

# ZHE HAN, PH.D., B. LAW, P.E.

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Research Associate

Center for Transportation Research (CTR)

The University of Texas at Austin (UT Austin)

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## TECHNICAL INTERESTS

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Large-scale Transportation Infrastructure Management, Resilience Analysis, Emerging Technologies, Risk Assessment and Management, Traffic Safety Analysis, Asset Valuation and Management, Optimization Technique, Innovative Financing Mechanisms, Public-Private Partnerships

## EDUCATION

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01/2014-08/2017 **Ph.D.** in Civil Engineering. The University of Texas at Austin. Austin, Texas, USA

08/2015-05/2017 **Portfolio in Applied Statistical Modeling.** Department of Statistics and Data Science. The University of Texas at Austin. Austin, Texas, USA

08/2012-12/2013 **M.S.** in Civil Engineering. The University of Texas at Austin. Austin, Texas, USA

08/2010-07/2012 **Bachelor of Law.** Tsinghua University. Beijing, China

08/2008-07/2012 **B.S.** in Civil Engineering. Tsinghua University. Beijing, China

## CURRENT AND PREVIOUS ACADEMIC POSITIONS

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04/2020-Present **Research Associate**

Center for Transportation Research, The University of Texas at Austin, Austin, Tx, USA

09/2017-03/2020 **Postdoctoral Research Fellow**

Center for Transportation Research, The University of Texas at Austin, Austin, Tx, USA

## HONORS, AWARDS, AND RECOGNITIONS

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10/2023 **Best Paper Award Winner.** Transportation Research Board (TRB) Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity (AMR20), Washington, D.C., USA

03/2023 Paper featured as **Editor's Choice** by *Journal of Infrastructure Systems*, American Society of Civil Engineers (ASCE)

06/2021 **Excellent Paper Award Winner.** The 4th World Transport Convention (WTC), Xi'an, China

01/2017 **IACIP Outstanding Graduate Student Award.** International Association of Chinese Infrastructure Professionals (IACIP), Washington, D.C., USA

01/2017 **Second Prize.** Student poster competition of the 7th IACIP Annual Workshop, Washington, D.C., USA

10/2016 **Kolodzey Travel Grant.** The University of Texas at Austin, USA

08/2016 **Walter L. and Reta Mae Moore Graduate Fellowship.** The University of Texas at Austin, USA

01/2016 **Professional Development Award.** The University of Texas at Austin, USA

12/2015 **Capital Area Section-TexITE Scholarship.** Texas Institute of Transportation Engineers, Texas, USA

09/2015 **Robert Herman Endowed Scholarship.** The University of Texas at Austin, USA

05/2015 **Best Paper Award Winner.** The 9th International Conference on Managing Pavement Assets. Alexandria, Virginia, USA

01/2015 **Second Prize.** Poster competition of the 5th IACIP Annual Workshop, Washington, D.C., USA

12/2011 **First Class Scholarship for Science and Technology Academic.** Tsinghua University, Beijing, China

12/2011 **Second Class Scholarship for Social Work.** Tsinghua University, Beijing, China

12/2011 **Third Class of Yinzhen Han Alumni Academic Scholarship.** Tsinghua University, Beijing, China

## RESEARCH PROJECTS AND INTERAGENCY CONTRACTS

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10/2023-08/2024 **Key Researcher.** Interagency Contract: House Bill 1, GAA Art V, Rider 51. Texas Department of Public Safety Driver License Division Study

*Active. \$496,661.96. Sponsored by Texas Department of Public Safety*

09/2023-08/2025 **Co-Investigator.** Project 0-7182: Determine Effectiveness of Construction Management Plans.

