do We Move: Modeling Human Movement With System Dynamics. in Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence (**AAAI'21**), Feb 2021.
- [C17]: **Hua Wei***, Xian Wu*, Wenbo Guo*, Xinyu Xing. Adversarial Policy Training against Deep Reinforcement Learning, in Proceedings of the 30th USENIX Security Symposium (**USENIX Security**), Vancouver, Canada, Aug 2021.
- [C18]: **Hua Wei**, Chacha Chen, Chang Liu, Guanjie Zheng, Zhenhui Li. Learning to Simulate on Sparse Trajectory Data, in Proceedings of European Conference on Machine Learning and Principles in Practice of Knowledge Discovery in Databases (**ECML-PKDD'20**), Ghent, Belgium, Sep 2020. (**Best Applied Data Science Paper Award**, $1/236=0.4\%$)
- [C19]: **Hua Wei**, Chacha Chen, Guanjie Zheng, Kan Wu, Vikash Gayah, Kai Xu, Zhenhui Li, PressLight: Learning Max Pressure Control for Signalized Intersections in Arterial Network, in Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'19**), Anchorage, AK, USA, Aug 2019.
- [C20]: **Hua Wei**, Nan Xu, Huichu Zhang, Guanjie Zheng, Xinshi Zang, Chacha Chen, Weinan Zhang, Yanmin Zhu, Kai Xu, Zhenhui Li. CoLight: Learning Network-level Cooperation for Traffic Signal Control, in Proceedings of the 28th ACM International Conference on Information and Knowledge Management (**CIKM'19**), Nov 2019.
- [C21]: **Hua Wei**, Guanjie Zheng, Huaxiu Yao, Zhenhui Li, IntelliLight: A Reinforcement Learning Approach for Intelligent Traffic Light Control, in Proceedings of the 2018 ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'18**), Aug 2018.
- [C22]: **Hua Wei**, Yuandong Wang, Tianyu Wo, Yaxiao Liu, Jie Xu, ZEST: A Hybrid Model on Predicting Passenger Demand for Chauffeured Car Service, in Proceedings of 25th ACM International Conference on Information and Knowledge Management (**CIKM'16**), Oct 2016.
- [C23]: Dongkuan Xu, Junjie Liang, Wei Cheng, **Hua Wei**, Haifeng Chen, Xiang Zhang. Transformer-Style Relational Reasoning with Dynamic Memory Updating for Temporal Network Modeling. in Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence (**AAAI'21**), Feb 2021.
- [C24]: Guanjie Zheng*, Chang Liu*, **Hua Wei**, Chacha Chen, Zhenhui Li. Rebuilding City-Wide Traffic from Multi-Source Data. in Proceedings of the Thirty-seventh IEEE International Conference on Data Engineering (**ICDE'21**), Chania, Greece, April 2021.
- [C25]: Chacha Chen, **Hua Wei**, Nan Xu, Guanjie Zheng, Ming Yang, Yuanhao Xiong, Kai Xu, Zhenhui Li. Toward A Thousand Lights: Decentralized Deep Reinforcement Learning for Large-Scale Traffic Signal Control. in Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI'20**), New York, USA, Feb 2020.
- [C26]: Yong Zhang, **Hua Wei**, Xuelian Lin, Fei Wu, Zhenhui Li, Kaiheng Chen, Yuandong Wang, Jie Xu, Context-aware Location Annotation on Mobility Records through User Grouping, in Proceedings of 22nd Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD'18**), June 2018.

- [C27]: Hongjian Wang, Porter Jenkins, **Hua Wei**, Fei Wu, Zhenhui Li. Learning Task-Specific City Region Partitions, in Proceedings of the 2019 the Web Conference (**WWW'19**), May 2019.
- [C28]: Huaxiu Yao*, Xianfeng Tang*, **Hua Wei**, Guanjie Zheng, Zhenhui Li. Revisiting Spatial-Temporal Similarity: A Deep Learning Framework for Traffic Prediction, in Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence (**AAAI'19**), Jan. 2019.
- [C29]: Guanjie Zheng, Yuanhao Xiong, Xinshi Zang, Jie Feng, **Hua Wei**, Huichu Zhang, Yong Li, Kai Xu, Zhenhui Li. Learning Phase Competition for Traffic Signal Control, in Proceedings of the 28th ACM International Conference on Information and Knowledge Management (**CIKM'19**), Nov 2019.

