Li Song

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RESEARCH INTEREST

- **Intelligent Transportation System Control with CAVs** (Deep Reinforcement Learning Technologies)
- **Transportation Big Data Analysis and Mining** (Safety and Spatiotemporal Patterns Identification)

EDUCATION

2019- 2022 **University of North Carolina at Charlotte, College of Engineering. USA**
Ph.D. GPA: 4/4
Major: Intelligent Transportation Management and Control. (Advisor: Prof. Wei Fan)
Dissertation: Impacts Of Connected And Automated Vehicles on Deep Reinforcement Learning Controlled Intersection Systems

2017-2019 **Harbin Institute of Technology. School of Transportation Science and Engineering. CN**
M. Eng. (Research) GPA: 3.35/4 Rank: 2/34 Top 5%
Major: Transportation Planning and Management (Advisor: Assoc. Prof. Xiaoning Wang)

2013-2017 **Shanghai Maritime University. College of Transport and Communications. CN**
B. Eng. GPA: 3.7/4 Rank: 2/113 Top 1%
Major: Transportation and Management (Advisor: Prof. Jihong Chen)

WORKING EXPERIENCE

2020-2022 **Research Assistant**, Projects from Transportation Research Center of NCDOT (NC-CAV) and USDOT (CAMMSE)

2019-2020 **Teaching Assistant**, INES-8090-092 & 003: Top Infrastructure and Environment System, UNCC

PUBLICATIONS

1. **Song, L.**, Fan, W.# and Li, Y. (2021). Time-of-day variations and the temporal instability of multi-vehicle crash injury severities under the influence of alcohol or drugs after the Great Recession. *Analytic Methods in Accident Research*, 32, 100183. **(SCI, Q1, IF:11.8)**
2. **Song, L.**, Fan, W.,# Li, Y., Wu, P. (2021). Exploring Pedestrian Injury Severities at Pedestrian-Vehicle Crash Hotspots with An Annual Upward Trend: A Spatiotemporal Analysis with Latent Class Random Parameter Approach, *Journal of Safety Research*, 76, 184-196. **(SCI, Q1, IF: 3.5)**
3. **Song, L.,** Li, Y., Fan, W.#, and Wu, P. (2020). Modeling pedestrian-injury severities in pedestrian-vehicle crashes considering spatiotemporal patterns: insights from different hierarchical Bayesian random-effects models. *Analytic Methods in Accident Research,* 28, 100137. **(SCI, Q1, IF:11.8)**
4. **Song, L.** and Fan, W.# (2020). Combined Latent Class and Partial Proportional Odds Model Approach to Exploring the Heterogeneities in Truck-Involved Severities at Cross and T-Intersections, *Accident Analysis and Prevention*, 144, 105638. **(SCI, Q1, IF: 5.0)**
5. **Song, L.** and Fan W.# (2021). Traffic signal control under mixed traffic with connected and automated vehicles: a transfer-based deep reinforcement learning approach. *IEEE ACCESS.* 9, 145228-145237. **(SCI, Q2, IF: 3.4)**
6. **Song, L.**, Li, Y., Fan, W.,# Liu, P. (2021). Mixed Logit Approach to Analyzing Pedestrian Injury Severity in Pedestrian-Vehicle Crashes in North Carolina: Considering Time of Day and Day of Week, *Traffic Injury Prevention*. (SCI, Q4, IF: 1.5)