*Active. \$299,302.47. Sponsored by Texas Department of Transportation*

- 09/2022-08/2024 **Principal Investigator.** Project 0-7137: Assessment of Austin, El Paso, and San Antonio HERO Incident Management Programs.  
*Active. \$393,182.94. Sponsored by Texas Department of Transportation*
- 09/2020-08/2024 **Co-Principal Investigator.** Interagency Contract: Technical Assistance for the Austin District  
  - Task 1 **Researcher** (\$1,418,451.92): Technical Support for Major Corridors Analyses
  - Task 3 **Co-leader** (\$1,528,675.77): Provide Technical Support in District Safety Analysis
  - Task 5 **Leader** (\$616,245.95): Knowledge Transfer and Support for the Austin District
  - Task 6 (\$2,367,177.72): Provide Technical Support in Development of a Comprehensive Operational & Maintenance Master Planning Tool
    - **09/2020 – 12/2022: Task 6 Co-leader**
    - **01/2023 – 08/2024: Task 6 Leader***Active. \$7,672,318.83. Sponsored by Texas Department of Transportation, Austin District*
- 09/2021-12/2023 **Co-Investigator.** Project 0-7123: Define a Statewide Plan for a Sustainable Real-Time Travel Time Network for Texas Hurricane Evacuations and Safe Citizen Return.  
*Active. \$399,868.11. Sponsored by Texas Department of Transportation*
- 04/2020-05/2022 **Co-Investigator.** Project 0-7050: Improving the Identification of Curve-Related Crashes in the Crash Records Information System (CRIS)  
*Completed. \$209,041. Sponsored by Texas Department of Transportation*
- 04/2020-01/2022 **Key Researcher.** Interagency Contract: Technical Assistance to Professional Engineering Procurement Services (PEPS) Scope of Work Library  
*Completed. \$515,931.89. Sponsored by Texas Department of Transportation*
- 01/2020-12/2021 **Co-Investigator.** Project 0-7055: Create a Resilient Port System in Texas: Assessing and Mitigating Extreme Weather Events  
*Completed. \$307,158. Sponsored by Texas Department of Transportation*
- 07/2016-09/2021 **Invited International Expert Advisor.** Research and Application of VFM Quantitated Assessment Method for China's PPP Model  
*Completed. Invited by Dr. Wenjuan Wang from Capital University of Economics and Business, Beijing, China*
- 10/2019-12/2020 **Key Researcher.** Interagency Contract: Technical Assistance to Texas Department of Public Safety Driver License Division  
*Completed. \$976,008. Sponsored by Texas Department of Public Safety*
- 09/2019-10/2020 **Co-Investigator.** Interagency Contract: Conversion Plan to Digital Library  
*Completed. \$466,254. Sponsored by Texas Department of Transportation*
- 09/2017-08/2020 **Co-Leader.** Interagency Contract. Task 2: Provide Technical Assistance in Freeway Studies  
*Completed. \$360,000. Sponsored by Texas Department of Transportation, Austin District*
- 09/2017-08/2020 **Co-Leader.** Interagency Contract. Task 4: Technical Assistance in Incorporating Data and Processes in Austin District Safety Analysis  
*Completed. \$450,000. Sponsored by Texas Department of Transportation, Austin District*
- 09/2017-08/2020 **Co-Leader.** Interagency Contract. Task 7: Technology Transfer and Support for the Austin District  
*Completed. \$300,000. Sponsored by Texas Department of Transportation, Austin District*
- 09/2017-08/2020 **Co-Leader.** Interagency Contract. Task 8: Support in Development of a Comprehensive Operational and Maintenance Master Planning Tool  
*Completed. \$825,000. Sponsored by Texas Department of Transportation, Austin District*
- 09/2017-08/2020 **Co-Leader.** Interagency Contract. Task 9: Support the Austin District Environmental Section in Data Collection and Evaluation  
*Completed. \$450,000. Sponsored by Texas Department of Transportation, Austin District*
- 02/2018-10/2019 **Co-Investigator.** Interagency Contract: Economic and Safety Considerations: Motor Vehicle Safety Inspections for Passenger Vehicles in Texas  
*Completed. \$151,002. Sponsored by Texas Department of Public Safety*
- 01/2018-10/2019 **Co-Investigator.** Interagency Contract: Evaluating Safety and Economic Impacts of Texas Travel Information Centers  
*Completed. \$93,325. Sponsored by Texas Department of Transportation*

08/2013-08/2017 **Key Researcher.** Interagency Contract: Support in Developing the Austin District's 4-year Plan  
 Completed. \$395,000. Sponsored by Texas Department of Transportation, Austin District

## **REFEREED JOURNAL PUBLICATIONS**

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\*Indicating current or former students I guided or worked with.

