# SAFER-SIM Accomplishments

April 1, 2019 – September 30, 2019

## 1. Accomplishments

### 1.1 Research Accomplishments

#### *1.1.1 Peer-reviewed journal publications*

Published


1. Pai Mangalore, G., Ebadi, Y., Samuel, S., Knodler, M. A., & Fisher, D. L. (2019). The Promise of Virtual Reality Headsets: Can They be Used to Measure Accurately Drivers' Hazard Anticipation Performance?. Transportation Research Record, https://doi.org/10.1177%2F0361198119847612
2. Zhang, F., Mehrotra, S., Roberts, S. C. (2019). Driving distracted with friends: Effect of passengers and driver distraction on young drivers' behavior. Accident Analysis & Prevention, 132. https://doi.org/10.1016/j.aap.2019.07.022
3. Ebadi, Y., Fisher, D., & Roberts, S. C. (2019). Impact of cognitive distractions on drivers' hazard anticipation behavior in complex scenarios. Transportation Research Record. https://doi.org/10.1177%2F0361198119846463
4. Hamann, C., Schwab-Reese, L. O'Neal, E.E., Butcher, B., Yang, J., & Peek-Asa C. (2019). Family communication patterns and teen driving intervention effectiveness. American Journal of Health Behavior, 43(5), 963-974. https://doi.org/10.5993/AJHB.43.5.8
5. O'Neal, E. E., & Plumert, J. M. (2019). Do mother-child conversations about safety differ in middle- and low-income families? Journal of Injury and Violence Research, 11,171-178. https://doi.org/10.5249/jivr.v11i2.1093
6. O'Neal, E. E., Jiang, Y., Brown, K., Kearney, J. K., & Plumert, J. M. (2019). How does crossing roads with friends impact risk taking in young adolescents and adults? Journal of Pediatric Psychology, 44(6), 726-735. https://doi.org/10.1093/jpepsy/jsz020 Jiang, Y., O'Neal, E. E., Rahimian, P., Yon, J.P., Plumert, J. M., & Kearney, J. K. (2019). Joint action in a virtual environment: Crossing roads with risky vs. safe human and agent partners. IEEE Transactions on Visualization and Graphics, 25, 2886-2895. https://doi.org/10.1109/TVCG.2018.2865945
7. Rahimian, P., O'Neal, E., Plumert, J. M., and Kearney, J. K. (2018). Harnessing vehicle-to-pedestrian (V2P) communication technology: Sending traffic warnings to texting pedestrians. Human Factors, 60 (6), 833-843. https://doi.org/10.1177%2F0018720818781365
8. O'Neal, E. E., Jiang, Y., Franzen, L. J., Rahimian, P., Yon, J. P., Kearney, J. K., & Plumert, J. M. (2018). Changes in perception–action tuning over long time scales: How children and adults perceive and act on dynamic affordances when crossing roads. Journal of Experimental Psychology: Human Perception and Performance, 44, 18-26. https://psycnet.apa.org/doi/10.1037/xhp0000378
9. Rahman, M. H., Abdel-Aty, M., Lee, J., & Rahman, M. S. (2019). Enhancing traffic safety at school zones by operation and engineering countermeasures: A microscopic simulation approach. Simulation Modelling Practice and Theory, 94,

334-348. https://doi.org/10.1016/j.simpat.2019.04.001

Accepted for publication

1. Valdés, D., Colucci, B., Figueroa-Medina, Rojas, M., Colón, E., Taveras, Y. (2019). "Seguridad de Peatones en Zonas Escolares utilizando Simulador de Conducción". Scientific Technical Journal of the Dominican College of Engineers, Architects, and Surveyors (CODIA), Santo Domingo, Dominican Republic. (**approved for publication in 2019 fall-winter issue)**
2. Valdés, D., Colucci, B., Colón, E., García, R., Ruiz, J., Ruiz, B., Taveras, Y. (2019). "Uso de Simuladores de Conducción para evaluar el Comportamiento de los conductores y Mejorar la Seguridad en las Carreteras". Scientific Technical Journal of the Dominican College of Engineers, Architects, and Surveyors (CODIA), Santo Domingo, Dominican Republic. (**approved for publication in 2019 fall-winter issue)**

Submitted

1. Elmquist and D. Negrut, "Methods and Models for Simulating Autonomous Vehicles" under review with IEEE transactions on intelligent vehicles. - Submitted
2. Nassereddine, H., Santiago-Chaparro, K., and Noyce, D., 2019. Advanced Warning System for Safer Interaction Between Vehicles and Vulnerable Road Users. Transportation Research Record: Journal of the Transportation Research Board. Submitted for Presentation and Publication.
3. Nassereddine, H., Santiago-Chaparro, K., Riehl, J. and Noyce, D., 2019. Safely and Effectively Communicating Non-Connected Vehicle Information to Connected Vehicles. Transportation Research Record: Journal of the Transportation Research Board. Submitted for Presentation and Publication.
4. Deliali, A., Campbell, N., Knodler, M., Christofa, E. 2019. Understanding the Safety Impact of Protected Intersections Design Elements-A Driving Simulation Approach. Transportation Research Board Annual Meeting and Transportation Research Record [submitted for presentation and publication]
5. O'Neal, E. E., Zhou, S., Jiang, Y., Kearney, J. K., & Plumert, J. M. (2019). Let's cross the next one: Parental scaffolding of prospective control over movements. Manuscript submitted for publication.
6. Moatz Saad, Mohamed Abdel-Aty, Yina Wu, and Md Sharikur Rahman. Transportation Research Board (TRB), 2020. "Safety and Operational Impact of Connected Vehicles' Lane Configuration Design on Freeway Facilities with Managed Toll Lanes." (Under Review).

