

SAFER-SIM Accomplishments

March 31, 2022 – September 30, 2022

1. Accomplishments

1.1 Research Accomplishments

1.1.1 Peer-reviewed journal publications

Published

1. McGehee, D., Roe, C., Kasarla, P., & Wang, C. (2022). Quantifying and recommending seat belt reminder timing using naturalistic driving video data. *Journal of Safety Research*, 80:399-407.
2. A. Fallahdizchah and C. Wang, "Profile monitoring based on transfer learning of multi-profile with incomplete samples," *IISE Transactions*, 2022, 54(7): 643-658.
3. Carney, C., Gaspar, J. & Horrey, W. (accepted), Longer-Term Exposure vs. Training: Their Effect on Drivers' Mental Models of ADAS Technology, *Transportation Research Part F*.
4. O'Neal, E. E., Wendt, L., Hamann, C., Reyes, M.L., Yang, J., and Peek-Asa, C. (Submitted). Rates and Predictors of Teen Driver Crash Culpability. *Journal of Safety Research*.
5. Malik, J., Kim, N.Y., Di Napoli Parr, M., Kearney, J.K., Plumert, J.M., & Rector, K. (2022). Do simulated augmented reality overlays influence street-crossing decisions for non-mobility-impaired older and younger adult pedestrians? Submitted to *Human Factors*.
6. Di Napoli Parr, M., O'Neal, E.E., Zhou, S., Williams, B., Butler, K.M., Kearney, J.K., & Plumert, J.M. (2022). How children judge affordances when walking and bicycling across virtual roads: Does mode of locomotion matter? Submitted to *Developmental Psychology*.
7. O'Neal, E. E., Wendt, L., Hamann, C., Reyes, M., Peek-Asa, C. (under review). Rates and predictors of teen crash culpability.
8. Gonzales, E., Roberts, S. C., & Mehrotra, S. (accepted). Curb Management Policy Insights and Recommendations for Communities of All Sizes. In *Proceedings of the Transportation Research Board 101st Annual Meeting 2022*.
9. Christofa, E., Ai, C., Deliali, A., Tainter, F., Cesic, L., Hannon, T., and Kostopoulou, E. 2022.
10. Bicyclist and Motorist Behavior at Bike Boxes. *Transportation Research Record: Journal of the Transportation Research Board*. [accepted]
11. Deliali, A., Fournier, N., Christofa, E., and Knodler, M. 2022. Investigating the Safety Impact of Segment and Intersection-levels Bicycle Treatments on Bicycle-Motorized Vehicle Crashes.
12. *Transportation Research Record: Journal of the Transportation Research Board*.
13. DOI: 10.1177/03611981221112670.
14. Han, Z., Gonzales, E., Christofa, E., and Oke, J. 2022. Modeling System-Wide Urban Rail Transit Energy Consumption: A Case Study of Boston. *Transportation Research Record: Journal of the Transportation Research Board*. DOI:

10.1177/03611981221096442.

Accepted for publication

Nothing to report

Submitted

Nothing to report

1.1.2 Book chapters

Nothing to report

1.1.3 Edited books

Nothing to report

1.1.4 Conference papers, posters, and symposia

Presented

1. Kearney, J.K., The Effectiveness of Smartphone Warnings and Alerts on Pedestrian Road Crossing. Presentation at the Rice University Workshop on Improving Mobility with Low Vision. Rice University, Houston Tx, July 29, 2022.
2. Kim, N. Y., O’Neal, E., Noferesti, I., Wang, J., Flathau, J., Tang, H. Kearney, J. K., & Plumert, J. M. (April, 2021). A parent-based intervention program for training prospective control skills in children. Poster presented at the 2022 biennial meeting of the Cognitive Development Society, Madison, WI.
3. O’Neal, E.E., Noonan, M.F., Tang, H., & Plumert, J.M. (April, 2022). How do mothers and fathers socialize safety values in sons and daughters? Poster presented at the 2022 biennial meeting of the Cognitive Development Society, Madison, WI.
4. Kim, A., O’Neal, E.E., Flathau, J., Tang, H., Kearney, J.K., & Plumert, J.M. (April, 2022). A parent-based intervention program for training prospective control skills in children. Poster presented at the 2022 Biennial Meeting of the Society for Research in Child Development, Virtual Conference.
5. O’Neal, E.E., Peek-Asa, C., Wendt, L., Hamann, C., Reyes, M., & Yang, J. (March, 2022). Factors associated with teens’ crash culpability. Oral presentation given at the 2022 annual meeting of the Society for Violence and Injury Research, Washington D.C.
6. O’Neal, E.E., Plumert, J.M., & Peek-Asa, C. (March, 2022). A method for evaluating parent-teen conversations about potential roadway hazards. Oral presentation given at the 2022 annual meeting of the Society for Violence and Injury Research, Washington D.C.
7. Roberts, S. C., Ebadi, Y., Talreja, N., Knodler, M. K., & Fisher, D. L. (2022). Designing and Evaluating an Informative Interface for Transfer of Control in a Level 2 Automated Driving System. 14th International Conference on Automotive User Interfaces and Interactive Vehicular Applications, Seoul, South Korea, 253-262.
8. Figueroa-Medina, D. Valdés, B. Colucci, N. Cardona & A. Chamorro. 2022. Pedestrian Walking Speeds and Success Rates on Mid-Block Crossings using Virtual Reality Simulation. Paper presented at the Road Safety and Simulation Conference

