Yuankai Wu, Ph.D.

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Research Interests

1 Spatiotemporal data modeling,
2 Reinforcement learning for transportation control,
3 Connected & automated vehicle highway systems.

Employment History

2019.10 – · · · · **Postdoc Researcher, McGill University,** Department of Civil Engineering.
Advisors: *Prof. Lijun Sun & Aurelie labbe (HEC Montreal)*

2019.06 – 2019.10 **Research associate.** The Joint Research Institute on Internet of Mobility, Southeast Univ. and Univ. of Wisconsin-Madison.

Education

2015 – 2019 **Ph.D., Beijing Institute of Technology**, Vehicle Operation Engineering.
Thesis title: *A high dimensional traffic state processing method based on tensorial model.*
Advisor: *Prof. Hongwen He.*

2016 – 2017 **Visiting Ph.D., University of Wisconsin-Madison**, Department of Civil & Environmental Engineering.
Advisor: *Prof. Bin Ran..*

2012 – 2015 **Master., Beijing Institute of Technology**, Transportation Engineering.
Thesis title: *Short-term traffic prediction based on dynamic tensor completion.*
Advisor: *Prof. Huachun Tan..*

2008 – 2012 **Bachelor., Shanghai Ocean University**, Mechanical Engineering.

Research Publications

700 Google scholar citations, h-index 12; i10-index 12

Patents

Projects Experience

Feb.2020 — · · · · **Ivado Postdoc Funding, (Role: PI. Award CAD 140,000$)**, Deep Spatiotemporal Modeling for Urban Traffic Data.

Dec.2019 — · · · · **Mitacs Canada and Fundway Technology Inc, Role: Investigator**, Develop reinforcement learning platform for traffic signal control based on real-world traffic data and scenarios.

Jan.2018 — Aug.2019 **National Natural Science Foundation of China, key project, Role: Investigator**, Multi-tensor networks for coupled high-dimensional multi-modal big data and its empirical study.

Sep.2012 — Dec.2016 **National Natural Science Foundation of China, Role: Investigator**, Multi-dimensional traffic data completion.

Jun.2018 — Aug.2019 **National Natural Science Foundation of China, Role: Investigator**, Deep reinforcement learning based energy management strategy for plug-in hybrid electric vehicles.

Projects Experience (continued)

Dec.2016 — Aug.2019	**Research in TOPS lab, University of Wisconsin, Madison, Role: Investigator**, Design and evaluation of Connected and Automated Vehicle & Highway systems.
Jan.2016 — Dec.2017	**SAIC MOTOR open funding, Role: Investigator**, Big data platform for key technologies of electric vehicles.
Jan.2014 — Dec.2015	**Open Fund of State Key Laboratory of Automotive Safety and Energy, Role: Investigator**, Research on anti collision system of vehicle based on video processing.
Jul.2014 — Oct.2014	**Tencent computer system Co. Ltd., Role: Research Internship**, Development of a traffic state prediction method using sparse floating car data.

Honors and Awards

2019	**Second Prize of Chinese Institute of Electronics (ranked 6/10)**.
Nov.2017	**China National Scholarships for PhD student**
Jul.2016	**China Scholarship Council (CSC) scholarships**
Dec.2014	**Best paper reward of the 12th academic conference of Beijing Institute of Technology**

Talks and Presentations

Oct. 2020	Deep learning for spatiotemporal modeling, Shenzen University, Remote lecture.
May. 2020	Deep learning for spatiotemporal modeling, Chengdu Normal University, Remote lecture.
Oct. 2019	Control methods for connected automated vehicle & highway systems, Hunan University, Changsha, China.
Jun. 2019	Tensor decomposition and its application on traffic data analysis, Tongji University, Shanghai, China.
	A deep reinforcement learning based car following model for electric vehicle, Proceedings of the 2019 World Transport Convention, Beijing, China
May. 2019	Traffic data analysis and data-driven control for connected and automated vehicle & highway systems, Central South University, Changsha, China.
Jun. 2018	A hybrid deep learning based traffic flow prediction method and its understanding, Central South University, Changsha, China
Apr. 2018	Deep learning method and its application on transportation systems, Beijing Jiaotong University, Beijing, China.
Aug. 2015	Short-term traffic flow prediction based on multilinear analysis and k-nearest neighbor regression, CICTP2015, Beijing, China.
Jan. 2015	Freeway short-term travel time prediction based on dynamic tensor completion, 94th TRB annual meeting, Washington DC, USA.
Nov. 2014	Robust Missing Traffic Flow Imputation Considering Nonnegativity and Road-capacity, Beijing Institute of Technology, Beijing, China.
Jan. 2014	Traffic Missing Data Completion with Spatial–Temporal Correlations, 93rd TRB annual meeting, Washington DC, USA.
Aug. 2013	A new traffic prediction method based on dynamic tensor completion, CICTP2013, Shenzeng, China.

Professional Services

Reviewer

• Transportation Research Part B: Methodological, • Transportation Research Part C: Emerging Technologies, • IEEE Transactions on Intelligent Transportation Systems, • IEEE Transactions on Industry Informatics, • IEEE Internet of Things Journal, • IEEE Transactions on Systems, Man, and Cybernetics: Systems, • Artificial Intelligence in Medicine, • Transactions in GIS, • Journal of Cleaner Production, • Applied soft computing, • International Journal of Electrical Power Energy Systems, • Journal of Advanced Transportation, • IEEE Sensors Journal, • Neurocomputing, • IEEE Access, • Physica A: Statistical Mechanics and its Applications, • Sensors, • Wireless Sensor Network, • Wireless Communications and Mobile Computing, • Mobile Information Systems, • IEEE/CAA Journal of Automatica Sinica, • SN Applied Sciences (SNAS), • Machine Learning and Knowledge Extraction, • World Electric Vehicle Journal, • Electronics, • Energy and AI, • TRB Annual Meeting - Transportation Research Board, • CICTP.

Member

• IVADO: The institute for data valorization, • Mitacs, • China Highway and Transportation Society. • World Transport Convention Standing Committee on Public Transportation Management