宋力

副研究员，武汉理工大学，交通与物流工程学院，交通工程系
邮箱: lisong1@whut.edu.cn ； 电话: 18697530883;
个人主页: https://lisong2019.github.io/web/
地址: 湖北省武汉市和平大道1040号 交通与物流工程学院, 430063

研究兴趣

- **网联自动驾驶技术下的智能交通系统控制策略** (深度强化学习控制：智能交通控制、拥堵治理)
- **交通大数据分析与挖掘** (统计及深度学习技术：时空状态分析、安全因素挖掘、异质性用户评估)

教育经历

2019.8- 2022.8 **北卡罗莱纳大学夏洛特分校，土木与环境工程系，美国**
博士研究生 GPA: 4/4 前1%
专业: 智能交通控制. (导师: Wei (David) Fan 范围 正教授)
博士论文:网联自动驾驶车技术及渗透率对深度强化学习控制的智能交叉口系统的影响

2017.9-2019.6 **哈尔滨工业大学，交通科技与工程学院，交通工程系**
工学硕士. (学硕) GPA: 3.35/4 排名: 2/34 前5%
专业: 交通运输规划与管理 (导师: 王晓宁 副教授)

2013.9-2017.6 **上海海事大学，交通运输学院，交通运输管理系**
工学学士. GPA: 3.7/4 排名: 2/113 前1%
专业: 交通运输 (导师: 陈继红 正教授)

工作经历

2022.8-至今 **副研究员，武汉理工大学交通与物流工程学院交通工程系**
2020.5-2022.8 **研究助理**，北卡交通部 NC-CAV自动驾驶交通研究中心
2019.8-2022.8 **研究助理**，美国交通部CAMMSE多模式交通研究中心
2019.8-2020.5 **助教**，博士课程 INES-8090-092: 交通系统分析及优化，北卡罗莱纳大学夏洛特分校

论文发表

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, JCR 1区 | 中科院 1区, IF:11.8, 交通领域排名第一顶级期刊)**
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, JCR 1区 | 中科院 2区, IF: 3.5 交通领域权威期刊)**
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, JCR 1区 | 中科院 1区, IF:11.8, 交通领域排名第一顶级期刊)**
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, JCR 1区 | 中科院 1区, IF: 5.0, 交通领域顶级期刊)**
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, JCR 2区 | 中科院 2区, 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, JCR 4区, 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, JCR 4区, 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.
9. **Song, L.**, Chen, J.#, et. al. (2018). Periodical characteristics of shipbuilding market activity: A wavelet analysis. *Journal of Marine Science and Technology*, 26(5), 692-702. (SCI, JCR 4区, IF: 1.4)
10. 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, JCR 2区, IF:6.4, 通讯作者)**
11. 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, 通讯作者)
12. 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, JCR 1区 | 中科院 1区, IF:11.8, 交通领域排名第一顶级期刊)**
13. Wu, P., **Song, L.**, Meng, X.# (2022). Temporal analysis of cellphone-use-involved crash injury severities: Calling for preventing cellphone-use-involved distracted driving. Accident Analysis and Prevention, 169, 106625. **(SCI, JCR 1区 | 中科院 1区, IF: 5.0, 交通领域顶级期刊)**
14. 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, JCR1区|中科院2区, IF: 3.5, 交通领域权威期刊)**
15. 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, JCR2区|中科院2区, IF:3.3)**
16. 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)
17. 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)
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)

会议论文

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)

获奖荣誉

国际级:

2022 “国家优秀自费留学生奖学金”, 中国国家留学基金管理委员会 (全球每年 600 人)
2021 “Don Blackburn 纪念奖学金”, *北卡州交通工程师协会, 美国* **(1%, 21)**
2019 “2019-2022 UNCC 博士生全奖” (5%)
2018 “杰出汇报奖”, *ICITE 2018 新加坡国际智能交通会议* **(5%, 116)**
2016 “二等奖”, *美国数学建模竞赛* (20%, 37338)

国家级:

2018 “研究生国家奖学金” **(3%, 110)**
2015 “二等奖”, *全国大学生数学建模大赛* **(3.4%, 85955)**

市级:

2021 “Paul D. Cribbins Cup” 奖杯, UNCC, *北卡州交通工程师协会, 美国* **(1%, 4)**
2017 “上海市优秀毕业生” **(5%, 174000)**
2015 “上海市奖学金” **(1%, 113)**
2015 “一等奖”, *上海赛区大学生数学建模竞赛*

校级:

2018 “校研究生一等奖学金” 及 “优秀学生” (12%, 34)
2017 “免试推免攻读研究生资格” **(2%, 4147)**
2017 “校优秀本科毕业论文” **(5%, 113)**
2016 “校特等奖学金” 及 “优秀学生” (2%, 113)
2015 “校特等奖学金” 及 “优秀学生” (2%,113)
2014 “校二等奖学金” 及 “三好学生” (5%, 198)

学术任职

2020.8-Now **主席: 校交通工程师协会** (UNCC-ITE):
- 邀请演讲嘉宾以及组织月度校ITE研讨会及活动;
- 在 NCSITE/NCDOT 会议中主持技术研讨会;
- 参加 NCSITE/NCDOT 系列活动.

2019.8-Now **会员:** 海外华人交通协会 (COTA), 美国交通工程师协会.

2019.8-Now **审稿:** Transportation Research Board (TRB) Annual Meeting, Journal of Transportation Engineering Part A, 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.

研究项目

2020.5-2022.7 **参与研究项目: 网联自动驾驶车对北卡州交通系统以及相关税收的影响分析.** 北卡交通部自动驾驶交通研究中心 NC-CAV ($124,547)

2019.8-2020.5 **参与研究项目: 时空状态及事故严重程度因素挖掘.** 美国交通部多模式交通研究中心 CAMMSE

2017.9-2018.6 **硕士阶段主要参与工程及研究项目:**
- 哈尔滨市交通信号灯控制改善项目
- 哈尔滨市交通排放及扬尘评估
- 深圳市左转位移交叉口设计项目
- 广州市高速公路建设环境影响评估

2018.2 **实习: 江西省城乡规划设计研究总院:** 参与南昌高速扩建改造与CBD 地下停车场设计

2017.3-2017.8 **实习: 上海交通大学规划建筑设计有限公司交通研究中心**

- **一项上海市交通委纵向课题**:上海各交通单位安全生产事故隐患排查治理
- **三项交通设计咨询** (山东潍坊交通发展咨询、上海市医院智能停车楼交通方案咨询、中俄物流园区设计咨询)
- **三项交通影响评价项目** (无锡游乐园项目、山东平度奥体中心、苏州居住小区)

专利发明

2018 王晓宁, **宋力**, 吴佩洁. 一种危化品集装箱的火灾报警与自动灭火系统, 发明专利，专利号：ZL 2018 1 0446653.0.

2018 史泽宇, **宋力**. 一种自动导引车连接装置，实用新型，专利号：ZL 2018 2 0334916.4.

会议展示

2021 **Song, L**., (2021). Impacts of mixed traffic on transfer-based DQN controlled signal intersection. 2021 4th CAMMSE Research Symposium. (**主持，汇报三等奖**)

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

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. (汇报)

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. (汇报)

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. (汇报)

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. (**汇报，杰出汇报奖**)

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. (汇报)

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. (海报)

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. (海报)

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. (海报)

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. (海报)

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. (海报)

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. (海报)