- (RSS 2022), Athens, Greece. June 8-10, 2022.
9. Deliali, A., Christofa, E., Ai, C., Tainter, F., Cestic, L., Hannon, T., and Kostopoulou, E. 2022. Effectiveness of Bike Boxes in Massachusetts, MassDOT Transportation Innovation Conference, Worcester, MA, May 24-25.
 10. Han, Z., Gonzales, E., Christofa, E., and Oke, J. 2022. Modeling System-Wide Urban Rail Transit Energy Consumption: A Case Study of Boston. MassDOT Transportation Innovation Conference, Worcester, MA, May 24-25.
 11. Gonzales, E., and Christofa, E. 2022. Flexible Transit Services. MassDOT Transportation Innovation Conference, Worcester, MA, May 24-25.
 12. Kostopoulou, E., Gonzales, E., and Christofa, E. 2022. Measuring Accessibility to Improve Public Health. MassDOT Transportation Innovation Conference, Worcester, MA, May 24-25.

Accepted/Not yet presented

Nothing to report

Submitted

Nothing to report

1.1.5 Paper/poster awards

1. IISE Energy Systems Track - Best Student Paper Competition (3rd place)", with Baghali, S.* and Alam, M. R.*, Title: Multi-stage Charging Station and Distributed Generator Planning in Decentralized Power Distribution and Transportation Systems, Institute of Industrial and Systems Engineers (IISE) Annual Conference, 2022

1.1.6 External grants related to SAFER-SIM

Awarded

1. Pilot Research Ideas Involving Artificial Intelligence and Machine Learning, funded by UI Injury Prevention Research Center and the Iowa Initiative for Artificial Intelligence. Our topic, Advanced Eye Tracking of Moving Objects in Driving Simulation, was awarded \$22,500 to support the time, effort, and computational resources in order to 1) Develop a machine learning algorithm to identify objects or areas of interest (AOIs) as AOIs move within a simulated driving environment. 2) Derive measures of eye gaze using pupil coordinate data and the location of AOIs identified under Aim 1. (reported under SAFER-SIM Project Title: Extended Evaluation of Training Programs to Accelerate Hazard Anticipation Skills in Novice Teen Drivers PI(s): Jodie Plumert, Michelle Reyes)
2. RIDE - Research for Inclusivity and Driving Equity, National Science Foundation Research Experiences for Undergraduates (REU) Site, \$400,000, 09/01/2022 – 08/31/2025, PI with co-PI Eleni Christofa. The objective of this grant is to immerse 10 undergraduate students in a 10 week summer research experience focused on community engaged research to improve the transportation experience for underserved communities. This grant will complement the SaferSim project by allowing an undergraduate student to continue analyzing the SaferSim data with a focus on improving underserved communities. (reported under SAFER-SIM Project

Title: Development and Testing of an In-Vehicle Interface for Use in Automated Driving Contexts PI(s): Shannon Roberts)

3. Risk Anticipation Training To Enhance Novice Driving (Risk-ATTEND): Efficacy Evaluation using Driving Simulation and Crash/Citation Records, Toyota Collaborative Safety Research Center, \$380,000, 04/01/2022-09/30/2023, co PI with PI Anuj Pradhan. The objective of this grant is to conduct an experimental evaluation of how a hazard anticipation training program for novice teen drivers affects not only their driving behavior, but also their crashes and citations. The new grant is very similar to this SaferSim work as they both focus on developing and evaluating a driver training program that relies on active training and the 3M approach – mistake, mitigation, and mastery. (reported under SAFER-SIM Project Title: Attention and Adaptation of Teen Drivers to Driving Automation Systems PI(s): Shannon Roberts, Jennifer McDermott)
4. Consumer education for advanced vehicle technologies: Tailored training based on drivers' self-perceptions and knowledge.
5. Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes, Massachusetts Department of Transportation (Christofa, Ai, and Tainter)
6. Building a Bicycle Simulator to Study Bicyclist-Connected & Automated Vehicle Interactions, Robert B. Brack Endowment funds for research (UMass) (Christofa & Pradhan)

Submitted

1. “Parental Scaffolding of Children’s Perception-Action Skills” Jodie Plumert (PI), Joseph Kearney (Co-PI), Cara Hamann (Co-PI). Grant application submitted to the National Science Foundation. (reported under SAFER-SIM Project Title: Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists; PI(s): Joseph Kearney, Jodie Plumert)
2. “A Novel System for Studying Naturalistic Parent-Child Road Crossing” Jodie Plumert (PI), Cara Hamann (Co-I). R21 grant application submitted to the National Institutes of Health. (reported under SAFER-SIM Project Title: Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists PI(s): Joseph Kearney, Jodie Plumert)
3. Shannon Roberts submitted one proposal that use results from this Safer-Sim project as preliminary research. It is listed below:
4. HCC: Small: AUTOMATE - Advancing Underrepresented Groups Travel Opportunities by Mobilizing Automated Vehicle Technology for Equity, National Science Foundation, \$600,000, 01/01/2023-12/31/2026, PI. This proposal is focused on building interfaces for driving automated systems that are inclusive and equitable. It logically builds on my current SaferSim work that is aimed at designing and testing warning systems for when a driving automation system fails (and the vehicle must explain to the driver why it is failing).
5. Using the Unusable: Identifying, Categorizing, and Evaluating Driver Distraction Countermeasures, AAA Foundation for Traffic Safety, \$200,000, 10/01/2022 – 03/31/2024, PI with co-PI Anuj Pradhan. This proposal is focused on better understanding driver’s motivation to use distraction mitigation technologies. It relies on background from this current SaferSim work that examined how people engage in

secondary activities while driving (and using driving automation systems). (reported under SAFER-SIM Project Title: Enhancing the effectiveness of automated vehicle sensory-based alert systems PI(s): Shannon Roberts)