### *1.1.2 Book chapters*

1. D. Negrut, A. Elmquist, D. Hatch, P. Ramanathan, R. Serban, "A Connected Autonomous Vehicle Emulator (CAVE) for testing multi-agent, conventional-autonomous mixed traffic scenarios." Advances in Computers and Information in Engineering Research, 2019

2. Christofa, E., Esentehr, S., Pollitt, K., 2019. Chapter 16: Incorporating Health Impacts in Transportation Project Decision Making, Transport and Health, Elsevier.
3. Roberts, S. C., Smith-Doerr, L., Zilberstein, S., Renski, H., Branch, E. H., & Wilkerson, T. (in press). Automation, work, and racial equity: How human systems engineering can shape the future of work. In R. D. Roscoe, E. K. Chiou, & A. R. Wooldridge (Eds.), Advancing Diversity, Inclusion, and Social Justice through Human Systems Engineering. Boca Raton, FL: CRC Press.

### *1.1.3 Edited books*

Nothing to report

### *1.1.4 Conference papers, posters, and symposia*

Presented

1. Poster: A. Elmquist, E. Brandt, and D. Negrut, "Virtual Sensing for Simulating Autonomous Behavior", Computing in Engineering Forum, 2019
2. Safely and Effectively Communicating Non-Connected Vehicle Information to Connected Vehicles. August 22, 2019. 2019 Mid-Continent Transportation Research Symposium. Iowa State University. Ames, IA
3. Valdés, D., Colucci, B., Figueroa-Medina, A., Colón, E., Rojas, M., García, R., Taveras, Y., Ramos, I., Arroyo, C. (2019). "Operational Analysis of School Zones Using a Driving Simulator". American Society of Civil Engineers: International Conference on Transportation & Development, Alexandria, VA.
4. Qin, L., Flockhart, P., Lapets, A., Jansen, F., Bab, K., Varia, M., Roberts, S. C., & Globus-Harris, I. (2019). From usability to secure computing and back again. In Proceedings of the 15th Symposium on Usable Privacy and Security (SOUPS) (pp. 191-210). Santa Clara, CA: Usenix Association.
5. O'Neal, E. E. & Plumert, J. M. (April, 2019). Peer influences on risk taking when crossing roads. Oral Presentation given at the biennial meeting of the Society for Advancement of Violence and Injury Research, Cincinnati, OH.
6. Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, Yina Wu, and Md Sharikur Rahman. International Conference on Transportation and Development 2019: Smarter and Safer Mobility and Cities. Reston, VA: American Society of Civil Engineers. "Safety Analysis of Managed Toll Lanes Considering Connected Vehicles."
7. Deliali, A., Christofa, E., Knodler, M., Tainter, F., Campbell, N., 2019. Assessing the impact of protected bicycle infrastructure on driver behavior. ASCE International Conference on Transportation and Development, June 9-12, Arlington, VA.

Accepted/Not yet presented

1. Paper and presentation: A. Elmquist, D. Hatch, R. Serban, D. Noyce, D. Negrut,

"Sensing Simulation for the Virtual Testing of Autonomous Vehicle Safety and Performance", Road Safety and Simulation Conference, 2019

2. Kelvin Santiago-Chaparro, Madhav Chitturi, Andrea Bill and David Noyce. Evaluation of Vehicle-Pedestrian Interactions at Right Turns with FYA. Road Safety and Simulation 2019. October 2019, Iowa City, Iowa.
3. Valdés, D., Knodler, M., Colucci, B., Figueroa-Medina, A., Rojas, M., Colón, E., Campbell, N., Tainter, F. (2019). "Speed Behavior in a Suburban School Zone: A Driving Simulation Study with Familiar and Unfamiliar Drivers from Puerto Rico and Massachusetts." Applied Human Factors and Ergonomics International Conference, Washington, DC.
4. Zhang, F., Petit, J., & Roberts, S. C. (accepted). A Simulator Study on Drivers' Response and Perception Towards Vehicle Cyberattacks. Human Factors and Ergonomics Society Annual Meeting Proceedings.
5. O'Neal, E.E. & Plumert, J. M. (October, 2019). How does child oppositionality impact parent-child conversations about safety? Poster accepted for presentation at the biennial meeting of the Cognitive Development Society, Louisville, KY.
6. Wang, W., Chakraborty, S., Heitbrink, D., Schwarz, C., Kearney, J.K., Baek, S. (2019). A Distributed Simulation Architecture for Intermodal Safety Research. Road Safety and Simulation International Conference.
7. Jiang, Y., Santiago-Chaparro, K.R., Chakraborty, S., Kearney, J.K. (2019). Multi-modal Distributed Simulation Combining Cars and Pedestrians. Road Safety and Simulation International Conference.
8. Jiang, Y., Santiago-Chaparro, K.R., Chakraborty, S., Kearney, J.K. (2019). The Impact of Vehicle Adaptive Headlamp Systems on Nighttime Bicyclist Safety. Road Safety and Simulation International Conference.
9. Moatz Saad, Mohamed Abdel-Aty, Yina Wu, and Md Sharikur Rahman. Road Safety & Simulation (RSS), 2019. "Safety Analysis of Managed Toll Lanes Considering Connected Vehicles." (Accepted)
10. Rahman, M.H., Abdel-Aty, M., Lee, J., Rahman, S. (2019). Improvement of Traffic Safety at School Zones: Engineering and Operational Countermeasures. Road Safety and Simulation 2019, Accepted.
11. Deliali, A., Campbell, N., Knodler, M., Jr., Christofa, E., 2019. Does the existence and configuration of protected intersections affect bicycle safety at intersections? A driving simulator approach. Road Safety and Simulation Conference, 14-17 October 2019 - Iowa City, IA, USA. [accepted]