PROFESSIONAL
EXPERIENCE

- New Jersey Institute of Technology** Sep. 2021 - July 2023
Assistant Professor
- Department of Informatics
- Tencent AI Lab, Tencent** Jan. 2021 - Aug. 2021
Staff Researcher
- Projects on open-sourcing Reinforcement learning for games.
- Tencent AI Lab, Tencent** July 2020 - Oct. 2020
Research Intern
- Project on offline reinforcement learning for multiplayer online battle arena game.
- City Brain Research Center** Feb. 2019 - May 2019, May 2018 - Aug. 2018
Full-time Research Intern Hangzhou, China
- Project on traffic signal control. This project aims to develop a self-learning traffic signal control system supported by data and AI techniques. I was in charge of developing RL techniques on multi-intersection traffic signal control.
- XiaoIce Team, Microsoft Inc.** Nov. 2016 - Mar. 2017
Full-time Algorithm Intern Beijing, China
- Project on knowledge-based question answering. This project involves the end-to-end question answering, including entity detection, relation prediction and answer generation.
- Didi Research, Didi Chuxing Inc.** Oct. 2015 - July 2016
Algorithm Research Intern Beijing, China
- Projects on a recommendation for drivers, payment risk prediction, and subsidy targeting. These projects involve testing various machine learning methods and computing big data using Hadoop and Spark. We have implemented several methods online that can efficiently improve the volume of transactions.

SELECTED
HONORS AND
AWARDS

- NJIT Provost URI Summer Fellowship: Integration of AI Assistance toward Improving Human Performance in High-frequency Decision Making (Advisor) *2022*
- Best Paper Award (in Applied Data Science Track of ECML-PKDD) *2020*
- Multiple Conference Travel Awards (CIKM'16, KDD'18, KDD'19, CIKM'19)
- College of IST Graduate Travel Awards *2019 & 2020*
- Outstanding Graduate in Beijing Top 1% *2013 & 2017*
- National Scholarship Top 1% *Oct. 2016*

TEACHING

- “CSE572 - Data Mining”, ASU. *2023 Fall*
- “IS657 - Spatio-temporal Urban Analytics”, NJIT. *2022 Fall*

- “IS392 - Web Mining and Information Retrieval”, NJIT. 2022&2023 Spring
- “IST 557 - Data Mining”, Pennsylvania State University. 2019 & 2020 Fall

TALKS

Tutorial:

- The 26rd IEEE International Conference on Intelligent Transportation Systems (ITSC 2023): Cross-simulator Datasets and Evaluations for Traffic Control Policies.
- The 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC 2020): Deep Reinforcement Learning for Traffic Signal Control.

Invited Talks:

- On the Possibilities of Large Language Models for Transportation
 - Discover the “Pathways to the Future” NSF Workshop, Oct 2023
- Towards Actionable Decision Making in the Real World
 - The 1st International Conference on AI-generated Content, Aug 2023.
 - North Carolina State University, Oct. 2022
 - Vanderbilt University, Nov. 2022
- Towards Urban Intelligence with Sparse Data
 - Ocean University of China, Mar. 2022
- Intelligent Decision Making for Urban Systems
 - Lawrence Berkeley National Laboratory, Sep. 2020
 - Urban Intelligence, Penn State IST 510, April 2020
- Reinforcement Learning for Urban Traffic Signal Control
 - Tongji University, Nov. 2019
 - Tsinghua University, Nov. 2019
 - Xi’an Jiao Tong University, Oct. 2019
 - University of Science and Technology of China, Oct. 2021
- Reinforcement Learning: An Introduction, Penn State IST 557, Oct. 2019
- Learning with Small Data, DaML Research, Penn State, Sep. 2019
- Overview of Data Mining and Machine Learning, GEOSC/GEOG 497, Penn State, Sep. 2019

PROFESSIONAL SERVICES

Conference Organizer:

- WSDM 2022, Chair of “Smart City Day”

Workshop Organizer:

- Workshop on DeepLearning-Hardware Co-Design for AI Acceleration: 2023.
- Workshop on Data-Driven Intelligent Transportation: 2018, 2019, 2022.
- Workshop on Prescriptive Analytics for the Physical World: 2020.

Challenge Organizer:

- [KDD Cup City Brain Challenge](#), 2021.
- [Challenge on Mobility Intervention for Epidemics](#), 2020.
- [Challenge on Traffic Signal Control](#), 2019.

Conference Session Chair:

- KDD 2023, Session “Graph Neural Networks” & “Online Games, Sports Analytics and Algorithmic Music”
- KDD 2022, Session “Deep Learning Applications”
- KDD 2021, Session “Reinforcement Learning”
- SDM 2021, Session “Time Series I”
- ECML-PKDD 2020, Session “Transportation”
- CIKM 2019, Session “Urban Computing I”

Journal Reviewer

- IEEE Transactions on Intelligent Systems and Technology (TIST)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- IEEE Transactions on Intelligent Transportation Systems (TITS)
- Transportation Research Part C (TR-C)

Conference Reviewer/PC/SPC Member: (a partial list)

- AAAI'18-23, KDD'18-23, IJCAI'18-23, NeurIPS'20-23, ICML'21-23, SDM'21, ITSC'21-23, CIKM'18-22, WWW'18/19, ICDM'19.