Mehrdad Nasri

Curriculum Vitae

Department of Civil and Environmental Engineering   Phone: (206) 619-6601
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Seattle, WA98195

EDUCATIONAL HISTORY

UNIVERSITY OF WASHINGTON
Ph.D. in Transportation Engineering

Sept 2023 - Present

- GPA: 3.98/4.00
- Research Area: AI & ML in Transportation Safety, Smart Traffic Operations
- Supervisor: Dr. Yinhai Wang, Professor

UNIVERSITY OF TEHRAN
M.Sc. in Highway and Transportation Engineering

Sept 2015 - June 2018

- GPA: 3.89/4.00
- Thesis: Exploring Risk Factors Related to Urban Transit Bus Crashes
- Supervisor: Dr. Kayvan Aghabayk, Associate Professor

UNIVERSITY OF TEHRAN
B.Sc. in Civil Engineering

Sept 2011 - Aug 2015

EMPLOYMENT HISTORY

UNIVERSITY OF WASHINGTON
Graduate Research Assistant, Instructor

Sept 2023 - Present

- **Developing a LLM-enabled Digital Twin system with an interactive dashboard for traffic safety management**
  Implemented a 2D simulation engine integrating road user detection and trajectory tracking outputs with SUMO microscopic simulation to enable what-if scenario testing.
  Designed and implemented a safety analytics module to compute surrogate safety measures (SSMs) and composite safety indices, and to generate comparative visualizations across scenarios and traffic conditions.
  Disseminated results through stakeholder meetings and conference presentations.
  Authored project reports and system manuals.
- **Instructor for Traffic Systems Operations (CET 590) Course for Graduate students at the University of Washington**
  Designed course materials and delivered lectures for Traffic Systems Operations.
  Developed homework assignments and designed the course project.
  Graded assignments and projects, provided timely feedback, and maintained course records (Canvas gradebook and communications).
  Held office hours, supported student learning, and coordinated course logistics.
- **NCHRP 17-100: Leveraging Artificial Intelligence and Big Data to Enhance Safety Analysis**
  Developed and implemented machine learning models to analyze multiple data sources for traffic safety.
  Designed a Neural Network model for predicting vehicle speed using single-loop detector data.
  Utilized Computer Vision (segmentation and detection) models to analyze street-view images for road safety assessment.
  Built ML models for lane marking detection from LiDAR data.
  Developed ML models to analyze Connected Vehicle Data (CVD) for Surrogate Safety Measures (SSM) extraction and traffic operations analysis.
  Conducted big data analytics for road user behavior detection.

Led coding, reporting, user guide development, and engagement with federal and state stakeholders.

- CDA Research: Developing and Testing of Cooperative Perception Use Case at the Port of Virginia (FHWA)
  Developed computer vision models for road user detection (YOLOv8) and tracking (ByteTrack, DeepSORT), Applied ML models for trajectory prediction and conflict estimation in real-world traffic environments.
  Managed data processing, analysis, and model calibration through field observations.
  Employed camera calibration techniques to enhance model accuracy.
  Authored technical reports summarizing methodologies and findings.
- Workforce Development for Engineering
  Designed and implemented questionnaires to assess workforce development needs.
  Applied machine learning models (Topic Modeling - LDA) and statistical techniques (Word Cloud, NLP) for response analysis.
  Conducted data analysis, coding, and reporting to extract insights.
  Collaborated with state stakeholders to discuss findings and policy implications.
- Intersection Safety Challenge (FHWA)
  Trained detection and tracking models for road user analysis.
  Executed camera calibration, data collection, annotation, and management.
  Conducted data analysis to improve safety insights.
- Additional Projects: "Cooperative multi-camera vehicle tracking and traffic surveillance with edge artificial intelligence and representation learning", and "Identifying Demographics of Collisions in American Indian and Alaskan Natives Communities"

