Hao Liu, Ph.D.

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EDUCATION

2020	**The University of Texas at Austin**
	Ph.D., Civil Engineering
2018	**The University of Texas at Austin**
	M.S., Statistics
2015	**Peking University**
	M.S., Solid Mechanics
2012	**China University of Mining and Technology (Beijing)**
	B.S., Engineering Mechanics

WORK EXPERIENCE

2024— present	**Jackson State University**
	Assistant Professor (tenure track)
	Department of Civil and Environmental Engineering
2021—2024	**The Pennsylvania State University**
	Postdoctoral Scholar
	Department of Civil and Environmental Engineering
2020—2021	**Center for Transportation Research, UT Austin**
	Postdoctoral Fellow, Supervisor: Christian Claudel and Natalia Ruiz Juri
2015—2020	**The University of Texas, Austin**
	Graduate Research Assistant
	Center for Transportation Research
2012—2015	**Peking University**
	Graduate Research Assistant

RESEARCH INTERESTS

Connected and autonomous vehicles; intelligent transportation systems; machine

learning; traffic flow modeling and control; traffic safety analysis; shared mobility

PUBLICATIONS

PEER-REVIEWED JOURNAL PUBLICATIONS

* indicates the students that I helped mentor

1. Ahmed, T.*, **Liu, H.** and Gayah, V.V. (2024) OCC-MP: A Max-Pressure framework to prioritize transit and high occupancy vehicles. *Transportation Research Part C: Emerging Technologies*. In press.
2. **Liu, H.** and Gayah, V.V. (2024) N-MP: A network-state-based Max Pressure algorithm incorporating regional perimeter control. *Transportation Research Part C: Emerging Technologies*. In press.
3. Gayah, V.V., Donnell, E., **Liu, H.** and Prajapati, A. (2024) Crash modification factors for high-tension cable median barriers: an empirical Bayes before–after study. *Transportation Research Record: Journal of the Transportation Research Board, https://doi.org/10.1177/036119812412503.*
4. Dong, X.*, **Liu, H.** and Gayah, V.V. (2024) An analytical model of many-to-one carpool system performance under cost-based detour limits. *International Journal of Transportation Science and Technology.* In press.
5. **Liu, H.**, Xiong, Z.C.* and Gayah, V.V. (2024) Quantifying the impacts of Right-Turn-on-Red, exclusive turn lanes and pedestrian movements on the efficiency of urban transportation networks. *International Journal of Transportation Science and Technology.* In press.
6. Ahmed, T.*, **Liu, H.** and Gayah, V.V. (2024) Identification of optimal locations of adaptive traffic signal control using heuristic methods. *International Journal of Transportation Science and Technology,* 13: 122-136.
7. Taglieri, D., **Liu, H**. and Gayah, V.V. (2024) Network-wide implementation of roundabouts vs. signalized intersections on urban streets: analytical and simulation comparison. *Transportation Research Record: Journal of the Transportation Research Board, https://doi.org/10.1177/03611981231192093*
8. **Liu, H.**, Devunuri, S., Lehe, L. and Gayah, V.V. (2023) Scale effects in ridesplitting: a case study of the City of Chicago. *Transportation Research Part A: Policy and Practice*, 173: 103690.
9. **Liu, H.** and Gayah, V.V. (2023) Total-delay-based Max Pressure: a Max Pressure algorithm considering delay equity. *Transportation Research Record: Journal of the Transportation Research Board, https://doi.org/10.1177/03611981221147051.*
10. **Liu, H.** and Gayah, V.V. (2022) A novel Max Pressure algorithm based on traffic delay. *Transportation Research Part C: Emerging Technologies,* 143:103803.
11. **Liu, H.**, Claudel, C., Machemehl, R. and Perrine, K. (2021) A robust traffic control model considering uncertainties in turning ratios. *IEEE Transactions on Intelligent Transportation Systems,* 23(7): 6539 – 6555.
12. **Liu, H.**, Claudel, C. and Machemehl, R. (2021) Robust traffic control using a first order macroscopic traffic flow model. *IEEE Transactions on Intelligent Transportation Systems,* 23(7):

8048 – 8062.