7. **Song, L.**, Fan, W.,# Liu, P. (2021). Exploring the effects of connected and automated vehicles at fixed and actuated signalized intersections with different market penetration rates, *Transportation Planning and Technology*, 44(6), 577-593. (SCI, Q4, IF: 1.2)
8. **Song, L.,** Fan, W.# (2021). Exploring Truck Driver-Injury Severity at Intersections Considering Heterogeneity in Latent Classes: A Case Study of North Carolina, *International Journal of Transportation Science and Technology*, 10(2), 110-120. (EI)
9. **Song, L.**, Chen, J.#, Li, X. K., Liu, X., Fei, Y., Yu, H. (2018). Periodical characteristics of shipbuilding market activity: A wavelet analysis. *Journal of Marine Science and Technology*, 26(5), 692-702. (SCI, Q4)
10. Li, Y., **Song, L.** and Fan, W.# (2021). Day-of-the-week variations and temporal instability of factors influencing pedestrian injury severity in pedestrian-vehicle crashes: a random parameters logit approach with heterogeneity in means and variances. *Analytic Methods in Accident Research,* 29, 100152. **(SCI, Q1, IF:11.8)**
11. Wu, P., **Song, L.,** Meng, X.#, Temporal analysis of cellphone-use-involved crash injury severities: calling for preventing cellphone-use-involved distracted driving. *Accident Analysis and Prevention.* **(SCI, Q1, IF: 5.0)**
12. Wu, P., **Song, L.**, Meng, X.# (2021). Influence of built environment and roadway characteristics on the frequency of vehicle crashes caused by driver inattention: a comparison between rural roads and urban roads. *Journal of Safety Research*. **(SCI, Q1, IF: 3.5)**
13. Wu, P., Meng, X.#, **Song, L.** (2021). Bayesian space-time modeling of bicycle and pedestrian crash risk by injury severity levels to explore the long-term spatiotemporal effects. *Physica A: Statistical Mechanics and its Applications*, 581, 126171. **(SCI, Q2, IF:3.3)**
14. Wu, P., Meng, X.#, **Song, L.** (2021). Identification and spatiotemporal evolution analysis of high-risk crash spots in urban roads at the microzone-level: Using the space-time cube method. *Journal of Transportation Safety and Security* (SCI, Q3, IF:3.0)
15. Wu, P., Meng, X.#, **Song, L**. (2020). A novel ensemble learning method for crash prediction using road geometric alignments and traffic data. *Journal of Transportation Safety & Security. 12(9),* 1128-1146. (SCI, Q3, IF:3.0)
16. Wang, X., **Song, L.#**, Wu, Z., Wu, P. (2019). Development of a freeway traffic noise prediction model based on equivalent sound source at the shoulder. *Proceedings of the Institution of Civil Engineers-Transport.* (SCI, Q4, IF:1.1)
17. Chen, J., Xue, K., **Song, L**.#, et al. (2019). Periodicity of world crude oil maritime transportation: Case analysis of Aframax Tanker market. *Energy Strategy Reviews*, 25, 47-55. **(SCI, Q2, IF:6.4)**
18. Wu, P., Meng, X.#, **Song, L.**, Zuo, W. (2019). Crash Risk Evaluation and crash severity pattern analysis for different types of urban junctions: fault tree analysis and association rules approaches. *Transportation research record*, 2673(1), 403-416. (SCI, Q3, IF:1.6)
19. Wang, X.#, **Song, L.**, Wu, P., Yu, S. (2019). Analysis of unconventional design for signalized and closely-spaced T-intersections. In 2019 *19th COTA conference International Conference of Transportation Professionals,* 2636-2647. (EI)
20. Wang, X.#, **Song, L.**, Wu, P. (2018). A novel method of island port's transport: automatic guided vehicle approach. In *2018 3rd IEEE International Conference on Intelligent Transportation Engineering*, 219-224. (EI)

UNDER REVIEW

21. Wu, P., **Song, L.,** Meng, X.# What is the systematic risk and individual risk of urban crashes based on different crash types? evidence from Shenzhen City, China. *Journal of Transportation Research Record* (1st review, SCI)

22. Li, Y., Fan, W.,# **Song, L.,** Liu, S. Combining Emerging Hotspots Analysis with XGBoost for Modeling Pedestrian Injuries in Pedestrian-Vehicle Crashes: A Case Study of North Carolina. *Accident Analysis and Prevention.* (1st review, SCI)

SCHOLARSHIPS & AWARDS

International Level

2021 "Don Blackburn Memorial Scholarship", North Carolina Section of the Institute of Transportation Engineers, NC, USA **(1%, 21)**

