

# Yunli Shao

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## Education

<b>Ph.D. in Mechanical Engineering</b>	Sep. 2015-Nov. 2019
<i>University of Minnesota (UMN), Twin Cities, MN</i>	
<b>Advisor:</b> Dr. Zongxuan Sun	
<b>Dissertation:</b> Optimization and Evaluation of Vehicle Dynamics & Powertrain Operation for Connected and Autonomous Vehicles	
<b>M.S. in Mechanical Engineering</b>	Aug. 2013-Apr. 2015
<i>University of Michigan, Ann Arbor, MI</i>	
<b>B.S. in Mechanical Engineering</b>	Sept. 2009-Jun. 2013
<i>Shanghai Jiao Tong University (SJTU), Shanghai, China</i>	

## Professional Experience

<b>Assistant Professor</b>	Aug. 2023-Present
<i>University of Georgia, Athens, GA</i>	
<b>Research &amp; Development Staff</b>	Dec. 2020-July. 2023
<b>Postdoctoral Research Associate</b>	Dec. 2019-Nov. 2020
<i>Oak Ridge National Laboratory (ORNL), Knoxville, TN</i>	
<b>Research Assistant</b>	May 2015-Nov 2019
<i>Automotive Propulsion Control Laboratory, University of Minnesota, Twin Cities, MN</i>	
<b>Application Software Engineer</b>	Jan. 2015-Apr. 2015
<i>Magna International Inc., Troy, MI</i>	
<b>Controls Systems &amp; Solutions Intern</b>	May 2014-Aug. 2014
<i>Eaton Corporation plc, Southfield, MI</i>	

## Referred Publications

### Journal Papers

Underlined are students and/or post-docs guided.

- J-1 Shi, Y., Wang, Z., LaClair, T., Wang, C., **Shao, Y.**, and Yuan, J., 2023. "A Novel Deep Reinforcement Learning Approach to Traffic Signal Control with Connected Vehicles", *Applied Sciences*, 13(4), p.2750.
- J-2 Shi, Y., Wang, Z., LaClair, T., Wang, C., **Shao, Y.**, 2023. "Real-Time Control of Connected Vehicles in Signalized Corridors using Pseudospectral Convex Optimization", *Optimal Control Applications and Methods*.
- J-3 Subramaniyan, A.B., Wang, C., **Shao, Y.**, Li, W., Wang, H., Zhang, G., Ma, T., 2022. "Hybrid Recurrent Neural Network Modeling for Traffic Delay Prediction at Signalized Intersections Along an Urban Arterial", *IEEE Transactions on Intelligent Transportation Systems*, 24(1), pp.1384-1394.
- J-4 Sun, W., Wang, S., **Shao, Y.**, Sun, Z. and Levin, M.W., 2022. "Energy and mobility impacts of connected autonomous vehicles with co-optimization of speed and powertrain on mixed vehicle platoons", *Transportation Research Part C: Emerging Technologies*, 142, 103764.
- J-5 **Shao, Y.**, Deter, D., Cook, A., Wang, C., Perry, N., Thompson, B., 2022. "Real-Sim Interface: Enabling Multi-resolution Simulation and X-in-the-loop Development for Connected and Automated Vehicles", *SAE International Journal of Connected and Automated Vehicles*, 5 (12-05-04-0026).

