

Hua Wei

CONTACT INFORMATION

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CURRENT POSITION

Assistant Professor, New Jersey Institute of Technology Sep. 2020 - Present
Department of Informatics, New Jersey Institute of Technology

EDUCATION

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

RESEARCH INTERESTS

Reinforcement learning and data mining.

PUBLICATIONS

Refereed Journal Publications

- [J1]: **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.
- [J2]: 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

- [C1]: 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**).
- [C2]: Porter Jenkins, **Hua Wei**, J. Stockton Jenkins, and Zhenhui Li. Probabilistic Simulation of Spatial Demand for Intelligent Product Allocation. In Proceedings of 4th ACM SIGSPATIAL International Workshop on GeoSpatial Simulation (**GeoSim'21**), Beijing, China, November 2, 2021.
- [C3]: **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 The 30th International Joint Conference on Artificial Intelligence (**IJCAI'21**), Aug 2021. (Acceptance rate: 19.3%)
- [C4]: Guanjie Zheng, Chang Liu, **Hua Wei**, Porter Jenkins, Chacha Chen, Tao Wen, Zhenhui Li. Knowledge-based Residual Learning. In Proceedings of the The 30th International Joint Conference on Artificial Intelligence (**IJCAI'21**), Aug 2021. (Acceptance rate: 19.3)
- [C5]: **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.
- [C6]: **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.

- [C7]: **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 and Practice of Knowledge Discovery in Databases (**ECML-PKDD'20**), Ghent, Belgium, Sep 2020. (**Best Applied Data Science Paper Award**, $1/236=0.4\%$)
- [C8]: **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. (Research track, acceptance rate: $170/1200=14.2\%$)
- [C9]: **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**), Beijing, China, Nov 2019. (Full paper in Research track, acceptance rate: $200/1030 = 19.4\%$)
- [C10]: **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**), London, UK, Aug 2018. (Research track with oral presentation, acceptance rate: $181/983=18.4\%$)
- [C11]: **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**), Indianapolis, USA, October 2016.
- [C12]: 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.
- [C13]: 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.
- [C14]: 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. (Acceptance rate: 20.6%)
- [C15]: 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**), Melbourne, Australia, June 2018. (Regular paper with oral presentation, acceptance rate: 10%)
- [C16]: 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**), San Francisco, CA, May 2019.

- [C17]: 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**), Honolulu, Hawaii, Jan. 2019.
- [C18]: 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**), Beijing, China, Nov 2019. (Full paper in Research track, acceptance rate: 200/1030=19.4%)
- [C19]: Yihuang Xiong, Weinan Chen, Wenbo Guo, **Hua Wei**, Ismaila Dabo. Identifying Electronic Descriptors to Predict Work Functions of Perovskite Electrodes, Bulletin of the American Physical Society (**APS'20**).

PROFESSIONAL
EXPERIENCE

- Tencent AI Lab, Tencent** Jan. 2021 - Aug. 2021
Staff Researcher
- 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.
 - Result: Publish a paper to IJCAI 2021 [C3].
- 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 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.
 - Result: Published a series of papers [C9][C10][C14][C18] in top-tier conferences including KDD, AAAI and CIKM.
- 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 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 online several methods that can efficiently improve the volume of transactions.

SELECTED
HONORS AND
AWARDS

- NSF CRII: Learning to Simulate with Small Data (Sole PI) 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

TEACHING

- Teaching Assistant at Pennsylvania State University Fall Semester of 2019 & 2020
- Assisting graduate student level course "IST 557 - Data Mining", by giving lectures and grading etc.

TALKS

Tutorial:

- The 23rd IEEE International Conference on Intelligent Transportation Systems (ITSC 2020): Deep Reinforcement Learning for Traffic Signal Control.

Invited Talks:

- 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

PROFESSIONAL SERVICES

Conference Organizer:

- WSDM 2022, Chair of “Smart City Day”

Conference Session Chair:

- 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: (a partial list)

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

Workshop PC Member:

- 2019 NeurIPS Workshop on Machine Learning for Autonomous Driving
- 2019 SIGKDD Workshop on Deep Reinforcement Learning for Knowledge Discovery
- 2019 CIKM Workshop on AI in Transportation
- 2018 NIPS Workshop on Machine Learning for Intelligent Transportation Systems

Workshop Organizer:

- Workshop on Data-Driven Intelligent Transportation: 2018, 2019.
- Workshop on Prescriptive Analytics for the Physical World: 2020.

Challenge Organizer:

- Challenge on Traffic Signal Control, 2019.
- Challenge on Mobility Intervention for Epidemics, 2020.
- KDD Cup City Brain Challenge, 2021.