SHAHRIG CONSULTING ENGINEERS
Transportation Project Manager

June 2020 - Sept 2023

- Determining the Optimal Locations for Establishment of Logistic Hubs in the southern part of Mainland
  Analyzed freight data, assessed and predicted demand, modeled and analyzed networks, managed access and mode choice, conducted 4-stage modeling, engaged stakeholders, prepared final reports, and managed meetings and workshops
- Transportation and Logistics Assessment for Persian Gulf Islands Comprehensive Plan
  Analyzed passenger and freight data, planned multimodal transportation, assessed and predicted demand, modeled networks, evaluated equity, analyzed mode choice, engaged stakeholders, prepared final reports, managed meetings and workshops, and collaborated with urban planning, economic, and social assessment teams
- Qeshm Island Master Plan: Traffic Management, Transportation Infrastructure Development Planning and Multimodal Transportation Planning
  Analyzed passenger and freight data, simulated traffic, planned transit, managed traffic safety, developed multimodal transportation plans, assessed and predicted demand, modeled networks, analyzed mode choice, engaged stakeholders, developed the master plan, managed meetings and workshops, and collaborated with the urban planning team
- Transportation Cost Analysis studies for Parsian Special Economic Zone
  Analyzed freight demand and prediction, and assessed the costs of various transportation mode combinations for managing freight demand

BEHRAN TRAFFIC CONSULTING ENGINEERS
Traffic Engineer and Project Manager

April 2018 - June 2022

- Collaboration with WHO in developing "Road Safety Strategic Framework" and "Speed Limit Setting Guidance for Rural Roads"
  Collected and analyzed data, conducted literature reviews, communicated with international partners (Safety Solution Pty Ltd., Australia), documented and translated technical documents, and managed meetings and workshops
- Developing Safety Improvement Plans for 180 Black Spots in rural areas

Designed safety improvement plans, analyzed crash factors, investigated roadways and black spots, collected and managed data, analyzed historical data, developed statistical models, documented findings, and managed meetings and workshops

- **Developing Vehicle Occupancy and Trip Generation Models for Neyshabour Comprehensive Traffic Studies**
  Developed models, collected and managed data, performed data analysis, developed statistical models, and documented the master plan
- **Traffic Impact Assessment for Recreational Complexes, Industrial Zones, etc.**
  Simulated traffic, collected and managed data, performed data analysis, forecasted demand, modeled networks, and documented findings
- **Median Openings and U-turns Management in Golestan Province Highways**
  Conducted preliminary design using AutoCAD, collected and managed data, performed data analysis, assessed traffic safety, predicted demand, documented findings, and managed meetings

UNIVERSITY OF TEHRAN
Lecturer, Graduate Research Assistant
Sep 2015 - Jun 2018

- **Investigating the Risk factors Associated with Pedestrian Crash Injury Severity (In collaboration with Dr. Nirajan Shiwakoti, RMIT University, Australia)**
  Developed models, performed statistical analysis, collected and managed data, conducted literature reviews, and developed papers
- **Exploring the Factors Associated with Urban Transit Bus Accidents**
  Developed binomial and multinomial logit models and classification methods, performed model development, statistical analysis, data collection and management, literature reviews, method development, and thesis and paper development
- **Urban Highways' Drainage Systems: Problems and Impacts on Traffic Flow and Safety**
  Conducted literature reviews, developed technical reports and papers, and presented the findings at conferences
- **Instructor for Highway Geometric Design, and Civil 3D Software Training Courses for undergraduate students**

PUBLICATIONS

1. **Nasri, Mehrdad**; Yin, Shuyi; Shankar, Venky; Wang, Yinhai. 2025, **Leveraging Image Semantic Segmentation for Road Infrastructure Localization in Traffic Safety Applications**, *Transportation Research Record: : Journal of the Transportation Research Board*, November 2025, https://doi.org/10.1177/03611981251372093
2. **Nasri, Mehrdad**, Aghabayk, K., Esmaili, A., Shiwakoti, N., 2022. **Using Ordered and Unordered Logistic Regressions to Investigate Risk Factors Associated with Pedestrian Crash Injury Severity in Victoria, Australia**, *Journal of Safety Research* 81, 78-90, https://doi.org/10.1016/j.jsr.2022.01.008
3. **Nasri, Mehrdad**, Aghabayk, K., 2020. **Assessing risk factors associated with urban transit bus involved accident severity: a case study of a Middle East country**, *International Journal of Crashworthiness*, 26:4, 413-423, https://doi.org/10.1080/13588265.2020.1718465
4. **Nasri, Mehrdad**; Yin, Shuyi; Wang, Yinhai. 2025, **Leveraging AI and Machine Learning for Safety Assessment: Analyzing Connected Vehicle Data for Turning Movement Counts at Intersections,** *International Conference on Transportation and Development (ICTD) 2025 Proceedings*, pp. 160-170, https://doi.org/10.1061/9780784486191.014.
5. **Nasri, Mehrdad**; Yin, Shuyi; Wang; Yinhai; Shankar, Venky. 2025, **Comprehensive Analysis of Multi-Modal Road User Behavior Using Big Data: Implications for Intersection Safety**, *International Conference on Transportation and Development (ICTD) 2025 Proceedings*, pp. 146-159, https://doi.org/10.1061/9780784486191.013.
6. Yinhai Wang, Shuyi Yin, **Mehrdad Nasri**, Chenxi Liu, Shucheng Zhang, Venky Shankar, Narayan Venkataraman, Rohan Shrestha, Brian Chandler, Lacy Brown, Nikki Davis, Houssam Ghandour, Frank Mannering, Janet Gates, Joey Cai. 2025, **Leveraging Artificial Intelligence**

