

Kai Wang, Ph.D., E.I.T.

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CAREER

Assistant Research Professor, 2022-Present

Connecticut Transportation Safety Research Center, Connecticut Transportation Institute,
University of Connecticut, Storrs, CT, U.S.

Statistician & Transportation Safety Engineer, 2016-2022

Connecticut Transportation Safety Research Center, Connecticut Transportation Institute,
University of Connecticut, Storrs, CT, U.S.

EDUCATION

Ph.D. - Urban & Transportation Engineering (Minor in Statistics), 2016

Department of Civil & Environmental Engineering, University of Connecticut, Storrs, CT,
US.

*Dissertation: Exploration of Advances in Statistical Methodologies for Crash Count and
Severity Prediction Model*

Advisor: Dr. John N. Ivan

<http://www.engr.uconn.edu/cee/people/facultymembers/15-research/45-john.html>

M.S. - Transportation Engineering (Minor in Statistics), 2013

Department of Civil & Environmental Engineering, South Dakota State University,
Brookings, SD, US.

*Thesis: Selection of Interest and Inflation Rates for Infrastructure Investment Analysis in
South Dakota*

Advisor: Dr. Xiao Qin

<https://uwm.edu/engineering/people/qin-ph-d-xiao/>

M.S. – Computing Data Analytics, 2020 – Present

School of Computational Science & Engineering, Georgia Institute of Technology,
Atlanta, Georgia, US.

B.S. - Project Management, 2011

Department of Civil Engineering, Xiamen University of Technology, Xiamen, China.

PROFESSIONAL REGISTRATION

Engineer-In-Training (E.I.T.) - State of Connecticut – EIT.0012193

AWARDS & HONORS

- Best Practices Award in Annual Traffic Records Forum, Association of Transportation Safety Information Professionals, 2019.
- Outstanding Reviewer Award, Journal of Accident Analysis & Prevention, 2017.
- Doctoral Dissertation Fellowship, University of Connecticut, 2016.
- Doctoral Student Travel Award, University of Connecticut, 2016.
- TRB ANB20 Young Research Paper Award, Transportation Research Board, 2015.
- Graduate Student Technician Scholarship, University of Connecticut, 2015.
- Graduate Research Assistantship, University of Connecticut, 2014-2016.
- Graduate Teaching Assistantship, South Dakota State University, 2013.
- Master Student Award: Dwayne & Helen Rollag Scholarship in CEE Graduate Studies, South Dakota State University, 2013.
- Master Student Award: Dwayne & Helen Rollag Scholarship in CEE Graduate Studies, South Dakota State University, 2012.
- Graduate Research Assistantship, South Dakota State University, 2011-2013.

ACADEMIC KNOWLEDGE

- Data Analytics and Computing
- Bayesian Statistics
- Machine Learning
- Statistical Modeling and Applications in Transportation
- Crash Data Analysis
- Traffic operations and Safety
- Transportation Economics
- Data Mining
- Transportation Construction Planning
- Risk Analysis & Simulations in Transportation Construction Decision-making
- GIS and GPS Applications in Transportation
- Pavement Management

RESEARCH, PROJECT GRANTS & WORKING EXPERIENCES

- Co-PI. CTfastrak Automated Bus Data Repository & Analysis. Connecticut Department of Transportation. 2022–2024. **\$499,326.**
- Investigator. Advancing the Behavioral Safety Analytic Tools Capabilities of the Connecticut Department of Transportation. Connecticut Department of Transportation, Federal Highway Administration. 2020-2021. **\$453,000.**