<u>Submitted</u>

1. Abstract submitted to SAE World Congress with paper submission pending approval of abstract. Paper is on "A Sensor Simulation Framework for Virtually Assessing Autonomous Vehicle Navigation" by A. Elmquist, R. Serban, D. Negrut
2. Valdés, D., Figueroa-Medina, A., Colucci, B., Rojas, M., Colón, E. (2019). "Evaluation of Driver Performance in an Urban Arterial Highway using a Driving Simulator". Road Safety and Simulation Conference, Iowa City, IA.
3. Valdés, D., Figueroa-Medina, A., Colucci, B., Rojas, M., Bustillo, A., Taveras, Y. (2019). "Innovation in Transportation Safety and Driving Simulation: Puerto Rico

Experience". ITE Florida-Puerto Rico District Annual Meeting, San Juan, Puerto Rico **(**submitted)

4. Pradhan A.K., Pai., G., Radadiya, G., Knodler, M., Fitzpatrick, C., Horrey, W.J., (2019, under review). A Proposed Framework for Identifying and Predicting Operator Errors when Using Advanced Vehicle Technologies. Submitted to Transportation Research Board.

### *1.1.5 Paper/poster awards*

1. Student Poster Award (3rd place) at 2019 MassDOT Transportation Innovation Conference, Worcester, MA, April 9-10, 2019 (Campbell)
2. Honorable mention for the 2019 Honda Outstanding Paper Award - Mangalore, G. P., Ebadi. Y., Samuel, S., Knodler, M. A., Fisher, D. L. (2019, June). Can Virtual Reality Headsets be used to measure accurately drivers' anticipatory behaviors? 10th Annual Driving Assessment Conference, Santa Fe, New Mexico.

### *1.1.6 External grants related to SAFER-SIM*

<u>Awarded</u>

1. Collaborative Research: Predicting Real-time Population Behavior during Hurricanes Synthesizing Data from Transportation Systems and Social Media
    - Funding Agency: National Science Foundation
    - Amount: $210,000
    - Duration: September 1, 2019- August 31, 2022
    - Traffic data analysis done under the SAFER-SIM project have significantly helped to understand certain aspects of hurricane evacuation that will be investigated in the above NSF-funded project.
2. AAAFTS Year 2 Collaboration

<u>Submitted</u>

1. Negrut submitted a proposal for an NSF Engineering Center, which was $25 million. The lead institution was UT-Austin. Other universities involved: University of Iowa, University of Wisconsin, University of California-Merced.
2. The Next Mobile Office for Knowledge Workers: Safe and Productive Work in Automated Vehicles (NSF)
3. Mechanisms for Enhancing Social Interactions with Automated Vehicles (Toyota)
4. NSF Smart Connected Communities-IRG Track 1

## 1.2 Leadership Development Accomplishments

### *1.2.1 Invited presentations*

1. Radu Serban, "Chrono Multiphysics Library: An overview of features, capabilities, and methods from a vehicle mobility perspective," Beijing Institute of Technology, April 2019, Beijing, China.
2. Radu Serban, "An overview of Chrono capabilities from a vehicle mobility

perspective," Multibody Summer School, May 2019, Parma, Italy.

3. Asher Elmquist, "Sensor simulation for autonomous vehicles and robotics," Computing in Engineering Forum, September 2019, Madison, WI.
4. "Camera Simulation for Autonomous Navigation," given by Asher Elmquist for the NATO Exploratory Team (ET-194) on "Mobility Assessment Methods and Tools for Autonomous Military Ground Systems"
5. Radu Serban, "Chrono Multiphysics Library: An overview of features, capabilities, and methods from a vehicle mobility perspective," Computing in Engineering Forum, September 2019, Madison, WI.
6. "Synchrono: An Open Source Multi-Agent Simulation Environment for Connected Autonomous Vehicles," Clemson University, Greenville, SC, April 16, 2019
7. 2020 Applied Ergonomics, Louisville, KY – John Lee
8. 2019 Road Safety and Simulation, Iowa City, IA – John Lee
9. 2019 HFC Forum, Oslo, Norway – John Lee
10. 2019 The Future of Human-Robot Interaction Symposium, TUDelft, Netherlands – John Lee
11. Alberto M. Figueroa Medina, Rising Issues in Highway Safety for Puerto Rico, Luis A. Ferré Activity Hall, May 30th 2019.
12. Benjamín Colucci, Road Safety Audits, 1st International Conference on Highway Engineering, Popayán, Colombia.
13. New England Human Factors & Ergonomics Society 2019 Student Conference, "Distraction due to Drones," April 26th, 2019, Cambridge, MA.
14. New England Intelligent Transportation Society 24th Annual Interchange, "Driver Distraction due to Drones in the Vicinity of Roadways," April 25th, 2019, Manchester, NH.
15. Khalighi, F., and Christofa, E. 2019. Signal Timing Optimization for Improved Mobility and Air Quality, T3e Webinar, ITS PCB Program, Volpe National Transportation Systems Center, 10 April.
16. Shannon Roberts was invited to present her work on driver distraction at the AAA Foundation for Traffic Safety's Workshop on the Effectiveness of Countermeasures Against Distracted Driving in Los Angeles, CA on September 4, 2019.
17. Shannon Roberts was invited to present her work on driving automation systems at the Safer Vehicle and Traffic Safety Centre at Chalmers in Gothenburg, Sweden on August 19, 2019 and at the University of Leeds in Leeds, United Kingdom on August 23, 2019.
18. Shannon Roberts as invited to present her work on how drivers respond to unexpected vehicle events during the Vehicles Symposium: Automated Vehicles Ecosystem End-to-End Cybersecurity in Orlando, FL on July 17, 2019.
19. O'Neal, E.E. Child pedestrians crossing the street and impactions for school bus stops. School Transportation New EXPO, Indianapolis, IN, June 9, 2019.
20. Coalition for Health Funding Public Health Fair, Rayburn Congressional Office Building, Washington D.C. (demonstrated our pedestrian simulator), representing the American Psychological Association (APA) and the Federation of Associations in Behavioral and Brain Sciences (FABBS), September 12, 2019.
    a. Matt Dennis, of CRD Associates; Dave Schwab on the staff of Rep. Rob Bishop (R-UT); Roberto Sada, Legislative Director for Rep.; Frank Pallone