6. Performance Evaluation of the PR-30/PR-189 Diverging Diamond Interchange Phase 2. Constructora Santiago, Inc. and Puerto Rico Highways and Transportation Authority. April 2022. (reported under SAFER-SIM Project Title: Assessing the Effect of Drivers' Behavior in Rural Roads with Advanced Driver Assistance Systems Using a Driving Simulator PI(s): Didier Valdés-Díaz, Ivette Cruzado and Alberto M. Figueroa-Medina)
7. Examining bicyclists' safety behaviors and acceptance of bike boxes using virtual reality, UMass ADVANCE Collaborative Research Grants (Christofa, Pradhan)

1.2 Leadership Development Accomplishments

1.2.1 Invited presentations

1. Shannon Roberts gave a presentation called "What's going on with this car?: How drivers respond to unexpected events in driving automation systems" for the Purdue University Human Factors and Ergonomics Society Technical Talks on April 11, 2022.
2. Taveras, Y. Uso de los simuladores de conducción para educación e investigación (Use of driving simulators for education and research). Conferencia de Seguridad Vial. Manta, Ecuador, September 16, 2022.
3. Figueroa, A., Chamorro, A., Cardona, N., and Badillo, J. June 16/22, 2022. Demonstrations of the UPRM Pedestrian Virtual Reality Simulator and the UPRM Driver Simulators. UPRM Pre-Engineering Summer Camp. R2-DEEP and the UPRM School of Engineering.
4. Christofa, E. 2022. Embracing Diversity, Equity, and Inclusion in Engineering. Department of Civil Engineering, The University of Memphis, 18 April.

1.2.2 Invited papers

Nothing to report

1.2.3 Invited workshops

1. Shannon Roberts organized the TRB Mid year meeting for the Young Driver Subcommittee from August 16-17, 2022 in Washington DC. The focus of the meeting was "Inequities and Disparities in Young Driver Safety".

1.2.4 Grant review panels

1. IPRC pilot grant proposal reviewer – (Reyes) – University of Iowa –
2. Alberto Figueroa-Medina. Member of Oversight Panel for NCHRP project 07-29: Development of the 8th edition of the AASHTO's A Policy on Geometric Design of Highways and Streets (Green Book). National Cooperative Highway Research Program, Transportation Research Board.
3. Shannon Roberts served on an NSF proposal review panel.
4. Shannon Roberts served on an NIH proposal review panel for HCMF (Human Complex Mental Function).

5. Shannon Roberts continues to serve on a BTSCRCP panel for BTS-01: Guidance for Employer-Based Behavioral Traffic Safety Programs for Drivers in the Workplace. For the panel, she provided guidance for the contractor in terms of how drivers will respond to traffic safety programs.
6. Anuj K. Pradhan – BTSCRCP - Determining the State of Knowledge, Opportunities for Outreach, and Data-driven Tools for Consumer Education of ADAS.

1.2.5 Advisory committees

1. UI Injury Prevention Research Center Executive Committee (Reyes) – University of Iowa
2. UI Great Plains Center for Agricultural Health Internal Advisory Committee (Reyes) – University of Iowa
3. Engineering Staff Advisory Council (Reyes, ended 6/30/2022)
4. Governor's Traffic Safety Bureau – Pedestrian Safety (O'Neal)
5. Scientific Committee, Driving Simulation Conference 2022 (Kearney)
6. Shannon Roberts is on the Center for Research on Families Steering Committee.
7. Shannon Roberts is on the Internal Advisory Board for the Institute of Diversity Sciences.
8. Didier Valdés, Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
9. Didier Valdés, Executive Committee of the National Institute for Congestion Reduction (NICR), University Transportation Center (UTC). Nov. 2021 - Present.
10. Alberto M. Figueroa-Medina, Standing Committee on Performance Effects of Geometric Design AKD-10 (formerly known as Operational Effects of Geometrics AHB-65), Transportation Research Board, 2013-April 2022.
11. Alberto M. Figueroa-Medina, Transportation Education Council, Institute of Transportation Engineers (ITE).
12. Alberto M. Figueroa-Medina, Transportation Safety Council, Institute of Transportation Engineers (ITE).
13. Alberto M. Figueroa-Medina, Executive Committee of the National Institute for Congestion Reduction (NICR), University Transportation Center (UTC). Nov. 2019 - Present.
14. Alberto M. Figueroa-Medina, Technical Committee of the Pan American Federation of Engineers Societies (UPADI), 2020-Present.
15. Ivette Cruzado, Friend of the Standing Committee on Performance Effects of Geometric Design AKD-10 (formerly known as Operational Effects of Geometrics AHB-65), Transportation Research Board, 2013-Present.
16. Ivette Cruzado, Coordinator of the Research Faculty for Faculty and Postdoctoral Fellows, UPRM.
17. Ivette Cruzado, Member of the Institutional Committee for Research, UPRM.
18. Ivette Cruzado, Co-Advisor of the Institute of Transportation Engineers, student chapter, at UPRM.
19. Ivette Cruzado, member of the Institute of Transportation Engineers.
20. TRR Editorial Board Task Force (Christofa)

