Woon Kim

EDUCATION

Ph.D. Civil Engineering, University of Maryland, College Park, MD — Jan 2008 – Mar 2014
M.S. Civil Engineering, University of Maryland, College Park, MD — Sep 2005 – Dec 2007
B.S. Transportation Systems, Korea Aerospace University, South Korea — Mar 1999 – Feb 2004

RESEARCH INTERESTS & AREAS OF EXPERTISE

Traffic safety, crash data analysis, before-after study, crash prediction modeling, statistical models, pattern recognitions, survey data analysis, driver behaviors, cohort study (teen and older drivers), speeding, speed limits, public perceptions of traffic safety, traffic incident management, intelligent transportation system, and connected and automated vehicles.

WORK EXPERIENCE

Department of Transportation Federal Highway Administration (FHWA) — Jun 2023 – Present
Research Highway Engineer

Lead/Conduct/Manage Transportation Infrastructure Related Traffic Safety Projects

- Plan and execute studies, experiments, and system designs aiming to improve traffic safety and develop study schedules and budgets.
- Perform all phases of research process, including problem definition, literature review, research design, data collection, analysis results, and preparation of reports.
- Analyze decision making processes and plan and execute research and studies aiming to improve the system process efficiency.
- Manage projects and programs by monitoring progress, reviewing deliverables (e.g., technical memos, final reports, techbriefs, manuscripts) from contractors, and approving relevant invoices.
- Represent FHWA at professional meetings, webinars, and conferences (e.g., Transportation Research Board (TRB), ATSIP Traffic Records Forum) and serve as a subject-matter expert to provide technical expertise and guidance for State Planning and Research studies, National Cooperative Highway Research Program projects, and Pooled Fund Studies.

AAA Foundation for Traffic Safety (AAAFTS) — Apr 2017 – Jun 2023
Senior Analyst/Researcher

Led/Conducted/Managed Traffic Safety Related Projects and Analyzed Relevant Data

- Executed and managed internal and external projects related to traffic safety culture, impact of speed, driving patterns, teen and older drivers' risk factors, effective policies for behavior changes, potential safety benefits from automated vehicles, public perceptions toward automated vehicle technology, and human-machine interface design.
- Led major data related in-house tasks, studies, and projects.
  - Led AAAFTS's national survey (*Traffic Safety Culture Index*) assessing public perceptions, attitudes, and self-reported behaviors relative to unsafe driving behaviors, which annually collects data from 3000+ nationally representative respondents.
  - Led a project compiling and harmonizing police crash files from 32 States to develop a dashboard visualizing results in Tableau.
  - Led work checking the quality of driving performance data collected via a driving app for longitudinal older drivers' cohort study.
  - Led a data fusion project merging data from different sources (i.e., speed, volume, and crash data) into a main dataset for further in-depth analysis examining the impact of posted speed limit changes on traffic safety.

- Coordinated with the AAA Public Affair group on online publications and press releases.
- Represented AAAFTS at professional meetings, webinars, and conferences (e.g., TRB, Institute of Transportation Engineers (ITE) annual meeting, ASCE conferences).

Maryland Department of Transportation Maryland Transit Administration (MTA) Feb 2015 – Apr 2017
Safety Data Manager/Analyst

Obtained/Managed/Oversaw/Analyzed Safety Related Data

- Maintained/managed the online incident database, Accident Reporting System (ARS), developed by MTA to archive all data of crashes and incidents, which MTA transit system (local/commuter buses, subways, light/commuter rails, paratransit) was involved in and were reported to the MTA Office of Safety.
- Tracked and analyzed crash/incident data to reveal risks, patterns, and trends and generated monthly, quarterly, and annual executive data analysis reports which were distributed to MTA Operation Department and Senior/Executive Management.
- Reviewed large quantities of operational crash reports daily (50+/day) to determine whether they were preventable or not, based on the national standards and guidelines published by the National Safety Council.
- Performed analyses and created special reports per senior and executive management requests. For example, performed a root cause analysis for collisions near curbsides per MTA CEO's request to develop strategies to reduce such collisions.
- Developed strategies to reduce crash/incident rates with the MTA Operations Department and the Geographical Information System Group based on seasonal trend analysis and hot spot assessment.
- Facilitated monthly meetings for the Safety Rules Compliance Program Committee who developed performance measures for transit operators' safety compliance and the online tracking system. Evaluated/discussed the performance and areas for improvement. Reviewed and analyzed data related to safety rules compliance and the results.