- Wang, X., Y. Li, and **Z. Han**, "Urban Pavement Network Reliability: A Triangular Fuzzy Number and Dual-network Methodology." Manuscript submitted to *International Journal of Pavement Engineering (IJPE)*. Under review.
- Pan, S.\*, K. Bathgate\*, **Z. Han**, J. Sun, and Z. Zhang. "Modeling Interdependent Infrastructure System Vulnerability with Imprecise Information Using Two Fuzzy Inference Systems." Manuscript submitted to *Transportation Research Record: Journal of the Transportation Research Board*. Under review.
- Lu, X., K. Bathgate\*, J. Robbennolt, J. Sun, S. Pan\*, **Z. Han**, and S. Boyles. "Understanding the Utilization of Real-Time Traffic Information during Hurricane Evacuations in Texas." Manuscript submitted to *Transportation Research Record: Journal of the Transportation Research Board*. Under review.
- Yang, X.\*, **Z. Han**, M. Murphy, and Z. Zhang. "A Methodological Procedure for Evaluating Curve-Related Misclassifications in Motor Vehicle Crash Databases." Manuscript submitted to *Research in Transportation Economics*. Revision under review.
- Sun, J.\*, **Z. Han**, and Z. Zhang. "Resource Allocation Framework for Optimizing Long-term Infrastructure Network Resilience." *Journal of Infrastructure Systems* (2023). Vol. 29, Issue 1 (March 2023). Published online: December 30, 2022. DOI: 10.1061/JITSE4.ISENG-2083. **Featured as Editor's Choice.**
- Gao, L., **Z. Han**, and Y. Chen. "Deep Learning-based Pavement Performance Modeling using Multiple Distress Indicators and Road Work History." *Journal of Transportation Engineering: Part B, Pavements* (2023). 149(1), p. 04022061. Published online on October 22, 2022. DOI: 10.1061/JPEODX.0000405.
- Politis, S.S.\*, Z. Zhang, **Z. Han**, J.J. Hasenbein, and M. Arellano. Stochastic Analysis of Network-Level Bridge Maintenance Needs Using Latin Hypercube Sampling. *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering* (2020), 7(1), p.04020049. DOI:10.1061/AJRUA6.0001099.
- Hoang, T.\*, **Z. Han**, and Z. Zhang. "Integrating Economic and Utility Concepts for A Comprehensive Bridge Valuation Model". *Transportation Research Record: Journal of the Transportation Research Board* (2020). 2674(9), pp.26-37. DOI: 10.1177/0361198120926509.
- Wang, X., Y. Gou, **Z. Han**, and Z. Zhang. "Pavement Network Reliability: A Dual-network Based on Fuzzy Set Methodology" *IET Intelligent Transport Systems* (2019), 13(3), pp.475-484. DOI: 10.1049/iet-its.2018.5191
- Han, Z.**, J. D. Porras-Alvarado, C. Stone, and Z. Zhang. "Incorporating Uncertainties into Determination of Optimal Pavement Preventive Maintenance Intervals." *Transportmetrica A: Transport Science* (2018): 1-21. ISSN: 2324-9935. DOI: 10.1080/23249935.2018.1433730
- Han, Z.**, J. D. Porras-Alvarado, J. Sun, and Z. Zhang. "Monte Carlo Simulation Based Assessment of Risks Associated with PPP Investments in Toll Highway Infrastructure." *Transportation Research Record: Journal of the Transportation Research Board*, No. 2670 (2017), 59-67. DOI: 10.3141/2670-08
- Porras-Alvarado, J. D., M. R. Murphy, H. Wu, **Z. Han**, and Z. Zhang. "Analytical Hierarchy Process to Improve Project Prioritization in the Austin District." *Transportation Research Record: Journal of the Transportation Research Board*. No. 2613 (2016). DOI: 10.3141/2613-04.
- Porras-Alvarado, J.D., **Z. Han**, MD Al-Amin, Z. Zhang. "Fairness and Efficiency Considerations in Performance-based Cross-Asset Resource Allocation." *Transportation Research Record: Journal of the Transportation Research Board*, No. 2596 (2016). DOI:10.3141/2596-03
- Qiu, S., **Z. Han**, W. Wang, K. Wang, and Z. Zhang. "Application of AASHTO PP69-10 & PP70-10 Based Continuous Rutting Depth Data." *International Journal of Pavement Research and Technology* 9, no. 1 (2016): 37-48. <http://dx.doi.org/10.1016/j.ijprt.2016.01.003>
- Wang, X., Z. Zhang, J. Chen, and **Z. Han**. "A Generalized Life-Cycle Cost Model for Rail Transit: Making Decisions Between At-grade Mode and Underground Mode." *International Journal of Rail Transportation Vol. 4*, no. 1 (2016): 37-54. DOI: 10.1080/23248378.2015.1015221.
- Wu, H., **Z. Han**, M. R. Murphy, and Z. Zhang. "Empirical Bayes Before-After Study on Safety Effect of Narrow Pavement Widening Projects in Texas." *Transportation Research Record: Journal of the Transportation Research Board* 2515 (2015): 63-69. DOI: 10.3141/2515-09

- Porras-Alvarado, J. D., D. Peters, **Z. Han**, and Z. Zhang. "Novel Utility-Based Methodological Framework for Valuation of Road Infrastructure." *Transportation Research Record: Journal of the Transportation Research Board* 2529 (2015): 37-45. DOI: 10.3141/2529-04
- Wang, X., Z. Zhang, J. Chen, and **Z. Han**. "Methodologies for Assessing Costs of Rail Transit Systems Based on Small Sample Data." *International Journal of Rail Transportation*, 2015, Vol. 3, No. 2, pp. 81-96, Taylor & Francis Group. DOI: 10.1080/23248378.2015.1015222

## **REFEREED CONFERENCE PROCEEDINGS**

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*\*Indicating current or former students I guided or worked with.*