1.2.6 Journal editing

1. Transportation Research Part F: Traffic Psychology (reviewer, Reyes)

2. Journal of Adolescent Health (reviewer, Reyes; reviewer, O'Neal)
3. Accident Analysis and Prevention (reviewer, Reyes)
4. Transportation Research Board Annual Meeting (reviewer, Reyes)
5. Traffic Injury Prevention (reviewer, O'Neal)
6. Transportation Research Interdisciplinary Perspectives, reviewer (Kearney)
7. International Journal of Human - Computer Studies, reviewer (Kearney)
8. Accident Analysis and Prevention reviewer, (Kearney)
9. Driving Simulation Conference, reviewer (Kearney)
10. Shannon Roberts is on the editorial board of Ergonomics
11. Samiul Hasan, Member of Editorial Advisory Board, Transportation Research Part C
12. Samiul Hasan, Associate Editor, Journal of Big Data Analytics in Transportation
13. Samiul Hasan, Associate Editor, IEEE ITS conference
14. Samiul Hasan, Associate Editor, ASCE Natural Hazards Review
15. Samiul Hasan, Associate Editor, Frontiers in Built Environment
16. Samiul Hasan, Associate Editor, Highway Transportation System Security and Emergency Response, Journal of Transportation Safety and Security (JTSS)
17. Samiul Hasan, Trial Editor (Engineering), Natural Hazards Review
18. Samiul Hasan, Associate Editor, Highway Transportation System Security and Emergency Response, Journal of Transportation Safety and Security (JTSS)
19. Samiul Hasan, Associate Editor, Journal of Advanced Transportation
20. Samiul Hasan, Associate Editor, Highway Transportation System Security and Emergency Response, Journal of Transportation Safety and Security (JTSS)
21. Samiul Hasan, Associate Editor, Journal of Advanced Transportation
22. Visual Cognition (Vecera, 2016-2022)
23. Didier Valdés, Applied Human Factors and Ergonomics (AHFE), Scientific Advisory Board, 2017-Present.
24. Didier Valdés, 19th LACCEI International Multi-Conference for Engineering, Education, and Technology.
25. Didier Valdés, 102nd TRB Annual Meeting, January 2021, Washington DC.
26. Didier Valdés, Editorial Board Member of International Journal of Natural Disasters, Accidents and Civil Infrastructure (RIDNAIC), Scipedia, August 2020 - Present.
27. Alberto M. Figueroa-Medina, 102nd Transportation Research Board (TRB) Annual Meeting, January 2022, Washington, DC.
28. Alberto M. Figueroa-Medina, Transportation Research Record, TRB Journal.
29. Alberto M. Figueroa-Medina, Accident Analysis and Prevention Journal, Elsevier.
30. Alberto M. Figueroa-Medina, Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, 2019 – August 2022.
31. Alberto M. Figueroa-Medina, International Journal of Natural Disasters, Accidents and Civil Infrastructure (RIDNAIC), Scipedia, September 2020 - Present.
32. Ivette Cruzado, Latin American and Caribbean Consortium of Engineering Institutions.
33. Ivette Cruzado, International Symposium on Highway Geometric Design.
34. Ivette Cruzado, The Open Transportation Journal.
35. Ivette Cruzado, Journal of Transportation Engineering.
36. Ivette Cruzado, Transportation Research Board, TRB Journal.
37. Anuj K. Pradhan – Accident Analysis and Prevention - Guest Editor

38. Anuj K. Pradhan – Transportation Research Record – Editorial Board
39. Anuj K. Pradhan – Frontiers in Neuroergonomics – Editorial Board
40. Anuj K. Pradhan - Journal of Law and Mobility – Contributing Editor
41. Transportation Research Record Handling Editor (Christofa)
42. Editorial Advisory Board of Transportation Research Part C: Emerging Technologies (Christofa)

1.2.7 Leadership positions in professional organizations

1. Transportation Research Board of the National Academies: Standing Committee on Vehicle User Education, Training, and Licensing; and Young Driver Subcommittee, Member (Reyes)
2. Society for the Advancement of Violence and Injury Research, Science Committee Co-Chair and Conference Planning Committee member (O’Neal)
3. Shannon Roberts serves as the Paper Review Coordinator for the Transportation Research Board Committee on Human Factors of Vehicles (ACH30).
4. Didier Valdés-Díaz, Technical Committee, Pan American Federation of Engineering Associations (UPADI), 2020-Present.
5. Alberto M. Figueroa-Medina, Executive Board of the Institute of Transportation Engineers Puerto Rico Section, 2022-Present.
6. Alberto M. Figueroa-Medina, Editorial Commission, Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, 2019 - June 2022.
7. Alberto M. Figueroa-Medina, Pan-American Transport Systems Technical Committee, Pan-American Federation of Engineering Associations (UPADI), 2020-Present.
8. TRB Committee on Vehicle User Education, Training, and Licensing – Paper Coordinator – Anuj Pradhan
9. AutoUI 2020 – Work in Progress Committee Co-chair – Anuj Pradhan
10. Anuj K. Pradhan – Association for the Advancement of Automotive Medicine – Chair of Automated Vehicles Special Interest Group
11. TRB ACP25 Traffic Signal Systems Committee Member (Christofa)
12. TRB AME70 Transportation and Public Health Committee Member and Secretary (Christofa)⁴
13. TRB ACH40 Human Factors of Infrastructure Design and Operations Committee – Member (Marshall)
14. Subcommittee: Human Factors of In-Vehicle Systems – Chair (Marshall)