- J-6 Wang, H., Wang, R., **Shao, Y.**, Li, W., Subramaniyan, A.B., Zhang, G., Ma, T., Ringler, J. and Chou, D., 2021. “Hybrid Neural Network Learning for Multiple Intersections along Signalized Arterials - A Microscopic Simulation vs Real System Effect”, *International Journal On Advances in Networks and Services*, Volume 14, Number 1 & 2
- J-7 **Shao, Y.**, and Sun, Z., 2021. “Energy-Efficient Connected and Automated Vehicles: Real-time Traffic Prediction Enabled Co-Optimization of Vehicle Motion and Powertrain Operation”, *IEEE Vehicular Technology Magazine*, 16(3), pp.47-56.
- J-8 **Shao, Y.**, and Sun, Z., 2020. “Vehicle Speed and Gear Position Co-optimization for Energy Efficient Connected and Autonomous Vehicles”, *IEEE Transactions on Control Systems Technology*, 29(4), pp.1721-1732.
- J-9 **Shao, Y.**, and Sun, Z., 2020. “Eco-approach with Traffic Prediction and Experimental Validation for Connected and Autonomous Vehicles”, *IEEE Transactions on Intelligent Transportation Systems*, 22(3), pp.1562-1572.
- J-10 **Shao, Y.**, Mohd Zulkefi, M.A., Sun, Z., Huang, P., 2019. “Evaluating Connected and Autonomous Vehicles Using a Hardware-in-the-loop Testbed and a Living Lab”, *Transportation Research Part C: Emerging Technologies*, v102, pp. 121-135.
- J-11 **Shao, Y.**, Mohd Zulkefli, M.A., and Sun, Z., 2017. “Vehicle and Powertrain Optimization for Autonomous and Connected Vehicles”, *ASME Mechanical Engineering: Dynamic Systems and Control*, 139(09), S19-S23.
- J-12 Hu, J., **Shao, Y.**, Sun, Z., and Bared, J., 2017. “Integrated Vehicle and Powertrain Optimization for Passenger Vehicles with Vehicle-Infrastructure Communication”, *Transportation Research Part C: Emerging Technologies*, v79, pp. 85-102.
- J-13 Hu, J., **Shao, Y.**, Sun, Z., Wang, M., Bared, J. and Huang, P., 2016. “Integrated Optimal Eco-Driving on Rolling Terrain for Hybrid Electric Vehicle with Vehicle-Infrastructure Communication”, *Transportation Research Part C: Emerging Technologies*, v68, pp.228-244.
- J-14 Mohd Zulkefli, M.A., Mukherjee, P., **Shao, Y.** and Sun, Z., 2016. “Evaluating Connected Vehicles and Their Applications”, *ASME Mechanical Engineering: Dynamic Systems and Control*, 138(12), S12-S17.
- J-15 Alex Shorter, K., **Shao, Y.**, Ojeda, L., Barton, K., Rocho-Levine, J., Hoop, J. and Moore, M., 2017. “A day in the life of a dolphin: Using bio-logging tags for improved animal health and well-being”, *Marine Mammal Science*, 33(3), pp.785-802.

## Conference Papers

Underlined are students and/or post-docs guided.

- C-1 He, S., Wang, S., **Shao, Y.**, Sun, Z. and Levin, M.W., 2023. “Real-Time Traffic Prediction Considering Lane Changing Maneuvers with Application to Eco-Driving Control of Electric Vehicles”, In 2023 IEEE Intelligent Vehicles Symposium (IV), IEEE.
- C-2 Wang, Z., Cook, A., **Shao, Y.**, Xu, G. and Chen, J., 2023. “Cooperative Merging Speed Planning: A Vehicle-Dynamics-Free Method”, In 2023 IEEE Intelligent Vehicles Symposium (IV), IEEE.
- C-3 **Shao, Y.**, Chambon, P., Cook, A., Wang, C., Deter, D., “Evaluating Connected and Automated Vehicles in Co-simulation Environment of Traffic Microsimulation and Vehicle Dynamics”, In *International Conference on Transportation and Development (ICTD) 2023, Austin, TX.*, pp. 207-217.
- C-4 Wang, Z., Cook, A., **Shao, Y.**, Sujun, V., Chambon, P., Deter, D., Perry, N., “Heavy-Duty Vehicle Air Drag Coefficient Estimation: From an Algebraic Perspective”, *2023 American Control Conference (ACC), San Diego, CA*, pp. 3169-3174.
- C-5 Yuan, J., LaClair, T., Wang, C., Lim, H., Li, W., Wang, H., **Shao, Y.**, “Integration of Distributed Queue-Aware, Eco-Approach Strategies and Bi-Linear Signal Control Algorithm Under Mixed Connected and Automated Traffic Environment on a Signalized Multi-Lane Corridor”, *102nd Transportation Research Board (TRB) Annual Meeting, 2023.*