University of Maryland at College Park Jun 2014 – Jan 2015
Research Associate

Led/Conducted/Participated in Various Research and Project Activities and Worked as an On- and Off-site Consultant for Maryland Department of Transportation State Highway Administration (SHA)

- Analyzed the impact of Automated Speed Enforcement deployment around freeway work zones.
- Designed an effective operational strategy that can dynamically allocate emergency response units to maximize their efficiency and the resulting benefits under existing resource constraints.
- Developed guidelines for designing un-signalized superstreets to improve intersection safety.
- Developed and conducted field implementation of a system to detect, control, and warn dilemma zones under various signal controls to minimize related crashes.
- Provided a workshop to staff in SHA Office of Traffic Safety about fundamental statistical analysis method that could be applicable for assessing the results from traffic engineering projects.

University of Maryland at College Park Jan 2006 – May 2014
Graduate Research Assistant

Provided Technical Advisory and Off-Site Support for SHA

- Assessed the Maryland incident data collected by SHA incident traffic management program, *Coordinated Highways Action Response Team* (CHART). Provided guidelines to improve their quality and efficiency and produced monthly, quarterly, and yearly project reports for the analysis results. Managed online open sources of the evaluation results at http://chartinput.umd.edu and responded the public inquiries.

- Statistically analyzed Maryland incident data to evaluate the performance of CHART and developed models predicting incident-induced delays and queues per SHA's request, which were used for traffic management during non-recurrent congestion by Office of Transportation Mobility and Operations.
- Developed the methodology for assessing the proposed "CHART statewide traffic incident management (TIM) patrol expansion" in order to expand their daily and weekly operation hours and coverage areas by increasing personnel and equipment in 2009. Conducted the corresponding benefit/cost estimation assessment.
- Developed a decision support tool to determine the necessity for implementing *Freeway Incident Traffic Management* (FITM) plans – SHA's advanced network-wide traffic management plans in response to major traffic crashes – based on the given traffic conditions and geometric configurations. Generated effective procedures for computing the individual and social benefits of a well-coordinated FITM

SELECTIVE REFEREED PUBLICATIONS

1. Wang, M., Mehrotra, S., Wong, N., Parker, J. I., Roberts, S. C., **Kim, W.**, ... & Horrey, W. J. (2024). Human-Machine interfaces and vehicle Automation: A review of the literature and recommendations for system Design, Feedback, and alerts. *Transportation Research Part F: Traffic Psychology and Behaviour*, *107*, 549-561.
2. Wang, M., Parker, J. I., Wong, N., Mehrotra, S., Roberts, S. C., **Kim, W.**, ... & Horrey, W. J. (2024). The effect of human-machine interface modality, specificity, and timing on driver performance and behavior while using vehicle automation. *Accident Analysis & Prevention*, *203*, 107606.
3. **Kim, W.**, But, J., Anorve, V., & Kelley-Baker, T. (2022). Examining US drivers' characteristics in relation to how frequently they engage in speeding on freeways. *Transportation research part F: traffic psychology and behaviour*, *85*, 195-208.
4. **Kim, W.**, Svancara, A. M., & Kelley-Baker, T. (2020). Understanding the impact of road design characteristic on teen driver's fatality. *Traffic injury prevention*, *21*(5), 313-318.
5. Betz, M. E., Villavicencio, L., Kandasamy, D., Kelley-Baker, T., **Kim, W.**, DiGuiseppi, C., ... & Li, G. (2019). Physician and family discussions about driving safety: findings from the LongROAD Study. *The Journal of the American board of family medicine*, *32*(4), 607-613.
6. **Kim, W.**, Kim, H., & Chang, G. L. (2015). Design of real-time emergency response system for highway networks: application for high frequency of traffic emergency events during peak hours. *Transportation research record*, *2484*(1), 70-79.
7. Kim, H., **Kim, W.**, Chang, G. L., & Rochon, S. M. (2014). Design of emergency response system to minimize incident impacts: Case study for Maryland District 7 network. *Transportation research record*, *2470*(1), 65-77.
8. Zhu, S., **Kim, W.**, Chang, G. L., & Rochon, S. (2014). Design and evaluation of operational strategies for deploying emergency response teams: Dispatching or patrolling. *Journal of transportation engineering*, *140(6)*, 04014021.
9. Liu, Y., **Kim, W.**, & Chang, G. L. (2013). Decision model for justifying the benefits of detour operation under non-recurrent congestion. *Journal of transportation engineering, 139*(1), 40-49.
10. Zhu, S., **Kim, W.**, & Chang, G. L. (2012). Design and Benefit–Cost Analysis of Deploying Freeway Incident Response Units: Case Study for Capital Beltway in Maryland. *Transportation research record*, *2278*(1), 104-114.
11. **Kim, W.**, Liu, Y., & Chang, G. L. (2012). Advanced traffic management system: integrated multicriteria system for assessing detour decisions during nonrecurrent freeway congestion. *Transportation research record*, *2324*(1), 91-100.