1.2.8 SAFER-SIM Webinars

During this reporting period SAFER-SIM leadership chose to change our approach to webinars from individual project webinars to online symposia where projects are grouped by subject matter to allow parties interested in specific topics to interact with several researchers and projects in a single session. Attendance at presentations will remain open to all transportation professionals and the public, recorded, and posted on the SAFER-SIM YouTube channel so they are available to anyone who was not able to attend or would like to review. The first project symposium is being planned for December 2022.

1.2.9 Professional awards

1. Jeehan Malik, Ballard & Seashore Dissertation Fellowship, University of Iowa
2. Apoorva Hungund - AAAM H. Clay Gabler Scholar's Program Award
3. Ganesh Pai – Link Foundation Fellowship
4. Anuj K. Pradhan – AAAM Elaine Wodzin Award

1.3 Education and Workforce Development Accomplishments

1.3.1 Peer-reviewed journal publications w/ student authors

1. McGehee, D., Roe, **C.**, **Kasarla, P.**, & **Wang, C.** (2022). Quantifying and recommending seat belt reminder timing using naturalistic driving video data. *Journal of Safety Research*, 80:399-407.
2. **Malik, J.**, **Kim, N.Y.**, **Di Napoli Parr, M.**, Kearney, J.K., Plumert, J.M., & Rector, K. (2022). Do simulated augmented reality overlays influence street-crossing decisions for non-mobility-impaired older and younger adult pedestrians? Submitted to *Human Factors*.
3. A. Fallahdizcheh and **C. Wang**, "Profile monitoring based on transfer learning of multi-profile with incomplete samples," *IISE Transactions*, 2022, 54(7): 643-658.
4. **Di Napoli Parr, M.**, O'Neal, E.E., Zhou, S., Williams, B., Butler, K.M., Kearney, J.K., & Plumert, J.M. (2022). How children judge affordances when walking and bicycling across virtual roads: Does mode of locomotion matter? Submitted to *Developmental Psychology*.
5. Christofa, E., Ai, C., **Deliali, A.**, Tainter, F., **Cesic, L.**, Hannon, T., and Kostopoulou, E. 2022. Bicyclist and Motorist Behavior at Bike Boxes. *Transportation Research Record: Journal of the Transportation Research Board*. [accepted]
6. **Deliali, A.**, Fournier, N., Christofa, E., and Knodler, M. 2022. Investigating the Safety Impact of Segment and Intersection-levels Bicycle Treatments on Bicycle-Motorized Vehicle Crashes. *Transportation Research Record: Journal of the Transportation Research Board*. DOI: 010.1177/03611981221112670.

1.3.2 Book chapters w/ student authors

Nothing to report

1.3.3 Conference posters and papers w/ student authors

1. Kim, N. Y., O'Neal, E., Noferesti, I., Wang, J., **Flathau, J.**, **Tang, H.** Kearney, J. K., & Plumert, J. M. (April, 2021). A parent-based intervention program for training prospective control skills in children. Poster presented at the 2022 biennial meeting of the Cognitive Development Society, Madison, WI.
2. O'Neal, E.E., Noonan, M.F., **Tang, H.**, & Plumert, J.M. (April, 2022). How do mothers and fathers socialize safety values in sons and daughters? Poster presented at the 2022 biennial meeting of the Cognitive Development Society, Madison, WI.
3. Kim, A., O'Neal, E.E., Flathau, J., **Tang, H.**, Kearney, J.K., & Plumert, J.M. (April, 2022). A parent-based intervention program for training prospective control skills in children. Poster presented at the 2022 Biennial Meeting of the Society for Research in Child Development, Virtual Conference.
4. Figueroa-Medina, D. Valdés, B. Colucci, **N. Cardona** & **A. Chamorro**. 2022.

Pedestrian Walking Speeds and Success Rates on Mid-Block Crossings using Virtual Reality Simulation. Paper presented at the Road Safety and Simulation Conference (RSS 2022), Athens, Greece. June 8-10, 2022.

5. Roberts, S. C., Ebadi, Y., **Talreja, N.**, Knodler, M. K., & Fisher, D. L. (2022). Designing and Evaluating an Informative Interface for Transfer of Control in a Level 2 Automated Driving System. 14th International Conference on Automotive User Interfaces and Interactive Vehicular Applications, Seoul, South Korea, 253-262
6. **Deliali, A.**, Christofa, E., Ai, C., Tainter, F., **Cesic, L.**, Hannon, T., and Kostopoulou, E. 2022. Effectiveness of Bike Boxes in Massachusetts, MassDOT Transportation Innovation Conference, Worcester, MA, May 24-25.