- Co-PI. Safety Evaluation of Alternatives for Installing Pedestrian Signals Under Side Street Green Operation. Connecticut Department of Transportation, Federal Highway Administration. 2021-2023. **\$200,000.**
- Co-PI. The Effect of Vehicle Mix on Crash Frequency and Crash Severity. NCHRP 22-49. Transportation Research Board of the National Academies. 2020 – 2023. **\$400,000.**
- Co-PI. Development of Crash Prediction Models for Short-Term Durations. NCHRP 22-48. Transportation Research Board of the National Academies. 2020 – 2023. **\$650,000.**
- Co-PI. Development and Application of a Disaggregate Artificial Realistic Data Generator for Computationally Testing Safety Analysis Methods. Exploratory Advanced Research (EAR) Program. Federal Highway Administration. 2019-2022. **\$1,288,664.**
- Investigator. Development and Application of Crash Severity Models for the Highway Safety Manual, NCHRP 17-85. Transportation Research Board of the National Academies, 2018-2021. **\$600,000.**
- Investigator. Expanding the Role of the Connecticut Transportation Safety Research Center to Enhance Connecticut’s Safety Analysis Methods and Systems. Connecticut Department of Transportation, Federal Highway Administration. 2016-2020. **\$10,008,427.**
- Investigator. Evaluation of Wet Weather Crash Locations and Conducting Pavement Friction Testing in Selected Locations, CTDOT 170-3487. Connecticut Department of Transportation. 2019-2020. **\$230,316.**
- Graduate Assistant. Improved Prediction Models for Crash Types and Crash Severities, NCHRP 17-62. Transportation Research Board of the National Academies. 2013-2017. **\$800,000.**
- Graduate Assistant. Improvements to Road Safety Improvement Selection Procedure for Connecticut, JHR 14-1. Connecticut Department of Transportation. 2014-2015.
- Graduate Assistant. Selection of Interest and Inflation Rates for Infrastructure Investment Analyses, SDDOT 2012-05. South Dakota Department of Transportation. 2012-2013.
- Graduate Assistant. Developing Safety Risk Index for Truck Preferred Arterial Corridors. National Center of Freight Infrastructure and Education (CFIRE). 2011-2013.

SKILLS

- Programming Language – Python, SQL, HTML, CSS, JavaScript
- Big Data Technology – Apache Hadoop, Apache Spark
- Statistical Software - SAS, R, STATA, JMP, SPASS, MATLAB, NLOGIT, WinBUGS, OpenBUGS, GAUSS.
- Risk Analysis & Simulation Software - @risk.
- Transportation Software - HCS+, TSIS, Synchro & SimTraffic, GPS, ArcGIS, TransCAD, Safety Analyst.

PUBLICATIONS

- Mohammad Razaur Shaon, Niloufar Shirani-bidabadi, Andrew Tucker, Dan Russell, **Kai Wang**, Eric Jackson. Behavioral Safety Analysis Using Integrated Multidisciplinary Data and Countermeasure Development. Transportation Research Board. 2022.