12. **Kim, W.**, & Chang, G. L. (2012). Development of a hybrid prediction model for freeway incident duration: a case study in Maryland. *International journal of intelligent transportation systems research*, *10*(1), 22-33.
13. **Kim, W.**, Chang, G. L., & Rochon, S. M. (2008, November). Analysis of freeway incident duration for ATIS applications. In *Proceedings of the 15th World Congress on Intelligent Transport Systems and ITS America Annual Meeting* (pp. 950-958).

SELECTIVE TECHNICAL REPORTS & RESEARCH BRIEFS

1. **Kim, W**., Romo, A. & McDonough, J. (2023). A Multi-Site Examination for the Impact of Changes in Posted Speed Limit on Traffic Safety (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
2. Mason, J., Carney, C., Gaspar, J. G., **Kim, W.**, Romo, A. & Horrey, W.J. (2023). Mapping Comprehension of ADAS across Different Road Users (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.
3. Wang, M., Parker, J., Wong, N., Mehrotra, S., Roberts, S.C., **Kim, W.**, Romo, A. & Horrey, W.J. (2023). Human-Machine Interfaces and Vehicle Automation: The Effect of HMI Design on Driver Performance and Behavior (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.
4. **Kim, W.** & Horrey, W.J. (2023). *Perceptions and Attitudes Towards Automated Vehicles, United States, 2021: Examining the Alignment Between Preferences for Adoption and Perceived Safety* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
5. **Kim, W.**, Tian, J., Arnold, L.S., Yang, C.Y.D., Molnar, L.J., DiGuiseppi, C., Li, G. & Eby, D.W. (2023). *In-Vehicle Technology Use and Associated Factors Among Older Drivers* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
6. Yang, C.Y.D., Horrey, W.J., Tefft, B.C. & **Kim, W.** (2023). *User Interactions with Vehicle Automation Technologies: A Review of Previous Research and a Proposed Framework* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
7. Mehrotra, S., Wang, M., Wong, N., Parker, J., Roberts, S.C., **Kim, W.**, Romo, A. & Horrey, W.J. (2022). *Human-Machine Interfaces and Vehicle Automation: A Review of the Literature and Recommendations for System Design, Feedback, and Alerts* (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.
8. **Kim, W.**, Villavicencio, L., Tefft, B.C. & Horrey, W.J. (2022). *Traffic Fatalities on Urban Roads and Streets in Relation to Speed Limits and Speeding, United States, 2010–2019* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
9. Arnold, L.S. & **Kim, W.** (2022). *Use of Potentially Impairing Medications in Relation to Driving, United States, 2021* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
10. **Kim, W.** & Horrey, W.J. (2022). *Public Understanding and Perception of Automated Vehicles, United States, 2018 – 2020* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
11. Tefft, B.C., Villavicencio, L., Benson, A., Arnold, L.S., **Kim, W.**, Añorve, V. & Horrey, W.J. (2022). *Self-Reported Risky Driving in Relation to Changes in Amount of Driving During the COVID-19 Pandemic* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
12. Tefft, B.C., Añorve, V., **Kim, W.** & Kelley-Baker, T. (2021). *Travel in the United States Before and During the COVID-19 Pandemic* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
13. **Kim, W.** & Kelley-Baker, T. (2021). *Users' Trust in and Concerns about Automated Driving Systems* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
14. **Kim, W.**, Kelley-Baker, T., Arbelaez, R., O'Malley, S. & Jensen, J. (2021). *Impact of Speeds on Drivers and Vehicles – Results from Crash Tests* (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.