1.3.4 Paper/poster awards w/ student authors

1. IISE Energy Systems Track - Best Student Paper Competition (3rd place)", with Baghali, S.* and Alam, M. R.*, Title: Multi-stage Charging Station and Distributed Generator Planning in Decentralized Power Distribution and Transportation Systems, Institute of Industrial and Systems Engineers (IISE) Annual Conference, 2022

1.3.5 Graduate students working on and supported by SAFER-SIM related projects

Site	Number
University of Iowa	7
University of Wisconsin Madison	3 (estimated)
University of Massachusetts Amherst	7
University of Central Florida	2
University of Puerto Rico Mayaguez	7

1.3.6 Undergraduate students working on and supported by SAFER-SIM related projects

Site	Number
University of Iowa	7
University of Wisconsin Madison	0
University of Massachusetts Amherst	7
University of Central Florida	0
University of Puerto Rico Mayaguez	2

1.3.7 Student attendance and presentations at the SAFER-SIM symposium

A symposium was not hosted this reporting period.

1.3.8 Transportation-related M.A. and PhD theses

1. Subramanian, L.D. (2022). Using a Virtual Environment to Study How Pedestrians and Bicyclists Respond work Warnings and Intent Communication for Autonomous Vehicles, [PhD thesis], Department of Computer Science, University of Iowa.
2. Wang, W. (2022). A Hybrid Inverse-kinematics Solution to Generate Avatars in Real-time for Virtual Reality Applications, [PhD thesis], Department of Computer Science, University of Iowa.
3. Nicole Plantier, in progress (dissertation prospectus meeting occurred October 13,

2022)

4. Ramos, L. I.M., (2022) “Driver Behavior Evaluation and its Relationship with the Safety of Highway Workers in Freeway Work Zones using a Driving Simulator.” (Title in Spanish: Evaluación del Comportamiento de los Conductores y su Relación con la Seguridad de los Trabajadores en Zonas de Construcción en Autopistas usando un Simulador de Conducción), Ph.D. Dissertation, University of Puerto Rico at Mayaguez.

1.3.9 Curriculum modules developed

1. Walter Guo – University of Central Florida - Curriculum module on machine learning has been added in CGN 3405 Numerical Methods for Civil Engineering Course at UCF.
2. CS 3980: Building Interactive Virtual Environments in Unity: (Fall, 2022) (Kearney – University of Iowa)
3. A new transportation laboratory course TRANSPORTATION ENGINEERING STUDIES was approved at the University of Puerto Rico at Mayaguez. The description of this laboratory course is: “Studies performed by civil engineers to characterize, analyze, simulate, and estimate the performance, service quality, and condition of transportation systems. Discussion of data collection and analysis techniques. Demonstration of software tools used to plan, evaluate, operate, and maintain transportation systems. Techniques for presenting data and communicating results for transportation systems.” One of the lab sessions included was related to Road user performance: driving and pedestrian simulation. In this session the students will learn about the use of simulation in studying road user behavior and the identification of safety countermeasures. This course is planned to be offered in the next academic year. (University of Puerto Rico-Mayaguez)

1.3.10 Student internships related to SAFER-SIM

1. Workplace Learning Connection internship: A rising high school senior spent 8 weeks this summer working with gaze coordinate data from our study to learn basics in R (import and plot data)
2. Meng Wang had an internship at AAFTS for summer 2022.

1.3.11 Presentations to student groups or classes

1. First-year honors seminar class- (15), 9/28/22 (Kearney - University of Iowa)
2. Presentation to Bucksbaum Academy seminar, Fall 2022 (Vecera – University of Iowa)
3. Linn County STEM Festival – 60 students
4. Jefferson County STEAM Festival – 250 students
5. Liberty High School Robotics Team Tour - 10 students
6. Perry Research Scholars Institute Tour – 18 students
7. Iowa National Summer Transportation Institute Tour – 20 students
8. STEM Pre-Service Teacher Conference Tour – 30 students
9. Kirkwood Community College Tour – 36 students
10. International Students Tour – 8 students

1.3.12 # Schools visited and # students present

1. Liberty High School Classroom visit – 210 students
2. Postville Middle School Classroom visit – 83 students

1.3.13 # Career fairs visited and # of attendees

2 STEM Festivals were attended, 310 students attendent

1.3.14 Summer institutes and programs and # of students participating

1. Shannon Roberts gave a presentation on Industrial Engineering and Human Factors for ~40 high school students in the Summer Engineering Institute on July 11, 2022.
2. Shannon Roberts presented her career path during a panel for ~15 high school students in the Massenberg Summer Institute on August 1, 2022.
3. Figueroa, A. Pedestrian Safety Virtual Reality Simulation Studies. Summer Transportation Institute. UPRM Civil Infrastructure Research Center. July 18, 2022. 16 students from 10th and 11th grade from public and private schools participated in the summer program.
4. Demonstration of the UPRM Pedestrian Virtual Reality Simulator. Summer Transportation Institute. UPRM Civil Infrastructure Research Center. July 18, 2022. 16 students from 10th and 11th grade from public and private schools participated in the summer program.
5. Demonstration of the UPRM Driving Simulator. Summer Transportation Institute. UPRM Civil Infrastructure Research Center. July 21, 2022. 16 students from 10th and 11th grade from public and private schools participated in the summer program.
6. Demonstrations of the UPRM Pedestrian Virtual Reality Simulator and the UPRM Driver Simulators. UPRM Pre-Engineering Summer Camp. R2-DEEP and the UPRM School of Engineering. June 16/22, 2022. 24 students participated in the presentation.