and Big Data to Enhance Safety Analysis: A Guide, *NCHRP 17-100, Research Report 1152, National Academies of Sciences, Engineering, and Medicine*. Washington, DC: The National Academies Press.

7. Muhammad Monjurul Karim, Yan Shi, Shucheng Zhang, Bingzhang Wang, **Mehrdad Nasri**, Yinhai Wang. 2025, **Large language models and their applications in roadway safety and mobility enhancement: A comprehensive review**, *Artificial Intelligence for Transportation*, Volume 1, 2025, 100004, https://doi.org/10.1016/j.ait.2025.100004.

8. Shucheng Zhang, Yan Shi, Bingzhang Wang, Yuang Zhang, Muhammad Monjurul Karim, Kehua Chen, Chenxi Liu, **Mehrdad Nasri**, Yinhai Wang. 2025, **A Comprehensive Review on Artificial Intelligence Empowered Solutions for Enhancing Pedestrian and Cyclist Safety**, arXiv, https://doi.org/10.48550/arXiv.2510.03314.

9. **Nasri, Mehrdad**; Wang, Yinhai. 2024, **Developing a Vehicle Dynamic Model for Analyzing the Impact of Roadway and Vehicle Characteristics on Speed Profiles**, *International Conference on Transportation and Development (ICTD) 2024 Proceedings*, pp. 726-738, https://doi.org/10.1061/9780784485521.065

10. Wang, Yinhai; Sun, Wei; Ricord, Sam; Souza, Cesar Maia de; Ling, Yifan; Shi, Yan; Wang, Bingzhang; **Nasri, Mehrdad**. 2024, **Comprehensive Transportation Equity Analysis for RITI Community: A Data-Driven Approach With Case Study,** *University of Alaska Fairbanks. Center for Safety Equity in Transportation (CSET),* https://rosap.ntl.bts.gov/view/dot/76520/dot_76520_DS1.pdf.

11. Wang, Yinhai; Sun, Wei; Ricord, Sam; Souza, Cesar Maia de; Ling, Yifan; Shi, Yan; Wang, Bingzhang; **Nasri, Mehrdad**. 2024, **Cost-Effective System for Rural Roadway Traffic, Surface Conditions and Weather Conditions Monitoring**, *University of Alaska Fairbanks. Center for Safety Equity in Transportation (CSET),* https://rosap.ntl.bts.gov/view/dot/76535.

12. **Book:** Saraei, K., Azarmehd, K., Mohammadpour, E., Gordani, Zh., Zare, A., Hayatnia, A., **Nasri, Mehrdad**, & Hassani, S., 2023. **Models and Methods for Location Selection of Port Logistics Centers**. *Entekhab Publications*. https://elmnet.ir/doc/32199053-81011.

PRESENTATIONS AND CONFERENCES

TRB 2026
- Poster Presentation: Can Surrogate Safety Measures Explain Crash Patterns at Signalized Intersections? Evidence from Large-Scale Connected-Vehicle Data Using Negative Binomial, Random Forest, and Diffusion GNN Models
- Poster Presentation: AI-Driven Extraction of Network-Wide Safety Indicators from Next-Generation Sensing Sources
- Poster Presentation: Identifying and Addressing Workforce Gaps in Transportation Infrastructure Projects: Evidence from Employer–Practitioner Surveys and Topic Modeling
- Transportation Research Board Annual Meeting 2026, Washington D.C.