- Julfiker Hossain, John Ivan, Shanshan Zhao, **Kai Wang**, Nalini Ravishanker. Investigation of Spatial Transferability of Alternative Parameterizations for the Dispersion Function in Negative Binomial Models Predicting Crash Counts by Severity. Transportation Research Board. 2022.
- Julfiker Hossain, John Ivan, Shanshan Zhao, **Kai Wang**, Sadia Sharmin, Nalini Ravishanker, Eric Jackson. Considering Demographics of Other Involved Drivers in Predicting the Highest Driver Injury Severity in Multi-Vehicle Crashes on Rural Two-Lane Roads in California. Journal of Transportation Safety & Security. 2022.
- **Kai Wang**, Mohammad Razaur Shaon, Niloufar Shirani-bidabadi, Andrew Tucker, Dan Russell, Eric Jackson, Neil Chaudhary, Julie Tison. Advancing the Behavioral Safety Analytic Tools Capabilities of the Connecticut Department of Transportation. National Transportation Library. US Department of Transportation. 2021.
- **Kai Wang**, Niloufar Shirani-bidabadi, Mohammad Razaur Rahman Shaon, Shanshan Zhao, Eric Jackson. Correlated Mixed Logit Modeling with Heterogeneity in Means for Crash Severity and Surrogate Measure with Temporal Instability. Accident Analysis & Prevention 160. 2021.
- **Kai Wang**, Tanmoy Bhowmik, Shanshan Zhao, Naveen Eluru, Eric Jackson. Highway Safety Assessment and Improvement through Crash Prediction by Injury Severity and Vehicle Damage Using Multivariate Poisson-Lognormal Model and Joint Negative Binomial - Generalized Ordered Probit Fractional Split Model. Journal of Safety Research 76. 2021.
- **Kai Wang**, Shanshan Zhao, Eric Jackson. Investigation of Exposure Measures and Functional Forms in Safety Performance Functions for Urban and Suburban Intersections using Generalized Negative Binomial - P Model. Accident Analysis & Prevention 148. 2020.
- Md Julfiker Hossain, John Ivan, Shanshan Zhao, **Kai Wang**, Sadia Sharmin, Nalini Ravishanker, Eric Jackson. The Impact of Demographics of all Drivers on the Highest Driver Injury Severity in Multi-Vehicle Crashes of Rural Two-Lane Roads in California. Transportation Research Board. 2020.
- Sadia Sharmin, John Ivan, Shanshan Zhao, **Kai Wang**, Md Julfiker Hossain, Nalini Ravishanker, Eric Jackson. Incorporating Demographic Proportions into Crash Count Models by Quasi-Induced Exposure Method. Transportation Research Record. 2020.
- Shanshan Zhao, **Kai Wang**, Chenhui Liu, Eric Jackson. Investigating the effects of monthly weather variations on Connecticut freeway crashes from 2011 to 2015. Journal of Safety Research 71. 2019.
- **Kai Wang**, Shanshan Zhao, Eric Jackson. Functional Forms of the Negative Binomial Models in Safety Performance Functions for Rural Two-Lane Intersections. Accident Analysis & Prevention 124. 2019.
- **Kai Wang**, Tanmoy Bhowmik, Shamsunnahar Yasmin, Shanshan Zhao, Naveen Eluru, Eric Jackson. Multivariate Copula Temporal Modeling of Intersection Crash Consequence Metrics: A Joint Estimation of Injury Severity, Crash Type, Vehicle Damage and Driver Error. Accident Analysis & Prevention 125. 2019.

- Shanshan Zhao, **Kai Wang**, Eric Jackson. Evaluation of Not-At-Fault Assumption in Quasi-Induced Exposure Method Using Traffic Crash Data at Varied Geographical Levels. Transportation Research Record. 2019.
- **Kai Wang**, Shanshan Zhao, Eric Jackson. Multivariate Poisson Lognormal Modeling of Weather Related Crashes on Freeways. Transportation Research Record. 2018.
- **Kai Wang**, Shanshan Zhao, John Ivan, Ishraq Ahmed, Eric Jackson. Evaluation of Hotspot Identification Methods for Municipal Roads. Journal of Transportation Safety & Security. 2018.
- Soyoung Jung, **Kai Wang**, Cheol Oh, Jaenam Chang. Development of Highway Safety Policies by Discriminating Freeway Curve Alignment Feature. KSCE Journal of Civil Engineering, 2017.
- **Kai Wang**, John Ivan, Nalini Ravishanker, Eric Jackson. Multivariate Poisson Lognormal Modeling of Crashes by Type and Severity on Rural Two Lane Highways. Accident Analysis & Prevention. Vol. 99, pp. 6-19, 2017.
- **Kai Wang**, John N. Ivan, Amy C. Burnicki, Sha A. Mamun. Predicting Local Road Crashes Using Socio-economic and Land Cover Data. Journal of Transportation Safety & Security. Vol. 9, No. 3. pp. 301-318, 2016.
- **Kai Wang**, Xiao Qin. Exploring Driver Errors at Intersections: Exploring Key Contributors and Solutions. Transportation Research Record 2514. Journal of TRB, 2015.
- **Kai Wang**, Shamsunnahar Yasmin, Karthik C. Konduri, Naveen Eluru, John N. Ivan. A Copula Based Joint Model of Injury Severity and Vehicle Damage in Two-Vehicle Crashes. Transportation Research Record 2514. Journal of TRB, 2015 (*TRB Committee ANB20 2015 Young Researcher Paper Award*).
- **Kai Wang**, Xiao Qin. Using Structural Equation Modeling to Measure Single-Vehicle Crash Severity. Transportation Research Record 2432. Journal of TRB, 2014.
- Xiao Qin, **Kai Wang**, Chase E. Cutler. Analysis of Crash Severity Based on Vehicle Damage and Occupant Injuries. Transportation Research Record 2386. Journal of TRB, 2013.
- Xiao Qin, **Kai Wang**, Chase E. Cutler. Logistic Regression Models of the Safety of Large Trucks. Transportation Research Record 2392. Journal of TRB, 2013.
- Lee W Jr. Munnich, Frank Douma, Xiao Qin, David J. Thorpe, **Kai Wang**. Evaluating the Effectiveness of State Toward-Zero-Deaths Programs. Transportation Research Board. TRB, 2013.