(D-NJ), Rep. Loebsack (D-IA); Katie Murray; Jon Bosworth, with Rep. Blumenauer; Lisa Kaeser, NICHD; Rep. Roybal-Allard (D-CA); Debbie Jessup, Rep. Roybal-Allard; Tiffany Kaszuba, candidate for NJ 4 congressional district; Sharon Wagener on the staff of Rep. Brownley (D-CA); David Hetzel on the staff of Senator Chuck Grassley (R-IA); Anna Breen on the staff of Senator Joni Ernst (R-IA).

21. Kearney - FHWA Turner Fairbank Highway Research Center, toured simulation facilities, demonstrated our pedestrian simulator, and met with Brian Phillips, Stacy Balk, and Jason Williams.
22. The Impact of New Technologies on Pedestrians and Bicyclists, AAA 2018 Forum on the Impact of Vehicle Technologies and Automation on Vulnerable Road Users and Driver Behavior and Performance, American Automobile Association, November 2018.
23. Dr. Mohamed Abdel-Aty: Assessing the Safety Benefits of Connected and Low Level Automated Vehicles, Keynote Speech, 7th International Symposium on Transportation Safety, Shanghai, July 2019.
24. Abdel-Aty: Application of Big Data Analytics and Visualization in Pro-Active Traffic Safety Management, Francis C. Turner distinguished lecture, ASCE Transportation and Development Institute banquet, Alexandria, VA, June 11, 2019.
25. Abdel-Aty: Work Force Development, AASHTO Safety Committee, Jacksonville, May 2019.
26. Abdel-Aty: Current Trends in Traffic Safety Research and the Future Opportunities for Practice, Keynote Speech, 2019 Traffic Safety Conference, Riyadh, March 2019.
27. Abdel-Aty: Advances in Traffic Safety Techniques and Strategies, opening ceremony speech, 2019 Traffic Safety Conference, Riyadh, March 2019.

### *1.2.2 Invited papers*

Nothing to report

### *1.2.3 Invited workshops*

1. Benjamín Colucci, National Cooperative Highway Research Program (NCHRP) Project 20-122, Rural Transportation Issues: Research Road Map.
2. Principals and students from this project have been invited to organize a workshop on Vehicle Automation at the Road Safety and Simulation (RSS) conference, to be held in Iowa City in October 2019.

### *1.2.4 Grant review panels*

1. Dan Negrut: National Science Foundation, Review Panel for the Office of Advanced Cyberinfrastructure
2. Benjamín Colucci, National Cooperative Highway Research Program (NCHRP) Project 20-05, Synthesis Report No. 48-11, Practices in One Lane Traffic Control on a Two-Lane Rural Highway.
3. Freight Mobility Research Institute (FMRI) (Christofa; not a panel)

4. Shannon Roberts served on an NSF proposal review panel.
5. Shannon Roberts continues to serve on a BTSCRP panel for BTS-01: Guidance for Employer-Based Behavioral Traffic Safety Programs for Drivers in the Workplace. For the panel, she provide guidance for the contractor in terms of how drivers will respond to traffic safety programs.
6. Panelist for NSF Civil Infrastructure Systems review panel
7. Samiul Hasan, NSF proposal review panel, May 2019.
8. Samiul Hasan, Reviewed proposals for National Institute for Transportation and Communities (NITC), a national University Transportation Center led by Portland State University, May 2019.

### *1.2.5 Advisory committees*

1. Serban member of the NATO Exploratory Team (ET-194) on "Mobility Assessment Methods and Tools for Autonomous Military Ground Systems"
2. Negrut - member of the NATO Exploratory Team (ET-194) on "Mobility Assessment Methods and Tools for Autonomous Military Ground Systems"
3. Didier Valdés, Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
4. Benjamín Colucci, Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
5. Benjamín Colucci, Panel Member of NCHRP Project (SN4811): Practices in One Lane Traffic Control on a Two-Lane Rural Highway.
6. Benjamín Colucci, Member TRB Committee AHB55 Work Zone Traffic Control.
7. Benjamín Colucci, Member Best Paper Award TRB Committee AHB55 Work Zone Traffic Control.
8. Benjamín Colucci, Member of the Advisory Committee of the Puerto Rico- State Transportation Innovation Council (STIC).
9. Benjamín Colucci, Member of the Advisory Committee of the US Virgin Island-State Transportation Innovation Council (STIC).
10. Benjamín Colucci, 2019 Latin American and Caribbean Consortium of Engineering Institution (LACCEI) International Multi-Conference for Engineering, Education, and Technology Scientific Advisory Board.
11. Benjamín Colucci, Co-Chair of the Traffic Enforcement Committee, International Road Federation.
12. Alberto M. Figueroa-Medina, Member of TRB Committee, AHB 65 Operational Effects of Geometrics.
13. Benjamín Colucci, Member, TRB Standing Committee AND30 "Simulation and Measurements of Vehicle and Operator Performance", 2019-2022.
14. Benjamín Colucci, Co-Chair of the Traffic Enforcement Committee, International Road Federation.
15. Benjamín Colucci, Member, Transportation Forensics and Risk Management (TFARM), Institute of Transportation Engineers (ITE), 2018 – Present.
16. Benjamín Colucci, Member, Transportation Education Council, Institute of Transportation Engineers (ITE), 2017 – Present.
17. Carla López del Puerto, Member, Editorial Board, ASCE Journal of Management in Engineering, 2015 – Present.