2019 2019-2022 "UNCC Doctoral Full Award" (5%)

2018 "Excellent Oral Presentation", *International Conference of Intelligent Transportation Engineering* (ICITE 2018), Singapore **(5%, 116)**

2016 "Honorable Mention", *The Mathematical Contest in Modeling,* USA (20%, 37338)

National Level

2018 "National Scholarship for Graduate Students" **(3%, 110)**

2015 "Second Prize", *National Undergraduate Mathematical Contest In Modeling* **(3.4%, 85955)**

Municipal Level

2021 "Paul D. Cribbins Cup" NCSITE, USA (1%, 4)

2017 "Outstanding Graduate of Shanghai" **(5%, 174000)**

2015 "Shanghai Scholarship" **(1%, 113)**

2015 "First Prize", *Undergraduate Mathematical Contest In Modeling, Shanghai*

School Level

2018 "First-Class Scholarship for Postgraduates" & "Excellent Students" (12%, 34)

2017 "Recommended for Postgraduate Student without Examination" **(2%, 4147)**

2017 "Excellent Dissertation of Shanghai Maritime University" **(5%, 113)**

2016 "School Principal Scholarship" & "Excellent Student" (2%, 113)

2015 "School Principal Scholarship" & "Excellent students" (2%,113)

2014 "School Second-class Scholarship" & "Triple-A student" (5%, 198)

ACADEMIC SERVICES

2020-Now **Research Assistant**, Projects from Transportation Research Center of NCDOT (NC-CAV) and USDOT (CAMMSE)

2019-2020 **Teaching Assistant**, INES-8090-092 & 003: Top Infrastructure and Environment System, UNCC

2020-Now **President of ITE Student Chapter of UNCC:**

- Invite over ten guest speakers and organize monthly ITE seminars and activities;
- Host technological session in NCSITE/NCDOT meetings;
- Attending NCSITE/NCDOT activities

2019-Now **Member** of Chinese Overseas Transportation Association (COTA), and ITE.

2019-Now **Reviewer** of Transportation Research Board (TRB) Annual Meeting, Journal of Traffic and Transportation Engineering (English Edition), Cogent Engineering, Connection Science, COTA International Conference for Transportation Professionals, International Journal of Transportation Science and Technology.

PATENTS

2018 Wang, X., **Song, L.**, Wu, P. (2018). A fire alarm and automatic fire extinguishing system for dangerous chemicals containers, CN Patent 201810446653.0.

2018 Shi, Z., **Song, L**. (2018). An automatic connection device for automatic guided vehicle, CN Patent 201810167525.2.

PROJECTS

2020-2022 **Participate in Research Projects: Impact of Connected and Autonomous Vehicles (CAVs) on North Carolina's Transportation System and Associated Revenue.** NCDOT Transportation Center of Excellence in Connected and Autonomous Vehicle Technology (NC-CAV) ($124,547)

2019-2020 **Participate in Research Projects: Spatiotemporal Patterns and Crash Injury Factors Identification.** USDOT University Transportation Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)

2017-2018 **Participate in Engineering and Academic Projects during Postgraduate Periods:**

- Signal Control System Modification for Harbin Urban Areas,
- Emissions Assessment and Prevention for Harbin Roadways
- Left-Turn Intersection Design and Reconstruction in Shenzhen
- Environmental Impact Assessment for Highway Construction in Guangzhou

2018/2 **Intern: Jiangxi General Institute of Urban and Rural Planning and Design**
Participate in one Nanchang expressway expansion and CBD underground parking lot project

2017/3-8 **Intern: TRC of Shanghai Jiao Tong University Architectural Design and Planning Co., Ltd.**

- One Research Project: *Investigation and Management of Potential Safety Accidents in Shanghai Traffic Units*
- Three Traffic Planning and Design Projects: *1) Network Planning for Weifang, Shandong, 2) Intelligent Parking Building for Hospital, 3) China-Russia Logistics Park.*
- Three Traffic Impact Analysis Projects: *1) Ocean Park in Wuxi, 2) Olympic Sports Center in Shandong, 3) Residential Areas in Suzhou.*