15. **Kim, W.**, Kelley-Baker, T., Sener, I., Zmud, J., Graham, M. & Kolek, S. (2019). *Users' Understanding of Automated Vehicles and Perception to Improve Traffic Safety –Results from a National Survey* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
16. **Kim, W.**, Kelley-Baker, T. & Chen, K.T. (2019). *Review of Current Practices for Setting Posted Speed Limits* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
17. **Kim, W.**, Añorve, V. & Tefft, B.C. (2019). *American Driving Survey, 2014 – 2017* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
18. Villavicencio, L., Svancara, A.M., Horrey, W.J., Kelley-Baker, T., **Kim, W**. & Tefft, B.C. (2018). *Assessing Fatality Rates in Crash Involvement for Motorists and Non-Motorists in Teen Driver Crashes by Risk Factor* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
19. Betz, M.E., Villavicencio, L., Kelley-Baker, T., **Kim, W.**, Mielenz, T.J., Eby, D.W., Molnar, L.J., Hill, L.L., Strogatz, D.S. & Carr, D.B. (2018). *Discussions with Older Family Members about Safe Driving: Findings from the AAA LongROAD study* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
20. Kelley-Baker, T., **Kim, W.** & Villavicencio, L. (2017). *The Longitudinal Research on Aging Drivers (LongROAD) Study: Understanding the Design and Methods* (Research Brief). Washington, D.C.: AAA Foundation for Traffic Safety.
21. **Kim, W.**, Kim, H., Won, M., & Chang, G. L. (2017). *Development of a Traffic Management Decision Support Tool for Freeway Incident Traffic Management (FITM) Plan Deployment* (No. MD-17-SHA/UM/4-19). Maryland. State Highway Administration.
22. **Kim, W.**, & Chang, G. L. (2012). *Review and enhancement of CHART operations to maximize the benefit of incident response and management* (No. MD-12-SB009B4U). Maryland. State Highway Administration.
23. **Kim, W.**, Franz, M., & Chang, G. L. (2012). *Enhancement of freeway incident traffic management and resulting benefits* (No. MD-11-SP009B4Q). Maryland. State Highway Administration.

SELECTIVE PRESENTATIONS

1. Characterizing Clusters of Road Users Based on Quality of and Confidence in Mental Models of Adaptive Cruise Control and Lane Keeping Assist, *Transportation Research Board 103rd Annual Meeting*, 2024
2. Effects of Driver Risk Profiles on Perceptions of Automated Vehicles, *67th International Annual Meeting Human Factors and Ergonomics Society*, 2023
3. Traffic fatalities on urban roads and streets in relation to speed limits and speeding, United States, 2010–2019, *2022 Institute of Transportation Engineers Annual Meeting*, 2022
4. Public understanding and perceptions of automated vehicles – Findings from a U.S. national survey, *American Society of Civil Engineers – International Conference on Transportation & Development*, Virtual conference, 2021
5. Speed & traffic safety outcomes, *2021 Humanetics North America Virtual Crash Meeting*, 2021
6. Distracted driving: public perceptions, attitudes, and behaviors, *Missouri 2020 State of Distracted Driving Virtual Press Conference*, 2020
7. Understanding the impact of road design characteristics on fatal crash involvement risks among teen drivers, *Transportation Research Board 98th Annual Meeting*, 2019
8. Older drivers & road design: safety perceptions, self-regulation, and crash risk, *2018 Institute of Transportation Engineers Annual Meeting*, 2018