- Hasan, M.\*, **Z. Han**, and R. Machemehl. "Development of Crash Database Parsing Tools to Support the Highway Safety Improvement Program in Texas". *International Conference on Transportation & Development (ICTD), American Society of Civil Engineers (ASCE)*. June 6 to June 9, 2021. Austin, Texas, USA.
- Wang, X., Y. Zhou, **Z. Han**, and Z. Zhang. "A Spatial Approach to Resource Allocation for Post-Earthquake Restoration of Urban Roadway Networks." *Transportation Research Board 95th Annual Meeting*, no. 16-3388. Jan. 10 to Jan. 14, 2016. Washington, D. C.
- Porras-Alvarado, J. D., **Z. Han**, Z. Zhang, and C. M. Walton. "An Integrated Approach to the Finance, Maintenance, and Operation of Highway Infrastructure." *In 2nd International Conference on Public-Private Partnerships*. May 26 to May 29, 2015. Austin, Texas, U.S.A.
- Porras-Alvarado, J. D., **Z. Han**, and Z. Zhang. "A Fair Division Approach to Performance-based Cross-Asset Resource Allocation." *In 9th International Conference on Managing Pavement Assets (ICMPA)*. Hosted by Virginia Tech Transportation Institute (VTTI). May 18 to May 21, 2015. **Winner, the Best Paper Award**. Alexandria, VA.
- Wang, X., Z. Zhang, and **Z. Han**. "Pavement Network Reliability: Triangular Fuzzy Number and Transited Network Methodology." *Transportation Research Board 94th Annual Meeting*, no. 15-5801. Jan. 11 to Jan. 15, 2015. Washington, D. C.
- Wang, X., Z. Zhang, and **Z. Han**. "Network-Level M&R Budget Planning Through Reliability of the Pavement Network." *Transportation Research Board 94th Annual Meeting*, no. 15-4515. Jan. 11 to Jan. 15, 2015. Washington, D. C.
- Han, Z.**, C. Stone, and Z. Zhang. "Reliability-based Approach to Optimizing Pavement Preventive Maintenance Cycles Using the Method of Moments." *Transportation Research Board 93rd Annual Meeting*, no. 14-3066. Jan. 12 to Jan. 16, 2014. Washington, D. C.

## **TECHNICAL REPORTS**

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*\*Indicating current or former students I guided or worked with.*

- Yang, X.\*, **Z. Han**, M. Murphy, and Z. Zhang. *Development of An Automated Methodological Procedure to Improve the Identification of Curve-Related Crashes in the Crash Records Information System (CRIS) – Final Report*. Report No. FHWA/TX-22/0-7050-1. Texas Department of Transportation.
- Bathgate, K.\*, Sun, J.\*, Pan, S.\*, Balakrishnan, S.\*, Zhang, Z., Murphy, M., **Han, Z.**, and Loftus-Otway, L. (2022). *Creating a Resilient Port System in Texas: Assessing and Mitigating Extreme Weather Events – Final Report*. Report No. FHWA/TX-22/0-7055-1. Texas Department of Transportation. Published May 2022.
- Murphy, M., S. Grenburg, D. Hazlett, L. Loftus-Otway, Teleki Consulting, S. Gallun, J. Guttman, M. Surka, **Z. Han**, M. Kammer-Kerwick, K. Takasaki, R. Machemehl, C. Baumanis, M. Brown, S. Pan\*, S. Balakrishnan\*, T. Lim, A. Markman, and Z. Zhang. "Management, Operating Structure, Efficiencies, and Opportunities and Challenges of Transferring the Driver License Program." (2020). Center for Transportation Research. The University of Texas at Austin.
- Murphy, M., **Z. Han**, N. Jiang, D. Hazlett, A. S. Ahsan\*, A. Cooper\*, C. Baumanis, Z. Zhang, R. Machemehl, and R. Harrison. "Evaluating Safety and Economic Impacts of Texas Travel Information Centers." (2018). Center for Transportation Research. The University of Texas at Austin. Transport Research International Documentation (TRID). Report number 01686002.
- Murphy, M., N. Jiang, **Z. Han**, D. Hazlett, C. Baumanis, A. S. Ahsan\*, R. Machemehl, and Z. Zhang. "Economic and Safety Considerations: Motor Vehicle Safety Inspections for Passenger Vehicles in Texas." (2018). Center for Transportation Research. The University of Texas at Austin. Transport Research International Documentation (TRID). Report number 01691602.
- Zhang, Z., **Z. Han**, and Z. Zhang, Center for Resilient Infrastructure and Smart Cities (CRISC), "Methodologies for Assessing Infrastructure Projects under Public-Private Partnerships: From Project Financing to

*Maintenance Scheduling*". (2017). Center for Resilient Infrastructure and Smart Cities (CRISC). Center for Transportation Research. The University of Texas at Austin.

Zhang, Z., **Z. Han**, and Z. Zhang, Center for Resilient Infrastructure and Smart Cities (CRISC), "*Procedures and Resources for Analyses Related to Public-Private Partnerships*." (2017). Center for Resilient Infrastructure and Smart Cities (CRISC). Center for Transportation Research. The University of Texas at Austin.

## BOOKS

**Co-Author.** Qiu, S., W. Wang, W., Wang, J. Wang, W. Hu, **Z. Han**. *Machine Vision-based Detection, Maintenance, and Management of Cracks for Transportation Infrastructures*. Published by Central South University Press. July 2021. Published in Chinese.

**Deputy Editor.** Qiu, S., Z. Wang, Y. Chen, B. Xue, and **Z. Han**. *Operation and Management of City Underground Utility Tunnel*. Published by China Architecture & Building Press. August 2019. ISBN: 9787112236763. Published in Chinese.

## INVITED TALKS AND TECHNICAL PRESENTATIONS

\*Indicating current or former students I guided or worked with.