18. Great Plains Center for Agricultural Health Internal Advisory Committee (Reyes)
19. UI Injury Prevention Research Center Executive Committee (Reyes)
20. TRB committee on vehicle automation (Schwarz)
21. SAE On Road Automated Driving Simulation Task Force (Schwarz)
22. Engineering Staff Advisory Council – Jacob Heiden
23. Engineering Staff Advisory Council – Jacob Heiden
24. TRB AHB25 Traffic Signal Systems Committee Member and Paper Review Coordinator (Christofa)
25. TRB TADD55 Task Force on Arterials and Public Health Member (Christofa)
26. TRB AND 50, Standing Committee on Traffic Control Devices (Knodler)
27. Transportation Research Board of the National Academies, Standing Committee on Operator Education and Regulation, Member (Reyes)

### *1.2.6 Journal editing*

1. Mathematics and Computers in Simulation (Radu Serban, associate editor)
2. Multibody System Dynamics (Dan Negrut, associate editor)
3. ASME Journal of Computational and Nonlinear Dynamics (Dan Negrut, guest editor)
4. John D. Lee, Human Factors and Ergonomics in Manufacturing and Service
5. Industries, Associate Editor
6. John D. Lee, Cognitive Engineering and Decision Making, Editorial board
7. John D. Lee, Theoretical Issues in Ergonomics Science, Editorial board
8. John D. Lee, IIE Transactions on Occupational Ergonomics Human Factors,
9. Editorial Board
10. John D. Lee, Journal of Experimental Psychology: Applied, Principal reviewer
11. John D. Lee, Committee on Maritime Safety, Transportation Research Board
12. John D. Lee, Cognition, Technology, and Work, Editorial board member
13. John D. Lee, Human Factors, Associate editor
14. Benjamin Colucci, Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, Editor-in-Chief.
15. Benjamín Colucci, ASCE Journal of Legal Affairs and Dispute Resolution, 2019.
16. Benjamín Colucci, Journal of Surveying Engineering, ASCE, 2019.
17. Carla López del Puerto, Associate Editor, ASCE Journal of Legal Affairs and Dispute Resolution, 2019.
18. Guest Editor for Transportation Research Part C: Emerging Technologies Special Issue on “Trajectory-based Modeling, Design, Operation and Assessment of Road Transportation Systems.” (Christofa)
19. Handling Editor, Transportation Research Record (Christofa)
20. Transportation Research Record (reviewer, Reyes)
21. Transportation Research Part F: Traffic Psychology (reviewer, Reyes)
22. IEEE Transactions on Visualization and Computer Graphics, reviewer (Kearney)
23. Transportation Research Board Annual Meeting, reviewer (Kearney)
24. IEEE Virtual Reality Conference, reviewer (Kearney)
25. Spatial Cognition and Computation, editorial board (Plumert)
26. Journal of Experimental Psychology: Applied, editorial board (Plumert)
27. Journal of Experimental Child Psychology, editorial board (Plumert)

28. Samiul Hasan, Associate Editor, Highway Transportation System Security and Emergency Response, Journal of Transportation Safety and Security (JTSS)
29. Samiul Hasan, Associate Editor, Journal of Advanced Transportation

### *1.2.7 Leadership positions in professional organizations*

1. Benjamín Colucci, Member, Board of Directors of the Pan-American Academy of Engineering (PAE), 2018-2020.
2. Benjamín Colucci, Vice-President of the Board of Trustees of the Society of Engineers of Puerto Rico, 2017-2019.
3. Benjamín Colucci, President of the International Relations Commission of the College of Engineers and Surveyors of Puerto Rico (CIAPR), 2017-2019.
4. Benjamín Colucci, President of the Pan-American Transport Systems Committee ( UPADI), 2017-2020.
5. Benjamín Colucci, Vice-President Caribbean Region of the Pan-American Union of Engineers in Association (UPADI), 2015-2019.
6. Benjamín Colucci, Vice-President of the International Society for Maintenance and Rehabilitation of Transport Infrastructures (iSMARTi).
7. Benjamín Colucci, Spokesperson for the Decade of Action Road Safety of Puerto Rico 2011- 2020.
8. Benjamín Colucci, UPRM Manager of the Dwight D. Eisenhower Transportation Fellowship Program for Hispanic Serving Institutions.
9. Benjamín Colucci, Director of Abertis Chair of Puerto Rico.
10. Benjamín Colucci, Member of the Board of Director of the College of Engineering of Surveyors of Puerto Rico-Mayaguez Chapter.
11. Benjamín Colucci, Founder and Director of the Puerto Rico Transportation Technology Transfer Center (PR-LTAP).
12. Benjamín Colucci, Every Day Count (EDC) Program Technical Oversight Director of Puerto Rico PRHTA and U.S. Virgin Island DPW.
13. Benjamín Colucci, El Puente Newsletter, Puerto Rico LTAP Editor-in-Chief, 1986 to present.
14. Benjamin Colucci, Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, President of Editorial Commission, 2015-2019.
15. Member of the Phasing Subcommittee for New England Institute of Transportation Engineers (ITE) Technical Committee Project “Guidelines for Design & Implementation of Advanced Traffic Signal Functions.” (Christofa)
16. Shannon Roberts serves as the Program Chair Elect for Surface Transportation Technical Group of the Human Factors and Ergonomics Society.
17. Scientific Committee, Society for Advancement of Violence and Injury Research, Member (O’Neal).
18. RSS Planning Committee (Reyes, Marshall, Heiden)
19. ACM Symposium on Applied Perception, Steering/Program Committee (Kearney) Barcelona, Spain, September 19-20, 2019