CONFERENCE PROCEEDINGS & PRESENTATIONS

- **Kai Wang**, Mohammad Razaur Shaon, Flavia Pereira. Connecticut Behavioral Safety Tool: Advancing the Behavioral Safety Analytics Capabilities for the CTDOT. 2022 ATSIP Traffic Records Forum. Denver, Colorado. 2022.
- Mohammad Shaon, Niloufar Shirani, Andrew Tucker, Dan Russell, **Kai Wang**, Eric Jackson. Behavioral Safety Analysis Using Integrated Multidisciplinary Data and Countermeasure Development. TRB Annual Meeting Poster Presentation. 2022.
- Julfiker Hossain, John Ivan, Shanshan Zhao, **Kai Wang**, Nalini Ravishanker. Investigation of Spatial Transferability of Alternative Parameterizations for the Dispersion Function in

- Negative Binomial Models Predicting Crash Counts by Severity. TRB Annual Meeting Poster Presentation. 2022.
- **Kai Wang**. Advancing the Behavioral Safety Analytic Tools Capabilities of the Connecticut Department of Transportation. United States Department of Transportation Peer Exchange. 2021.
 - John Ivan, Naveen Eluru, Shanshan Zhao, **Kai Wang**, Mohamed Abdel-Aty. DREDGE: Disaggregate Realistic Artificial Data (RAD) Generator - Design, Development and Application for Crash Safety Analysis. Federal Highway Administration EAR Program Midpoint Meeting. 2021.
 - Shanshan Zhao, **Kai Wang**, Eric Jackson. Developing A Data-Driven Roadway Safety Management System for Connecticut. 45th Transportation Records Forum. Austin, TX. 2019. (*2019 ATSIIP Best Practices Award*)
 - **Kai Wang**, Shanshan Zhao. Roadway Safety Management System in CT: Data Integration, Analysis, Validation and Implementation. 44th Transportation Records Forum. Milwaukee, WI. 2018
 - Shanshan Zhao, **Kai Wang**, Eric Jackson. Evaluation of Not-At-Fault Assumption in Quasi-Induced Exposure Method Using Traffic Crash Data at Varied Geographical Levels. TRB Annual Meeting Poster Presentation. 2018.
 - **Kai Wang**, Shanshan Zhao, Eric Jackson. Functional Forms of the Negative Binomial Models in Safety Performance Functions for Rural Two-Lane Intersections. TRB Annual Meeting Poster Presentation. 2018.
 - **Kai Wang**, Tanmoy Bhowmik, Shamsunnahar Yasmin, Shanshan Zhao, Naveen Eluru, Eric Jackson. Multivariate Copula Temporal Modeling of Intersection Crash Consequence Metrics: A Joint Estimation of Injury Severity, Crash Type, Vehicle Damage and Driver Error. TRB Annual Meeting Poster Presentation. 2018.
 - Shanshan Zhao, **Kai Wang**, Chenhui Liu, Eric Jackson. Freeway Crash Analysis Considering Monthly Variation in Traffic Volumes and Weather Conditions using Time Series Random Effect Negative Binomial Models. TRB Annual Meeting Poster Presentation. 2017.
 - **Kai Wang**, Shanshan Zhao, Eric Jackson. Multivariate Poisson Lognormal Modeling of Weather Related Crashes on Freeways. TRB Annual Meeting Poster Presentation. 2017.
 - **Kai Wang**, Shanshan Zhao, John Ivan, Ishraq Ahmed, Eric Jackson. Evaluation of Hotspot Identification Methods for Municipal Roads. TRB Annual Meeting Poster Presentation. 2017.
 - **Kai Wang**. A Multivariate Poisson Lognormal Model of Crashes by Crash Type and Severity on Rural Two Lane Highway in Connecticut. 2016 TRB Doctoral Student Research in Transportation Safety. 2016.
 - **Kai Wang**. A Copula Based Joint Model of Injury Severity and Vehicle Damage in Two-Vehicle Crashes. 2015 TRB Annual Meeting Workshop. 2016. (*TRB Committee ANB20 2015 Young Researcher Paper Award*).
 - **Kai Wang**, John N. Ivan, Amy C. Burnicki, Sha A. Mamun. Predicting Local Road Crashes Using Socio-economic and Land Cover Data. TRB Annual Meeting Poster Presentation. 2015.