Pan, S.\*, K. Bathgate\*, **Z. Han**, J. Sun, and Z. Zhang. "Modeling Interdependent Infrastructure System Vulnerability with Imprecise Information Using Two Fuzzy Inference Systems." Paper accepted to be presented at *Transportation Research Board 103rd Annual Meeting*. TRBAM-24-05970. Jan. 7 to 11, 2024. Washington, D. C.

Lu, X., K. Bathgate\*, J. Robbennolt, J. Sun, S. Pan\*, **Z. Han**, and S. Boyles. "Understanding the Utilization of Real-Time Traffic Information during Hurricane Evacuations in Texas." Paper accepted to be presented at *Transportation Research Board 103rd Annual Meeting*. TRBAM-24-01044. Jan. 7 to 11, 2024. Washington, D. C. **Best Paper Award Winner**. Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity (AMR20)

Jiang, K.\*, K. Bathgate\*, J. Sun\*, S. Pan\*, M. Murphy, **Z. Han**, and Z. Zhang. "Perceptions and Usage of Traffic Monitoring Devices during Past Hurricane Evacuations in Texas". *International Conference on Transportation & Development (ICTD), American Society of Civil Engineers (ASCE)*. June 14 to June 17, 2023. Austin, Texas, USA.

Yang, X.\*, **Z. Han**, M. Murphy, and Z. Zhang. "Developing an Automated Methodological Procedure for Improving the Identification of Curve-Related Crashes in the Texas Crash Records Information System (CRIS)". *International Conference on Transportation & Development (ICTD), American Society of Civil Engineers (ASCE)*. June 14 to June 17, 2023. Austin, Texas, USA.

**Han, Z.**, Y. Xu\*, M. Murphy, R. Machemehl, D. Hazlett, and Z. Zhang. "Project 0-7137: Assess HERO Incident Management Programs in Austin, El Paso, and San Antonio Metropolitan Areas". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Bathgate, K.\*, K. Jiang\*, **Z. Han**, M. Murphy, and Z. Zhang. "Evacuation Volume and Safety Assessment: A Case Study in Rural Texas Highways during Hurricane Laura on US 90 and US 287". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Pan, S.\*, **Z. Han**, and M. Murphy. "Development of Austin District Driveway Permit Tool". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Politis, S.\*, **Z. Han**, L. Liang, M. Arellano, and M. Murphy. "Transportation Infrastructure Maintenance and Rehabilitation Master Planning Tools". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Xu, Y.\*, **Z. Han**, M. Murphy, and Z. Zhang. "Project 0-7050: Improving the Identification of Curve-Related Crashes in the Crash Record Information System (CRIS)". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Bathgate, K.\*, K. Jiang\*, S. Pan\*, J. Robbennolt, L. Xu, J. Sun, **Z. Han**, and S. Boyles. "Evaluation of Real-Time Traffic Monitoring Devices for Texas Hurricane Evacuations". *Center for Transportation Research (CTR) Annual Symposium*. April 19, 2023. Austin, Texas, USA.

Bathgate, K.\*, K. Jiang\*, **Z. Han**, M. Murphy, and Z. Zhang. "Evacuation Volume and Safety Assessment: A Case Study in Rural Texas Highways during Hurricane Laura on US 90 and US 287". *Transportation Research Board 102nd Annual Meeting*. TRBAM-S-22-05194-1. Jan. 8 to 12, 2023. Washington, D. C.