2016/5 **Practice in Chinese and South Korean Port:** Zhangjiagang - Shanghai - Busan – Kuangyang

2014/7-8 **Summer Teaching Support Volunteer Activity in Guangxi:** Teaching and Raising Funds

2013-2017 **Monitor:** 2 School Level and 4 College Level Honors for the Class, and 5 Five-Star Honor for the Dormitory

CONFERENCE PRESENTATIONS

2021 **Song, L**., (2021). Traffic signal control in connected and automated environment: a transfer-based deep reinforcement learning approach while accounting for mixed traffic flow on varying information levels. 2021 4th CAMMSE Research Symposium. (Host & Oral)

2020 **Song, L**., (2020). Multimodal Session. 2020 NCSITE Annual Meeting. (Host)

2021 **Song, L**., (2021). Impacts of CAVs on transfer-based DQN controlled signal intersection: insights from mixed traffic and information levels. CEE Grad Student Symposium 2021. Online. (Oral)

2021 **Song, L**., (2021).Time-of-day variations and the temporal instability of multi-vehicle crash injury severities under the influence of alcohol or drugs: insights from the economic cycle after the Great Recession. 2021 COTA Research Lightning Talk. Online. (Oral)

2020 **Song, L.**, (2020). Exploring pedestrian injury severities at pedestrian-vehicle crash hotspots with an annual upward trend: a spatiotemporal analysis with latent class random parameter approach. In 2020 3rd CAMMSE Research Symposium. Online. (Oral)

2018 **Song, L**. (2018). A novel method of island port's transport: automatic guided vehicle approach. In 2018 3rd IEEE International Conference on Intelligent Transportation Engineering (ICITE). Singapore. (Oral, Honor: Excellent Oral Presentation)

2022 **Song, L**., Fan, W. (2022). Traffic signal control in connected and automated environment: a transfer-based deep reinforcement learning approach. In 2022 Transportation Research Board 101st Annual Meeting. Presentation (Poster)

2021 **Song, L**., Fan, W., Li, Y., and Wu, P. (2021). Modeling pedestrian-injury severities in pedestrian-vehicle crashes considering spatiotemporal patterns: insights from different hierarchical Bayesian random-effects models. North Carolina Department of Transportation Research & Innovation Summit 2021. NC. United States. Online. (Poster)

2021 **Song, L**., Fan, W., (2021). Exploring the effects of connected and automated vehicles at fixed and actuated signalized intersections with different market penetration rates. In 2021 Transportation Research Board 100th Annual Meeting. Presentation Number: TRBAM-21-00365. Online. (Poster)

2020 **Song, L**., Fan, W., Li, Y., and Wu, P. (2020). Exploring pedestrian injury severities at pedestrian vehicle crash hotspots with an annual upward trend: a spatiotemporal analysis with latent class random parameter approach. North Carolina Department of Transportation Research & Innovation Summit 2020. NC. United States. (Poster)

2020 Wang, X., **Song, L**., Wu, P., (2020). Research on Container Transportation's Discrete Choose Model Considering Carbon Tax. In 2020 Transportation Research Board 99th Annual Meeting. Washington DC, United States. (Poster)

2019 Wang, X., **Song, L**., Wu, P., Yu, S. (2019). Analysis of unconventional design for signalized and closely-spaced T-intersections. In 2019 19th COTA conference International Conference of Transportation Professionals (CICTP2019). Nanjing, China. (Poster)

2019 Wang, X., **Song, L**., Wu, Z., & Wu, P. (2019). Development of a Traffic Noise Prediction Model Based on Equivalent Sound Source at the Road Shoulder. In 2019 Transportation Research Board 98th Annual Meeting. Washington DC, United States. (Poster)

2018 Wang, X., **Song, L**., Bai, Q. (2018). Exploring Traffic Noise–Oriented Traffic Signal Warrant: A Bi-level Programming Approach. In 2018 Transportation Research Board 97th Annual Meeting. Washington DC, United States. (Poster)