- **Kai Wang**, Xiao Qin. Exploring Driver Errors at Intersections: Exploring Key Contributors and Solutions. TRB Annual Meeting Poster Presentation. 2015.
- **Kai Wang**, Xiao Qin. Using Structural Equation Modeling to Measure Single-Vehicle Crash Severity. TRB Annual Meeting Poster Presentation. 2014.
- Xiao Qin, **Kai Wang**. Applying Data Mining Techniques in Road Safety Analysis. 2014 TRB Annual Meeting Workshop Session “Emerging Methods in Road Safety Analysis”. 2014.
- **Kai Wang**. Using Structural Equation Modeling to Measure Single-Vehicle Crash Severity. 10th Annual Transportation Student Research Symposium, University of Connecticut. 2014.
- **Kai Wang**. Predicting Local Town Road Crashes – A New Approach for Using Land-Cover Data in Crash Prediction Models. 10th Annual Transportation Student Research Symposium, University of Connecticut. 2014.
- Xiao Qin, Zhiguang Wang, **Kai Wang**. Selection of Interest and Inflation Rates for Infrastructure Investment Analyses. Proceedings of the Research Review Board Meeting, Pierre, South Dakota. 2013.
- **Kai Wang**. Analyzing Crash Severity Based on Vehicle Damage and Occupant Injuries. 2013 UND-SDSU-NDSU Engineering Research Summit, South Dakota State University. 2013.
- **Kai Wang**. Modeling Large Truck Safety Using Logistic Regression Models. 2013 UND-SDSU-NDSU Engineering Research Summit, South Dakota State University. 2013.
- **Kai Wang**. Evaluating the Effectiveness of State Toward-Zero-Deaths Programs. 2013 UND-SDSU-NDSU Engineering Research Summit, South Dakota State University. 2013.
- Xiao Qin, **Kai Wang**, Chase E. Cutler. Analysis of Crash Severity Based on Vehicle Damage and Occupant Injuries. TRB Annual Meeting Poster Presentation. 2013.
- Xiao Qin, **Kai Wang**, Chase E. Cutler. Logistic Regression Models of the Safety of Large Trucks. TRB Annual Meeting Poster Presentation. 2013.
- Lee W Jr. Munnich, Frank Douma, Xiao Qin, David J. Thorpe, **Kai Wang**. Evaluating the Effectiveness of State Toward-Zero-Deaths Programs. TRB Annual Meeting Poster Presentation. 2013.