### *1.2.8 SAFER-SIM Webinars*

| Webinar | Date | Registrants | Archived Views |
|---|---|---|---|
| 1. Driver360: A Four Dimensional Scanning System to Better Understand Drivers | 5/22/2019 | 43 | 30 |
| 2. Risk Awareness and Perception Training using Virtual Reality (RAPT-VR) | 6/6/2019 | 55 | 56 |
| 3. Open Source Multi Agent Simulation Environment for Connected Autonomous Vehicles | 6/20/2019 | 33 | 32 |
| 4. Dissecting the Safety Benefits of Protected Intersection Design Features | 8/30/2019 | 25 | 13 |
| 5. Safely and Effectively Communicating Non-Connected Vehicle Information to Connected Vehicles | 9/10/2019 | 19 | 11 |
| 6. Human-Machine Interfaces to Convey Feedback in Automated Vehicles | 9/24/2019 | 62 | 20 |
| | | 237 | 162 |

### *1.2.9 Professional awards*

1. John D. Lee received the Equity and Diversity Faculty Award, a Faculty Recognition Award in 2019
2. John D. Lee received the University Housing's Honored Instructors Award in 2018
3. Benjamín Colucci, 2019 ITE's Wilbur S. Smith Distinguished Transportation Educator Award. For outstanding contribution to the transportation profession by relating academic studies to the actual practice of transportation, 2019, ITE Annual Meeting, Austin, TX.
4. Benjamín Colucci, Dedication of the 81st Annual Assembly of the College of Engineers and Surveyors of Puerto Rico (CIAPR), San Juan, Puerto Rico.
5. Barbara H. and Joseph I Goldstein Outstanding Junior Faculty Award, College of Engineering, University of Massachusetts Amherst (Christofa)
6. American Road &Transportation Builder Association "The Future Industry Spotlight Award", 2019 (Deliali)
7. 2019 Transportation Safety Council Edmund R. Ricker Individual Award, Institute of Transportation Engineering (ITE), July 2019 – Abdel-Aty
8. Real-time crash risk visualization using integrated tools for traffic safety evaluation and management, Stage II winner (2 teams UCF and Ford Motor Company), USDOT Solving for Safety Visualization Challenge, March 2019. – Abdel-Aty
9. Green Cross for Safety Award Excellence finalist. National Safety Council, March 2019 "Recognizes those who have made a significant impact on safety by raising awareness and bringing about change" – Abdel-Aty
10. Francis C. Turner Distinguished Lecture, Alexandria VA, June 2019 – Abdel-Aty

## 1.3 Education and Workforce Development Accomplishments

### *1.3.1 Peer-reviewed journal publications w/ student authors*

1. Pai Mangalore, G., Ebadi, Y., Samuel, S., Knodler, M. A., & Fisher, D. L. (2019). The Promise of Virtual Reality Headsets: Can They be Used to Measure Accurately Drivers' Hazard Anticipation Performance?. Transportation Research Record, https://doi.org/10.1177%2F0361198119847612
2. Ebadi, Y., Fisher, D., & Roberts, S. C. (2019). Impact of cognitive distractions on drivers' hazard anticipation behavior in complex scenarios. Transportation Research Record. https://doi.org/10.1177%2F0361198119846463
3. Rahman, M. H., Abdel-Aty, M., Lee, J., & Rahman, M. S. (2019). Enhancing traffic safety at school zones by operation and engineering countermeasures: A microscopic simulation approach. Simulation Modelling Practice and Theory, 94, 334-348. https://doi.org/10.1016/j.simpat.2019.04.001

### *1.3.2 Book chapters w/ student authors*

1. D. Negrut, A. Elmquist, D. Hatch, P. Ramanathan, R. Serban, "A Connected Autonomous Vehicle Emulator (CAVE) for testing multi-agent, conventional-autonomous mixed traffic scenarios." Advances in Computers and Information in Engineering Research, 2019

### *1.3.3 Conference posters and papers w/ student authors*

1. Paper and presentation: A. Elmquist, D. Hatch, R. Serban, D. Noyce, D. Negrut, "Sensing Simulation for the Virtual Testing of Autonomous Vehicle Safety and Performance", Road Safety and Simulation Conference, 2019
2. Poster: A. Elmquist, E. Brandt, and D. Negrut, "Virtual Sensing for Simulating Autonomous Behavior", Computing in Engineering Forum, 2019
3. Valdés, D., Colucci, B., Figueroa-Medina, A., Colón, E., Rojas, M., García, R., Taveras, Y., Ramos, I., Arroyo, C. (2019). "Operational Analysis of School Zones Using a Driving Simulator". American Society of Civil Engineers: International Conference on Transportation & Development, Alexandria, VA.
4. Valdés, D., Figueroa-Medina, A., Colucci, B., Rojas, M., Colón, E. (2019). "Evaluation of Driver Performance in an Urban Arterial Highway using a Driving Simulator". Road Safety and Simulation Conference, Iowa City, IA.
5. Valdés, D., Knodler, M., Colucci, B., Figueroa-Medina, A., Rojas, M., Colón, E., Campbell, N., Tainter, F. (2019). "Speed Behavior in a Suburban School Zone: A Driving Simulation Study with Familiar and Unfamiliar Drivers from Puerto Rico and Massachusetts." Applied Human Factors and Ergonomics International Conference, Washington, DC.
6. Valdés, D., Figueroa-Medina, A., Colucci, B., Rojas, M., Bustillo, A., Taveras, Y. (2019). "Innovation in Transportation Safety and Driving Simulation: Puerto Rico Experience". ITE Florida-Puerto Rico District Annual Meeting, San Juan, Puerto Rico **(submitted)**
7. Pai Mangalore, G., Ebadi, Y., Samuel, S., Knodler, M., & Fisher, D. (2019). Can