- C-6 **Shao, Y.**, Wang, C., Berres, A., Yoshioka, J., Cook, A. and Xu, H., 2022. "Computer Vision-Enabled Smart Traffic Monitoring for Sustainable Transportation Management", *In International Conference on Transportation and Development 2022* (pp. 34-45).
- C-7 **Shao, Y.**, Cook, A., Perry, N., Deter, D. and Wang, C.R., 2022. "Real-Sim: A Multi-resolution X-in-the-loop Experimental Approach for Testing Connected and Automated Vehicles", *2022 American Control Conference (ACC), Atlanta, GA*.
- C-8 **Shao, Y.**, Deter, D., Cook, A., Wang, C., Perry, N., Thompson, B., "A Flexible Real-Sim Interface for Integrated Hardware-in-the-loop Simulation for Connected and Automated Vehicles", *101st Transportation Research Board (TRB) Annual Meeting, 2022*
- C-9 Sun, W., Wang, S., **Shao, Y.**, Sun, Z. and Levin, M.W., "Energy and Mobility Impact of Connected Autonomous Vehicles with Co-optimization of Speed and Powertrain on Mixed Vehicle Platoons", *101st Transportation Research Board (TRB) Annual Meeting, 2022*
- C-10 Subramaniam, A.B., Wang, R., **Shao, Y.**, Li, W., Wang, H., Zhang, G., Ma, T., "Hybrid Recurrent Neural Network Modeling for Traffic Delay Prediction Along Signalized Intersections: A Case Study in Hawaii", *101st Transportation Research Board (TRB) Annual Meeting, 2022*
- C-11 Sun, W., Wang, S., **Shao, Y.**, Sun, Z. and Levin, M.W., "Traffic Prediction for Connected Vehicles on a Signalized Arterial", *2021 IEEE International Intelligent Transportation Systems Conference (ITSC)*.
- C-12 Wang, H., Li, W., Wang, R., **Shao, Y.**, Zhang, G., Ma, T., Ringler, J. and Chou, D., 2021. "Hybrid Neural Network Modeling for Multiple Intersections along Signalized Arterials-Current Situation and Some New Results", *The Tenth International Conference on Advances in Vehicular Systems, Technologies and Applications, VEHICULAR 2021, Best Paper Award*
- C-13 **Shao, Y.**, Zheng, Y., and Sun, Z., "Machine Learning Enabled Traffic Prediction for Speed Optimization of a Connected and Autonomous Electric Vehicle", *2021 American Control Conference (ACC)*
- C-14 **Shao, Y.** and Rios-Torres, J., "Traffic Prediction for Merging Coordination Control in Mixed Traffic Scenarios", *2020 ASME Dynamic Systems and Control Conference (DSCC), Pittsburgh, PA*.
- C-15 Suh, B., **Shao, Y.** and Sun, Z., "Vehicle Speed Prediction for Connected and Autonomous Vehicles Using Communication and Perception", *2020 American Control Conference (ACC), Denver, CO*.
- C-16 **Shao, Y.** and Sun, Z., "Optimal Speed Control For A Connected and Autonomous Electric Vehicle Considering Battery Aging and Regenerative Braking Limits", *2019 ASME Dynamic Systems and Control Conference (DSCC), Park City, UT*.
- C-17 **Shao, Y.** and Sun, Z., "Optimal Vehicle Speed and Gear Position Control For Connected and Autonomous Vehicles", *2019 American Control Conference (ACC), Philadelphia, PA*.
- C-18 **Shao, Y.**, Mohd Zulkefi, M.A., Sun, Z., Huang, P., "Hardware-In-The-Loop Testbed and Living Lab for Evaluating Connected and Autonomous Vehicles", *98th Transportation Research Board (TRB) Annual Meeting, Washington, D.C., 2019*.
- C-19 Oo, Y. L., **Shao, Y.**, and Sun, Z., 2019. "Evaluating Fuel Economy Of Connected and Autonomous Vehicles Under Different Traffic Factors", *98th Transportation Research Board (TRB) Annual Meeting, Washington, D.C., 2019*.
- C-20 **Shao, Y.** and Sun, Z., "Optimal Eco-Approach Control With Traffic Prediction For Connected Vehicles," *2018 ASME Dynamic Systems and Control Conference (DSCC), Atlanta, GA*.
- C-21 **Shao, Y.** and Sun, Z., "Robust Eco-Cooperative Adaptive Cruise Control With Gear Shifting", *2017 American Control Conference (ACC), Seattle, WA*.
- C-22 Hu, J., **Shao, Y.**, Sun, Z., and Bared, J., "Integrated Vehicle and Powertrain Optimization for Passenger Vehicles with Vehicle-Infrastructure Communication", *96th Transportation Research Board (TRB) Annual Meeting, Washington, D.C., 2017*.

- C-23 Hu, J., **Shao, Y.**, Sun, Z., Wang, M., Bared, J. and Huang, P., “Integrated Optimal Eco-driving on Rolling Terrain for Hybrid Electric Vehicle Under Connected-Vehicle Context”, *95th Transportation Research Board (TRB) Annual Meeting, Washington, D.C.*, 2016.

### Book Chapters

- B-1 Xu, H., Berres, A., **Shao, Y.**, Wang, C., New, J.R. and Omitaomu, O.A., 2023. “Toward a Smart Metaverse City: Immersive Realism and 3D Visualization of Digital Twin Cities”, *Advances in Scalable and Intelligent Geospatial Analytics*, pp.245-257.

### Scholarship and Awards

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Best Poster Award, <i>IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS)</i>	2022
Best Paper Award, <i>IARIA Vehicular</i>	2021
Matthew J. Huber Award, Excellence in Transportation Research & Education, University of Minnesota	2019
Doctoral Dissertation Fellowship (DDF), University of Minnesota	2018-2019
Mechanical Engineering Department Fellowship, University of Minnesota	2015
National Scholarship, China	2011-2012
Academic Excellence Scholarship, SJTU	2009-2010, 2010-2011