PACTRANS 2025
- Poster Presentation: Can Surrogate Safety Measures Explain Crash Patterns at Signalized Intersections? Evidence from Large-Scale Connected-Vehicle Data
- **Best student poster award!**
- 12th Annual 2025 Region 10 Transportation Conference (Pacific Northwest Transportation Consortium), Portland.

TRB 2025
- Poster Presentation: Leveraging Image Semantic Segmentation for Road Infrastructure Localization in Traffic Safety Applications
- Poster Presentation: Zero-shot Learning based Cyclists Detection through Surveillance Systems
- Transportation Research Board Annual Meeting 2025, Washington D.C.

ASCE ICTD 2025
- Poster Presentation: Improving Nighttime Driving Safety: Machine Learning for Street Luminaire Detection and Localization

- Poster Presentation: Cooperative Perception-Based Vehicle Trajectory Prediction and Conflict Estimation
- Poster Presentation: Analyzing Multi-Modal Road User Behavior with Big Data: Insights for Intersection Safety
- International Conference on Transportation and Development (ICTD) 2025, Phoenix.

ASCE ICTD 2024
- Poster Presentation: Developing a Vehicle Dynamic Model for Analyzing the Impact of Roadway and Vehicle Characteristics on Speed Profiles
- International Conference on Transportation and Development (ICTD) 2024, Atlanta.

PACTRANS 2024
- Poster Presentation: Leveraging Image Semantic Segmentation for Road Infrastructure Localization in Traffic Safety Applications
- 11th Annual 2024 Region 10 Transportation Conference (Pacific Northwest Transportation Consortium), Moscow, Idaho.

2024 NW Tribal Transportation Symposium
- Guest Presenter: Technology Implementations for Rural Road Safety Data Collection, Analysis & Visualization
- Northwest Tribal Technical Assistance Program (TTAP) Center Symposium, Spokane.

PACTRANS 2023
- Poster Presentation: Enhancing the Road Safety through Road Safety Audit (RSA)
- 10th Annual 2023 Region 10 Transportation Conference (Pacific Northwest Transportation Consortium), Seattle.

ASCE ICTD 2026
- Podium Presentation: AI-Enhanced Traffic Safety Digital Twin: From Intelligent Sensors to Simulation and Decision Support
- Poster Presentation: Can Surrogate Safety Measures Explain Crash Patterns at Signalized Intersections?
- Poster Presentation: AI-Augmented Micromobility Data Pipeline for Urban Signalized Sites
- Poster Presentation: AI-Driven Extraction of Network-Wide Safety Indicators from Next-Generation Sensing Sources
- International Conference on Transportation and Development (ICTD) 2026, Detroit.

NaTMEC 2026
- Podium Presentation: AI-Enhanced Traffic Safety Digital Twin: From Intelligent Sensors to Simulation and Decision Support
- Podium Presentation: AI-Driven Extraction of Network-Wide Safety Indicators from Next-Generation Sensing Sources
- National Travel Monitoring Exposition and Conference 2026, Nashville.

PROFESSIONAL SKILLS

Computer Programming: Python, C, MATLAB, R
Modeling, Optimization and Simulation: Machine Learning models (Supervised and Unsupervised), Computer Vision models (Detection and Tracking), Logistic Regression, Uncertainty Assessment, Statistical Modelling, Optimization Tools
Statistical Analysis: Python (pandas, sklearn, numpy, etc.), R, STATA, SPSS, NLOGIT, Biogeme
Traffic Simulation: SUMO, AimSun, Vissim
Road Geometric Design: AutoCAD Civil3D, AutoTURN, AutoCAD
Traffic Related Courses: Traffic Simulation (PTV License), Black Spot Management, Road Safety Audit, Multimodal Transportation

REFERENCES

Dr. Yinhai Wang: Professor, PhD Supervisor
- Department of Civil and Environmental Engineering, University of Washington
- Email: yinhai@uw.edu

Dr. Kayvan Aghabayk: Assistant Professor, M.Sc. Thesis Supervisor
- School of Engineering, University of Tehran
- Email: kayvan.aghabayk@ut.ac.ir

Dr. Nirajan Shiwakoti: Senior Lecturer, Collaboration in paper
- School of Engineering, RMIT University
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