virtual reality headsets be used to measure accurately drivers' anticipatory behaviors?. In Proceedings of the... international driving symposium on human factors in driver assessment, training and vehicle design (Vol. 2019, pp. 342-348). University of Iowa Public Policy Center.
8. Moatz Saad, Mohamed Abdel-Aty, Yina Wu, and Md Sharikur Rahman. Road Safety & Simulation (RSS), 2019. “Safety Analysis of Managed Toll Lanes Considering Connected Vehicles.” (Accepted)
9. Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, Yina Wu, and Md Sharikur Rahman. International Conference on Transportation and Development 2019: Smarter and Safer Mobility and Cities. Reston, VA: American Society of Civil Engineers. “Safety Analysis of Managed Toll Lanes Considering Connected Vehicles.”
10. Rahman, M.H., Abdel-Aty, M., Lee, J., Rahman, S. (2019). Improvement of Traffic Safety at School Zones: Engineering and Operational Countermeasures. Road Safety and Simulation 2019, Accepted.
11. Deliali, A., Christofa, E., Knodler, M., Tainter, F., Campbell, N., 2019. Assessing the impact of protected bicycle infrastructure on driver behavior. ASCE International Conference on Transportation and Development, June 9-12, Arlington, VA.
12. Deliali, A., Campbell, N., Knodler, M., Jr., Christofa, E., 2019. Does the existence and configuration of protected intersections affect bicycle safety at intersections? A driving simulator approach. Road Safety and Simulation Conference, 14-17 October 2019 - Iowa City, IA, USA. [accepted]

### *1.3.4 Paper/poster awards w/ student authors*

1. Student Poster Award (3rd place) at 2019 MassDOT Transportation Innovation Conference, Worcester, MA, April 9-10, 2019 (Campbell)
2. Honorable mention for the 2019 Honda Outstanding Paper Award - Mangalore, G. P., Ebadi. Y., Samuel, S., Knodler, M. A., Fisher, D. L. (2019, June). Can Virtual Reality Headsets be used to measure accurately drivers’ anticipatory behaviors? 10th Annual Driving Assessment Conference, Santa Fe, New Mexico.

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

| **Site** | **Number** |
|---|---|
| University of Iowa | 9 |
| University of Wisconsin Madison | 3 |
| University of Massachusetts Amherst | 13 |
| University of Central Florida | 7 |
| University of Puerto Rico Mayaguez | 6 |

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

| **Site** | **Number** |
|---|---|
| University of Iowa | 11 |

| | |
|---|---|
| University of Wisconsin Madison | 4 |
| University of Massachusetts Amherst | 1 |
| University of Central Florida | 4 |
| University of Puerto Rico Mayaguez | 2 |

### *1.3.7 Student attendance and presentations at the SAFER-SIM symposium*

Nothing to report

### *1.3.8 Transportation-related M.A. and PhD theses*

1. Asher Elmquist, defended his Master's thesis in May 2019, thesis title was "Synthetic Generation of Sensor Data in a Virtual Environment for Simulating Autonomous Behavior"
2. Rahimian, Pooya (2019) The effect of latency on steering behavior in virtual reality [PhD thesis]
3. Moatz Saad, Safety, Operational, and design analyses of managed toll and connected vehicles' lanes. PhD dissertation. Summer 2019
4. Md Sharikur Rahman, Assessing the Safety and Operational Benefits of Connected and Automated Vehicles: Application on Different Roadways, Weather, and Traffic Conditions. PhD dissertation. Summer 2019

### *1.3.9 Curriculum modules developed*

1. Human-computer interaction: Interactive data visualization (Undergraduate/Graduate)
2. Modeling Human-Machine Systems (Graduate)
3. PSY: 3050 Applied Psychology: Real-World Problems, Instructor: Jodie Plumert (module on traffic safety; 4 class periods)

### *1.3.10 Student internships related to SAFER-SIM*

1. UW – 1 intern
2. UI – 5 interns

### *1.3.11 Presentations to student groups or classes*

1. Shannon Roberts presented her perspective on obtaining an engineering degree to 15 high school students in the Massenberg Summer Institute on July 24.
2. Shannon Roberts presented her perspective on life at UMass to incoming graduate students during the Spaulding-Smith/REAL Fellows Orientation on August 28.
3. "Distracted Driving" – talk given at Safer Driver Driver's Education – May 2nd, 2019; June 25th, 2019; Aug. 2nd, 2019. (O'Neal)
4. 4/6/2019 Explore Engineering@Iowa 60
5. 5/14/2019 Cedar Rapids Jefferson High School Tour 6
6. 5/21/2019 Northwest Junior High School STEM Team Visit 11
7. 7/8/2019 Trail Trekkers 15

8. 7/11/2019 Traffic Safety Merit Badge 8
9. 8/2/2019 World Scout Jamboree 1854
10. 9/19/2019 Visiting Japanese Scholars 3

*1.3.12 # Schools visited and # students present*

1. Clemson University (April, 2019): 40 students present (invited lecture)
2. Mississippi State University (May, 2019): 10 students present (invited lecture)
3. Northwestern University (April, 2019): 30 students present (invited lecture)
4. University of Wisconsin-Stout (April, 2019): 30 students present (invited lecture)
5. Beijing Institute of Technology (April, 2019): 20 students present (invited lecture)
6. University of Parma (May, 2019): 40 international students present (summer school)
7. Darmstadt Technical University (July, 2019): 45 international students present (summer school)
8. University of Wisconsin-Madison (May, 2019): 40 students present (invited lecture)
9. Carla Lopez del Puerto, Academia Inmaculada Concepcion, 30 students, Mayaguez, Puerto Rico (September 25th 2019).
10. 4/17/2019 Roosevelt Middle School Visit 150