13. **Liu, H**, Li, D.D., Xue, Y.H., Lv, P.Y., Shi, Y.P., and Duan, H.L. (2016) Numerical simulation of cavitating flow around a slender body with slip boundary condition. *SCIENCE CHINA Physics, Mechanics & Astronomy* 59 (2), 624702.
14. Lv, P.Y., Xue, Y.H., **Liu, H.**, Shi, Y.P., Xi, P., Lin, H. and Duan, H.L. (2015) Symmetric and asymmetric meniscus collapse in wetting transition on submerged structured surfaces. *Langmuir* 31(4), 1248-1254.

PEER-REVIEWED CONFERENCE PROCEEDINGS

* indicates the conference papers that I presented

1. Liu, H. and Gayah, V.V. (2024) N-MP: A network-state-based Max Pressure algorithm incorporating regional perimeter control. 25th International Symposium on Transportation and Traffic Theory, ISTTT 25, July, Ann Arbor, Michigan.
2. **Liu, H.*,** Levin, M. and Gayah, V.V. (2024) A Max Pressure algorithm for traffic signals considering pedestrian queues. *103rd Annual Meeting of the Transportation Research Board*, January, Washington, D.C.
3. Ahmed, T., **Liu, H.** and Gayah, V.V. (2024) Identification of Optimal Locations of Adaptive Traffic Signal Control Using Heuristic Methods. *103rd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
4. Ahmed, T., **Liu, H.** and Gayah, V.V. (2024) An occupancy based Max-Pressure algorithm to provide transit signal priority. *103rd Annual Meeting of the Transportation Research Board*, January, Washington, D.C.
5. Gayah, V.V., Donnell, Eric., **Liu, H.** and Prajapati, A.K. (2024) Crash modification factors for high-tension cable median barriers: An empirical Bayes before-after study. *103rd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
6. Dong, X., **Liu, H.** and Gayah, V.V. (2024) An analytical model of many-to-one carpool system performance under cost-based detour limits. *103rd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
7. **Liu, H.*** and Gayah, V.V. (2023) TD-MP: a Max Pressure algorithm considering delay equity. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
8. **Liu, H.***, Devunuri, S., Lehe, L. and Gayah, V.V. (2023) Scale effects in ridesplitting: a case study of the City of Chicago. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
9. **Liu, H.*,** Xiong, Z.C. and Gayah, V.V. (2023) Quantifying the impacts of Right-Turn-on-Red, exclusive turn lanes and pedestrian movements on the efficiency of urban transportation networks. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
10. **Liu, H.***, Vishnoi, S. and Claudel, C. (2023) A two-stage stochastic model considering randomness of demand in variable speed limit and boundary flow control. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
11. Blackburn, L.A., Hamilton, I., Gayah, V.V., Guler, I., Carter, D., Mayhew, B., Seymour., J., **Liu, H.** (2023) Bottom up or top down: comparing pedestrian exposure estimates using city and statewide

exposure models. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.

12. Lu, M., **Liu, H**. and Guler, I. (2023) Impact of bikes on traffic efficiency based on car-bike mixed traffic flow modeling. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
13. Lyu, L., Zhou, D.Q., Liu, H., Gayah, V.V. and Guler, I. (2023) Adaptive action selection strategy of reinforcement learning approach for intelligent traffic light control. *102nd Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
14. **Liu, H.***, Claudel, C. and Machemehl, R. (2022) A Lax-Hopf solution based traffic control model considering random turning ratios. *101st Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
15. **Liu, H.*** and Machemehl, R. (2020) A queueing theory based stochastic traffic delay model for adaptive signal control. *99th Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
16. **Liu, H.***, Baumanis, C., Machemehl, R. and Li, Y. (2020) A simulation-based paradox: longer blockage, less delay? *99th Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
17. **Liu, H.***, Chen, A. and Machemehl, R. (2020) An adaptive signal control method using a first order macroscopic traffic flow model. *99th Annual Meeting of the Transportation Research Board,* January, Washington, D.C.
18. **Liu, H.***, Chen, A. and Machemehl, R. (2019) An adaptive signal control method using cell transmission model and mixed integer linear programming. *98st Annual Meeting of the Transportation Research Board,* January, Washington, D.C.