- Hasan, M.\*, **Z. Han**, R. Machemehl, and M. Murphy. "Development of Crash Database Parsing Tools to Support the Highway Safety Improvement Program in Texas". *Center for Transportation Research (CTR) Annual Symposium*. April 13, 2022. Austin, Texas, USA.
- Bathgate, K.\*, J. Sun\*, S. Pan\*, **Z. Han**, M. Murphy, and Z. Zhang. "Project 0-7055: An Extreme Weather Risk-Assessment Framework for Port Infrastructure Systems". *Center for Transportation Research (CTR) Annual Symposium*. April 13, 2022. Austin, Texas, USA.
- Sun, J.\*, **Z. Han**, and Z. Zhang. "Quantifying the Benefits of Autonomous Vehicles to Roadway Infrastructure." *Transportation Research Board 101st Annual Meeting*, TRBAM-22-04425. Jan. 9 to Jan. 13, 2022. Washington, D. C.
- Sun, J.\*, **Z. Han**, and Z. Zhang. "A Resource Allocation Framework for Optimizing Long-term Infrastructure Network Resilience." *16<sup>th</sup> Annual Inter-University Symposium on Infrastructure Management (AISIM)*. July 17 to July 18, 2021. Hosted by the University of Texas at Austin, Austin, Texas, U.S.A. Virtual Meeting.
- Sun, J.\*, **Z. Han**, and Z. Zhang. "A Life-Cycle Resource Allocation Framework for Optimizing Infrastructure Network Resilience." *4<sup>th</sup> World Transport Convention (WTC)*. June 16 to June 18, 2021. **Excellent Paper Award Winner**. Xi'an, China.
- Hasan, M.\*, **Z. Han**, and R. Machemehl. "Development of Crash Database Parsing Tools to Support the Highway Safety Improvement Program in Texas". *International Conference on Transportation & Development (ICTD)*, American Society of Civil Engineers (ASCE). June 6 to June 9, 2021. Austin, Texas, USA.
- Sun, J.\*, **Z. Han**, and Z. Zhang. "A Life-Cycle Resource Allocation Framework for Optimizing Infrastructure Network Resilience." *Transportation Research Board 100th Annual Meeting*, TRBAM-21-04301. Jan. 25 to Jan. 29, 2021. Virtual meeting.
- Hoang, T.\*, **Z. Han**, and Z. Zhang. "Integrating Economic and Utility Concepts for A Comprehensive Bridge Valuation Model". *Transportation Research Board 99th Annual Meeting*, no. 19-05545. Jan. 12 to Jan. 16, 2020. Washington, D. C.
- Politis, S.S.\*, Z. Zhang, **Z. Han**, J.J. Hasenbein, M. Arellano. "Simulation-Based Bridge Network Maintenance Budget Planning Using Latin Hypercube Sampling". *Transportation Research Board 99th Annual Meeting*, no. 19-02165. Jan. 12 to Jan. 16, 2020. Washington, D.C.
- Han, Z.**, J. D. Porras-Alvarado, J. Sun\*, and Z. Zhang. "Monte Carlo Simulation Based Assessment of Risks Associated with PPP Investments in Toll Highway Infrastructure." *3<sup>rd</sup> World Transport Convention (WTC)*. June 13 to June 16, 2019. Beijing, China
- Galvis, O.\*, **Z. Han**, M. Murphy, and Z. Zhang. "Develop A Tool to Automate Damage Claim Process". *Center for Transportation Research (CTR) Annual Symposium*. April 10, 2019. Austin, Texas, USA.
- Han, Z.**, J. D. Porras-Alvarado, and Z. Zhang. "Genetic Algorithm Based Optimization of Capital Structure in Design-Build-Finance-Operate-Maintain Toll Highway Infrastructures." *Transportation Research Board 98th Annual Meeting*, no. 19-02923. Jan. 13 to Jan. 17, 2019. Washington, D. C.
- Sun, J.\*, **Z. Han**, J. D. Porras-Alvarado and Z. Zhang. "Impact of Autonomous Vehicle on Asset Value of Roadway Network." *World Transport Convention*. June 18 to June 21, 2018. Beijing, China.
- Galvis, O.\*, and **Z. Han**. "Benefit-Cost Estimate for Skid Resistance Improvements at The Network Level Using Markov Chains". *Center for Transportation Research (CTR) Annual Symposium*. April 12, 2018. Austin, Texas, USA.
- Porras-Alvarado, J. D., C. Stone, **Z. Han**, T. Lim, and Z. Zhang. "An Innovative Approach to Integrate Economic Benefits of Existing Roadways into Asset Valuation." *World Conference on Pavement and Asset Management (WCPAM)*. June 12 to June 16, 2017. Baveno, Italy.
- Han, Z.**, J. D. Porras-Alvarado, J. Sun\*, and Z. Zhang. "Monte Carlo Simulation Based Assessment of Risks Associated with PPP Investments in Toll Highway Infrastructure." *Transportation Research Board 96th Annual Meeting*, no. 17-06702. Jan. 8 to Jan. 12, 2017. Washington, D. C.
- Porras-Alvarado, J. D., M. R. Murphy, H. Wu, **Z. Han**, and Z. Zhang. "Analytical Hierarchy Process to Improve Project Prioritization in the Austin District." *Transportation Research Board 96th Annual Meeting*, no. 17-03985. Jan. 8 to Jan. 12, 2017. Washington, D. C.
- Porras-Alvarado, J. D., **Z. Han**, and Z. Zhang. "A Utility-based Asset Valuation Approach to Cross Asset Resource Allocation Considering Efficiency and Equity." *Transportation Research Board 96th Annual Meeting*, no. 17-03332. Jan. 8 to Jan. 12, 2017. Washington, D.C.
- Han, Z.**, and Z. Zhang. "A Spatial Allocation Approach for Post-Earthquake Urban Roadway Network." *Center for Transportation Research (CTR) Annual Symposium*. April 13, 2016. Austin, Texas, USA.