1.4 Technology Transfer

1.4.1 SAFER-SIM webinars

See 1.2.8 SAFER-SIM Webinars

1.4.2 Registrations for webinars

See 1.2.8 SAFER-SIM Webinars

1.4.3 Views of archived webinar content

There were zero (0) views this period.

1.4.4 Press releases for SAFER-SIM related research

1. <https://www.ucf.edu/news/as-hurricane-season-kicks-off-ucf-researchers-working-to-make-communities-more-resilient/>
2. <https://engineering.umass.edu/news/reus-bring-students-campus-summer-research-and-mentorship-0>

1.4.5 Media requests

Title	Publisher
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1. Shannon Roberts gave an interview for WWLP's Mass Appeal program for National Women in Engineering Day on June 23, 2022.. The 5 minute segment aired on local television.	WWLP
2. Samiul Hasan was interviewed on Fox Weather to discuss evacuation challenges during Hurricane Ian in September 2022.	Fox Weather
3. "John McGivern's Main Streets" filmed and episode on Iowa City and a behind the scenes segment on the National Advanced Driving Simulator	https://mainstreets.tv/

1.4.6 Tours of facilities

1. 4/1/22: Justin Wood- Indiana University- 3 people
2. 9/30/22: Professor Karen Adolph (NYU)
3. STEM Pre-Service Teacher Conference toured the National Advanced Driving Simulator on April 9, 2022
4. Reid Willis, Legislative Assistant with Senator Chuck Grassley's Office toured the National Advanced Driving Simulator at the University of Iowa on April 12, 2022
5. Liberty High School Robotics Team toured the National Advanced Driving Simulator on April 18, 2022
6. Dr. Tara Lovestead from the National Institute of Standards and Technology visited the UI as an invited speaker to the College of Pharmacy and toured the National Advanced Driving Simulator on April 26, 2022
7. Iowa Department of Transportation visited the National Advanced Driving Simulator on May 5, 2022
8. FTA Region 7 Administrator visited the National Advanced Driving Simulator on May 6, 2022
9. P.E.O. women's education group visited the National Advanced Driving Simulator on May 13, 2022
10. Iowa City Porsche Club hosted a car show and tours of the National Advanced Driving Simulator on May 21, 2022
11. Representative Mariannette Miller-Meeks visited and toured the National Advanced Driving Simulator on June 6, 2022
12. Aisin visited the National Advanced Driving Simulator on June 17, 2022
13. Iowa National Summer Transportation Institute (INSTI) participants toured the National Advanced Driving Simulator on June 21, 2022
14. Kirkwood Community College students toured the National Advanced Driving Simulator on June 27, 2022
15. International Students hosted by Gideon Zamba toured the National Advanced Driving Simulator on July 2, 2022
16. Representatives from OPM and SAMHSA/DFWP visited and toured the National Advanced Driving Simulator on July 14, 2022

17. Students participating in the Perry Research Scholars Institute toured the National Advanced Driving Simulator on July 19, 2022
18. Iowa Technology Institute conference attendees toured the National Advanced Driving Simulator on August 31, 2022
19. UI Center for Advancement hosted a tour for 30 alumni of the National Advanced Driving Simulator on September 9, 2022
20. Rep. Best to the Iowa House of Representatives and two staffers visited and toured the National Advanced Driving Simulator on September 19, 2022

1.4.7 Website traffic

Metric	This Period	Lifetime
Total Users	2170	27,328
New Users	2100	26,698
Sessions	3248	50,230
Page Views	6247	104,676

1.4.8 Patents filed

Nothing to report

1.4.9 DOT requests for presentations or proposals related to SAFER-SIM

Nothing to report

1.4.10 Practitioner attendance at events

See 1.2.8 *SAFER-SIM Webinars*

1.4.11 Number of improved or new simulation technologies, software, methods, or processes

1. Project Title: Development and Testing of an In-Vehicle Interface for Use in Automated Driving Contexts; PI(s): Shannon Roberts - Through this project, we developed two interfaces that better informs drivers of the functionality of automated vehicle technology. In comparison to a bare bones interface, the two improved interfaces yielded optimal performance (i.e., drivers took back control of the vehicle quickly and efficiently).

1.5 Collaboration

1.5.1 Attendance at the SAFER-SIMposium

See 1.2.8 *SAFER-SIM Webinars*

1.5.2 Interdisciplinary research projects within and across sites

1. Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists (Computer Science/Psychological & Brain Sciences)

2. Multi-modal Distributed Simulation Combining Cars, Bicyclists, and Pedestrians (Computer Science/Psychological & Brain Sciences)
3. Using Simulation to Study Communication between Autonomous Vehicles and Vulnerable Road Users (Computer Science/Psychological & Brain Sciences)
4. Understanding Bicyclists' Behaviors Through Learning from Big Trip Data (Business/Public Health/Urban & Regional Planning)
5. Defining Safety-Critical Scenarios for Simulation-Based Automated Vehicle Evaluation - (UW-Madison Engineering/Global Health Institute)
6. Attention and Adaption of Teen Drivers to Driving Automated Systems – (UMass College of Engineering/College of Natural Sciences)