RESEARCH REPORTS TO SPONSOR

1. Gayah, V.V., Donnell, E.T., Prajapati, A. and **Liu, H.** (2023). Crash modification factors for high-tension cable median barriers in Pennsylvania. *Final Report for the Pennsylvania Department of Transportation,* PennDOT-2023-ECMS-E04834-WO14.
2. Guler, S.I., Gayah, V.V., **Liu, H.**, Chowdhury, L. and French, S. (2023) Behavior safety in Pennsylvania, *Final Report for the Pennsylvania Department of Transportation*, FHWA-PA-2023-008-PSU WO 008.
3. Gayah, V.V., Guler, S.I., **Liu, H.,** Blackburn, L. and Hamilton, I. (2022) Quantification of systemic risk factors for pedestrian safety on North Carolina. *Final Report for the North Carolina Department of Transportation*, FHWA/NC/2022-1.
4. **Liu, H.**, Ross, H.W., Nair, G. and Ruiz-Juri, N. (2021) Using smart work zone trailer data to evaluate and predict lane closure impacts with a consideration of work intensity. *Final report for Smart Work Zone Deployment Initiative*, Part of TPF-5(438).
5. Ruiz-Juri, N., Ross, H.W. and **Liu, H.** (2020) Post-event estimation of work zone traffic impacts. *Final Technical Memorandum for TxDOT Austin District*.
6. Ruiz-Juri, N., Ross, H.W. and **Liu, H.** (2020) Prediction of work zone traffic impacts. *Final Technical Memorandum for TxDOT Austin District*.

7. **Liu, H.** and Machemehl, R. (2020) Corridor level adaptive signal control continuation. *Final report for Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE @ UNC Charlotte).*
8. **Liu, H.**, Baumanis, C. and Machemehl, R. (2018) Evaluation of right-of-way temporary use fees in urban networks. *Final Technical Memorandum for City of Austin*. Project # 160000006

PRESENTATIONS

RESEARCH PRESENTATIONS AT CONFERENCES OR OTHER MEETINGS

* indicates that I served as presenter

1. Taglieri, D., **Liu, H.*** and Gayah, V.V. (2023) Network-wide implementation of roundabouts Vs. signalized intersections on urban streets: analytical and simulation comparison, *The International Conference on Transportation and Development and the International Airfield & Highway Pavements Conference*, Austin, TX.
2. **Liu, H**., Machemehl, R. and Claudel, C. (2020) Robust control of traffic flow on networks using chance constrained optimization, *C2SMART seminar series*, NYU.
3. **Liu, H**., Machemehl, R. and Claudel, C. (2020) Robust control of traffic flow on networks using chance constrained optimization, *Purdue University seminar series*, West Lafayette (IN).
4. **Liu, H**., Machemehl, R. and Claudel, C. (2019) Robust control of traffic flow on networks using chance constrained optimization, *Workshop on Resilient Control of Infrastructure Networks*, Politecnico of Torino, Torino, Italy.
5. **Liu, H.***, Chen, A. and Machemehl, R. (2018) An adaptive signal control method using the CTM model and Lighthill-Whitham-Richards model. *1st CAMMSE Research Symposium*, Charlotte, NC.
6. **Liu, H.,** Claudel, C. and Machemehl, R. (2018) A stochastic formulation of the optimal boundary control problem involving the Lighthill-Whitham-Richards model. *15th IFAC Symposium on Control in Transportation Systems*, Savona, Italy.
7. **Liu, H.**, Machemehl, R. and Baumanis, C. (2018) The effect of a temporary lane blockage on an urban network. *2018 CSCE Annual Conference*, Fredericton, Canada.

INVITED TALKS

* indicates that I served as presenter

1. **Liu, H.*** and Gayah, V.V. (2022) A travel delay based Max Pressure algorithm. *2022 INFORMS Annual Meeting*, October, Indianapolis, IN.
2. **Liu, H.*** and Gayah, V.V. (2023) Development of Max Pressure traffic signal control: efficiency and practice. Institute of Transportation Engineers Pakistan (ITEP), December, Pakistan.