- Porras-Alvarado, J. D., **Z. Han**, M. A. Amin, and Z. Zhang. "Fairness and Efficiency Considerations in Performance-based Cross-Asset Resource Allocation." *Transportation Research Board 95th Annual Meeting*, no. 16-5357. Jan. 10 to Jan. 14, 2016. Washington, D.C.
- Wang, X., Y. Zhou, **Z. Han**, and Z. Zhang. "A Spatial Approach to Resource Allocation for Post-Earthquake Restoration of Urban Roadway Networks." *Transportation Research Board 95th Annual Meeting*, no. 16-3388. Jan. 10 to Jan. 14, 2016. Washington, D. C.
- Porras-Alvarado, J. D., **Z. Han**, Z. Zhang, and C. M. Walton. "An Integrated Approach to the Finance, Maintenance, and Operation of Highway Infrastructure." *2nd International Conference on Public-Private Partnerships*. May 26 to May 29, 2015. Austin, Texas, United States.
- Porras-Alvarado, J. D., **Z. Han**, and Z. Zhang. "A Fair Division Approach to Performance-based Cross-Asset Resource Allocation." *9th International Conference on Managing Pavement Assets (ICMPA)*. May 18 to May 21, 2015. **Best Paper Award Winner**. Alexandria, VA, United States.
- Han, Z.**, H. Wu, M. Murphy, K. R. Persad, and Z. Zhang. "GIS Tools for Displaying 4-Year Plan Projects." *Center for Transportation Research (CTR) Annual Symposium*. April 8, 2015. Austin, Texas, USA.
- Wu, H., **Z. Han**, M. Murphy, and Z. Zhang. "Empirical Bayes Before-After Study on Safety Effect of Narrow Pavement Widening Projects in Texas". *Center for Transportation Research (CTR) Annual Symposium*. April 8, 2015. Austin, Texas, USA.
- Qiu, S., **Z. Han**, K. C. P. Wang, and Z. Zhang. "Application of AASHTO PP69-10 & PP70-10 Based Continuous Rutting Depth Data." *Transportation Research Board 94th Annual Meeting*, no.15-5496. Jan.11 to Jan. 15, 2015. Washington, D. C.
- Wu, H., **Z. Han**, M. R. Murphy, and Z. Zhang. "Empirical Bayes Before-After Study on Safety Effect of Narrow Pavement Widening Projects in Texas." *Transportation Research Board 94th Annual Meeting*, no. 15-3001. Jan.11 to Jan. 15, 2015. Washington, D. C.
- Wang, X., Z. Zhang, and **Z. Han**. "Pavement Network Reliability: Triangular Fuzzy Number and Transited Network Methodology." *Transportation Research Board 94th Annual Meeting*, no. 15-5801. Jan. 11 to Jan. 15, 2015. Washington, D. C.
- Wang, X., Z. Zhang, and **Z. Han**. "Network-Level M&R Budget Planning Through Reliability of the Pavement Network." *Transportation Research Board 94th Annual Meeting*, no. 15-4515. Jan. 11 to Jan. 15, 2015. Washington, D. C.
- Porras-Alvarado, J. D., D. Peters, **Z. Han**, and Z. Zhang. "Novel Utility-Based Methodological Framework for Valuation of Road Infrastructure." *Transportation Research Board 94th Annual Meeting*, no. 15-5315. Jan. 11 to Jan. 15, 2015. Washington, D. C.
- Han, Z.**, C. Stone, and Z. Zhang. "Reliability-based Approach to Optimizing Pavement Preventive Maintenance Cycles Using the Method of Moments." *Transportation Research Board 93rd Annual Meeting*, no. 14-3066. Jan. 12 to Jan. 16, 2014. Washington, D. C.
- Wang, X., J. Liu, **Z. Han**, and Z. Zhang. "Reliability of Post-Seismic Urban Road Network: Weight Model of Sections." *1st International Symposium on Disaster Prevention and Mitigation of Infrastructure*, hosted by China Highway and Transportation Society, 2014. Chongqing, China.

## **PAPER WORKING IN PROGRESS**

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*\*Indicating current or former students I guided.*

- Han, Z.**, J. D. Porras-Alvarado, J. Sun, and S. Boyles. "An Optimization Approach for Financial Structural in Design-Build-Finance-Operate-Maintain Partnerships." Manuscript is being finalized. Journal TBD.
- Han, Z.**, X. Wang, Y. Li, and Z. Zhang. "Network-Level Maintenance & Rehabilitation Budget Planning Through Pavement Network Reliability." Plan to submit to *Transportation Research Part C: Emerging Technologies*. Manuscript is being finalized.
- Han, Z.**, X. Wang, Y. Li, and Z. Zhang. "An Edge Betweenness Centrality Based Relative Importance Index for Post-Earthquake Restoration of Urban Roadway Networks." Plan to submit to *Computer Aided Civil and Infrastructure Engineering*. Manuscript is being finalized.
- Han, Z.**, X. Wang, J. Liu, Z. Zhang, L. Gao, and Yihao Ren. "Empirical Approach to Characterizing Chinese Railway Network with Consideration of High-Speed Railways."
- Han, Z.**, M. Murphy, and Z. Zhang. "Investigation of Texas Passenger Vehicle Safety Inspection First Time Failure Rate based on Survey Data."
- Han, Z.**, A. K. Singh, X. Zhang, C. Claudel, and Z. Zhang. "Real-Time Automated Accident Detection using Supervised Machine Learning."