1.5.3 Collaborative research projects across SAFER-SIM or other UTC sites

1. Multi-modal Distributed Simulation Combining Cars, Bicyclists, and Pedestrians (UI/UW/UM)
2. Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists (UI/UM/UCF)
3. Enhancing School Zone and School Bus Safety (UCF/UPR)
4. Evaluation of Safety Enhancements in School Zones with Familiar and Unfamiliar Drivers (UPR/UM)
5. The Impact of Driver's Mental Models of Advanced Vehicle Technologies on Safety and Performance (UI/UM)
6. Analyzing the Performance of Remote-Drivers on Transit Shuttle Short Routes (UW/UPR)
7. Interfacing Synchrono and NADS for Virtual Simulation of Conventional & Connected and Autonomous Vehicles (UW/UI)
8. AAFTS/SaferSim Cooperative Research Program (UI/UM/UW/UCF)

1.5.4 Collaborations with industry partners and government agencies

<i>Organization Name</i>	<i>Location</i>	<i>Contribution</i>
1. UI Injury Prevention Research Center and the Iowa Initiative for Artificial Intelligence	University of Iowa	Financial support In-kind support Facilities Collaborative research Personnel Exchange
2. Recreative Association of Sport Buenaventura	Mayagüez, Puerto Rico	Provided facilities at low cost to perform data collection activities for the project.
3. Mayagüez Bureau of Highway Patrol	Mayagüez, Puerto Rico	The Mayaguez Bureau of Highway Patrol provided Equipment and experienced police officers to measure BAC during the project data collection.

4. Puerto Rico Local Technical Assistance Program (PR-LTAP)	Department of Civil Engineering and Surveying, University of Puerto Rico at Mayaguez	The PR-LTAP Center provided access to their HTC Vive Eye Pro Virtual Reality equipment for its use by the SAFER-SIM researchers during this project.
5. AAA Foundation for Traffic Safety	Washington D.C.	Financial support Collaborative research

1.5.5 Collaborative peer-reviewed journal publications

Nothing to report

1.5.6 Collaborative book chapters

Nothing to report

1.5.7 Student exchanges with other SAFER-SIM sites

Nothing to report

1.5.8 Students pursuing advanced degrees at other SAFER-SIM sites

Nothing to report

1.5.9 Programs involving community colleges

1. University of Wisconsin Shuttle Project involving Gateway Technical College

1.5.10 Graduates hired at SAFER-SIM, other UTC sites, or external organizations

Nothing to report

1.6 Diversity

1.6.1 # SAFER-SIM projects involving underrepresented/minority (U/M) students

10 projects involving 15 students

1.6.2 # U/M events attended

1. 6/27/22: Iowa National Summer Transportation Institute- 21 students
2. 7/14/22: Perry Research Scholars Institute through Belin-Blank summer program- 15 students
3. The mobile version of the UPRM Driving Simulator and the Pedestrian Virtual Reality

Simulator were exhibited at “ Las Catalinas Mall” from July 3 to July 31, 2022. More than 1,500 people were able to interact with the simulator. This activity was also part of a project for the PR Highway and Transportation Authority that was derived from a SAFER-SIM previous project.

1.6.3 # U/M students at attended events

1536 students

1.6.4 Graduating U/M student placement

1. Lakshmi Devi Subramanian, Assistant Professor, Department of Computer Science and Technology, Kean University, Union, New Jersey.
2. Jah'inaya Parker is now a PhD student in Industrial Engineering at the University of Wisconsin Madison.
3. Beatrice Ojuri is now a research coordinator/assistant at Kennedy Krieger Institute.

1.7 Outcomes

1.7.1 Number of improved or new technologies, software, methods, or processes adopted

1. Project Title: Training to Improve Situational Awareness Regarding Operational Design Domain in Driving Automation Systems; PI(s): Shannon Roberts - Through this project, we developed a training program that better informs drivers of the limitations of automated vehicle technology. In comparison to no training and reading a user manual, the training system, which was delivered via PowerPoint, yielded optimal performance (i.e., drivers took back control of the vehicle quickly and efficiently).

1.7.2 Stakeholders who adopt, implement or deploy SAFER-SIM research findings or technologies through policy, practice, regulation, rulemaking or legislation

Nothing to report

1.7.3 Number of projects that reach adoption, implementation or deployment

Nothing to report

1.8 Impacts

1.8.1 Expected reductions in crashes from implemented policy, practice, regulation, rulemaking, or legislation

1. Project Title: Development and Testing of an In-Vehicle Interface for Use in Automated Driving Contexts; PI(s): Shannon Roberts - If the advanced dashboard interface were implemented on a larger scale, more drivers would be aware of automated vehicle functionality and would more closely monitor the technology when it is activated. This would in turn lead to fewer instances of unexpected vehicle behavior (e.g., the vehicle doesn't stop for a pedestrian at an intersection) and fewer

crashes.

2. Project Title: Development and Testing of an In-Vehicle Interface for Use in Automated Driving Contexts; PI(s): Shannon Roberts - Through this project, we developed two interfaces that better informs drivers of the functionality of automated vehicle technology. In comparison to a bare bones interface, the two improved interfaces yielded optimal performance (i.e., drivers took back control of the vehicle quickly and efficiently).

1.8.2 Expected reduction in congestion and traffic conflicts from implemented policy, practice, regulation, rulemaking or legislation

Nothing to report