- Han, Z.**, W. Wang, L. Gao, X. Lin, S. Qiu, M. Barbara, and Y. Chen. “Quantifying the Impact Factors of Under-Reporting Near-Misses for Construction Workers.”
- Sun, J., **Z. Han**, and Z. Zhang. “Impact of Autonomous Vehicle on Asset Value of Roadway Network.”
- Porras-Alvarado, J. D., **Z. Han**, and Z. Zhang. “A Utility-based Asset Valuation Approach to Cross Asset Resource Allocation Considering Efficiency and Equity.”
- Gao, Z., K. Wang, W. Bao, **Z. Han**, and S. Bratu. “Efficient Sets Based Control for Network Revenue Management under Customer Choice Model.”
- Porras-Alvarado, J. D., M. R. Murphy, N. Jiang, and **Z. Han**. “Weight Characterization of Specialized Hauling Vehicles based on Weigh-in-Motion and Department of Public Safety Weight Enforcement Data.”

## **PROFESSIONAL SOCIETY ACTIVITIES AND MEMBERSHIPS**

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- 10/2023-01/2024 **Organizing Committee Member.** International Association of Chinese Infrastructure Professionals (IACIP) Annual Workshop. Washington, D.C.
- 07/2023-Present **Member of the Economics & Finance Committee.**  
Transportation & Development Institute (T&DI) Committees. American Society of Civil Engineers (ASCE)
- 06/2023-Present **Member of the Infrastructure Systems Committee (ISC).**  
Transportation & Development Institute (T&DI) Committees. American Society of Civil Engineers (ASCE)
- 03/2023-Present **Project Panel Member.** National Academies.  
*NCHRP 20-24(147): Identify Best Practices for Automated Driving Systems and Other Emerging Technologies*
- 10/2022-06/2023 **Committee Member.** Local Tours Program Committee.  
International Conference on Transportation & Development (ICTD 2023), American Society of Civil Engineers (ASCE). June 14 to June 17, 2023, Austin, Texas, USA.
- 06/2020-Present **Registered Texas Professional Engineer (P.E.).** Serial Number: 138112.  
Licensed by Texas Board of Professional Engineers and Land Surveyors
- 11/2019-Present **Technical Committee Chair**  
World Transport Convention (WTC), Technical Committee on Infrastructure Asset Management
- 03/2018-Present **Associate Member.** American Society of Civil Engineers (ASCE)
- 09/2017-Present **Membership Committee Member.** International Association of Chinese Infrastructure Professionals (IACIP)
- 07/2015-Present **Academic Committee Friend Member**  
Transportation Research Board (TRB), ACS10 Standing Committee on Transportation Safety Management Systems. National Academies. United States
- 07/2015-Present **Academic Committee Friend Member**  
Transportation Research Board (TRB), AKR10 Standing Committee on Maintenance and Operations Management. National Academies. United States
- 07/2015-Present **Academic Committee Friend Member**  
Transportation Research Board (TRB), AKT10 Standing Committee on Pavement Management Systems. National Academies. United States
- 05/2014-Present **Academic Committee Friend Member**  
Transportation Research Board (TRB), ACS20 Standing Committee on Safety Performance and Analysis. National Academies. United States
- 05/2014-Present **Member.** Chinese Overseas Transportation Association (COTA)
- 01/2014-Present **Member.** International Association of Chinese Infrastructure Professionals (IACIP)
- 04/2016-04/2018 **LabVIEW Certified Associate Developer.** Licensed by National Instruments
- 05/2015 **Organizing Committee Member.** The 2nd International Conference on Public-Private Partnerships, Austin, Texas, USA
- 10/2012-08/2017 **Member.** Institute of Transportation Engineers (ITE). Student Chapter at The University of Texas at Austin
- 10/2012-08/2017 **Member.** Intelligent Transportation Society (ITS) of America. Student Chapter at The University of Texas at Austin
- 10/2012-11/2013 **Secretary.** Institute of Transportation Engineers (ITE). Student Chapter at The University of Texas at Austin



11/2010-07/2012 **Vice President.** Student Association of Science and Technology. Tsinghua University, Beijing, China

## **EDITORIAL POSITIONS**

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11/2020-Present **Section Editor-in-Chief.** *Current Social Sciences: Traffic Safety Analysis Field*

04/2022-Present **Guest Editor.** *Computation.* MDPI  
Special Issue on *Algorithm to Compute Urban Road Network Resilience*

10/2020-Present **Editorial Board Member.** *International Journal of Transportation Engineering and Technology*

05/2020-Present **Editorial Board Member.** *Transportation Management.* EnPress

## **REFEREE SERVICES**

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01/2020-Present **Reviewer Board Member.** *Symmetry.* MDPI

- Civil Engineering
- Construction and Building Materials
- Environmental Science and Pollution Research
- Green Materials
- IET Renewable Power Generation
- International Journal of Environmental Research and Public Health
- International Journal of Pavement Engineering
- International Journal of Transportation Science and Technology
- Journal of Advanced Transportation
- Journal of Transportation Engineering, Part B: Pavements
- Journal of Urban Planning and Development
- Kybernetes
- Natural Hazards
- Omega
- SAGE Open
- Sustainability
- Technology Analysis & Strategic Management
- Transportmetrica A: Transport Science
- Transportation Research Record
- Water
- World Transport Convention