*1.3.13 # Career fairs visited and # of attendees*

1. Career Fair organized in conjunction with the Computing in Engineering Forum, September 10-11, 2019, University of Wisconsin-Madison, Madison, WI.
2. 4/7/2019 Iowa City STEAM Fest 102
3. 7/23/2019 Johnson County Fair STEM Festival 650

*1.3.14 Summer institutes and programs and # of students participating*

1. July 14-19, 2019, UW organized a summer camp called "Promoting the Computational Science Initiative" (ProCSI). There were 24 participants. Organized by Negrut, ProCSI introduces high school students to the Computational Science discipline. Participants were shown how the fundamental building blocks they are currently learning in high school math, physics, and science classes are connected to advanced concepts in computer science and engineering that they may encounter at the University as a student or in the everyday world around them. The ProCSI schedule of events is available here: https://sbel.wisc.edu/procsi/
2. Summer Transportation Institute 2019 (STI)—14 High School Student, June-July, Department of Engineering and Surveying- UPR
3. Eureka Workshop, Girls Inc., July 2019 – 18 middle school females
4. Shannon Roberts presented concepts on Industrial Engineering and Human Factors to 40 high school students who participated in the UMass Summer Engineering Institute on July 10. The students were also given a tour of the lab facilities, including the driving simulator.
5. 6/17/2019 Iowa Summer Institute in Biostatistics 23
6. 6/20/2019 Women in Science and Engineering Summer Camp 20

7. 7/12/2019 Perry Research Scholars Institute 20

## 1.4 Technology Transfer

### *1.4.1 SAFER-SIM webinars*

6 webinars

### *1.4.2 Registrations for webinars*

237 registrations

### *1.4.3 Views of archived webinar content*

162 views

### *1.4.4 Press releases for SAFER-SIM related research*

NA

### *1.4.5 Media requests*

| Title | Publisher |
|---|---|
| 1. Iowa Senate approves autonomous vehicle regulations | KMA Land |
| 2. Art, science collide in dance | The Daily Iowan |
| 3. Automotive Driving Simulator Market Size, Growth, Trends, Top Players & Future Outlook In Near Years | TechnoBleak |
| 4. 9 signs you could be a distracted driver | The Gazette |
| 5. Combining arts & engineering: NEXUS hosts student open house | The Daily Iowan |
| 6. UCF, Ford Advance in National Contest to Make Driving Safer | UCF Today |
| 7. Big Ten Bucket List - Iowa | Big Ten Network |
| 8. University of Central Florida announced as finalist for prestigious award from NSC | National Safety Council |
| 9. Iowa City plans ahead on handling automated vehicles | The Gazette |
| 10. Talking to Teens Can Lead to Safer Driving | Iowa Now |
| 11. Fact Checker: Are drugs now a bigger factor than alcohol in traffic deaths? | The Gazette |
| 12. UI program teams up with Iowa DOT and Iowa State University for driverless vehicles | The Daily Iowan |
| 13. U.S. Secretary of Transportation Announces Automated Driving System Demonstration Grant Winners | US Department of Transportation |
| 14. University of Iowa awarded $7 million from US DOT to test driverless technologies | The Gazette |
| 15. UI wins $7M grant to study autonomous vehicles in rural Iowa | CBJ Business Daily |
| 16. DOT Announces $60 Million in Grants for Automated Projects | Transportation Topics |

| | |
|---|---|
| 17. U.S. DOT announces $60 million in AV research grants | Automotive News |
| 18. DOT announces the remaining eight grants in its ADS Demonstration program | Microsoft News |
| 19. University of Iowa driving simulator awarded $7 Million federal grant | KCRG |
| 20. $7.1 million federal grant to help NADS study automated vehicles on rural roads | The University of Iowa |
| 21. Demonstrating Research on Cognitive Functioning in Virtual Reality to Lawmakers | FABBS |

### *1.4.6 Tours of facilities*

1. On June 19, 2019, the mayor of Racine County and engineers from the city of Racine visited the driving simulator and the participants drove the scenario used in the experiment.
2. A tour of the facilities was conducted for ESPN fame on August 6, 2019. The tour was attended by 5 people.
3. 9/4/2019 Jennifer McBride
4. 6/11/2019 Jeremy Raw- FHWA
5. 5/20/2019 FHWA visitors
6. 4/16/2019 Shive-Hattery
7. 4/24/2019 Aisin
8. 5/7/2019 Iowa Federal District Legislative Staff
9. 8/9/2019 Toyota
10. 8/15/2019 NHTSA
11. 8/16/2019 Seoul Institute of Technology
12. 8/29/2019 Harman
13. 9/13/2019 Governor's Empower Rural Iowa Initiative Meeting
14. 9/17/2019 NTSB

### *1.4.7 Website traffic*

| **Metric** | **This Period** | **Lifetime** |
|---|---|---|
| Total Users | 2736 | 5630 |
| New Users | 2710 | 5630 |
| Sessions | 4461 | 9400 |
| Page Views | 8406 | 27,704 |

### *1.4.8 Patents filed*

Nothing to report

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

1. Effectiveness of Bicycle Boxes in Massachusetts, Massachusetts Department of

Transportation

### *1.4.10 Practitioner attendance at events*

43 industry members registered for Simulation Boot Camp

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

1. Chrono::Sensors module – the project focuses on establishing a library of sensors that is open source and publicly available. For most of it, it's based off the race-tracing package called OptiX.
2. Virtual world representation framework – a simulation technology with the goal to establish an infrastructure that allows one to generate virtual worlds that work hand-in-hand with the sensor library being developed.
3. New approach to defining, identifying, and designing scenarios to examine driver behaviors in driving simulation to assess errors and mental models.
4. We developed a simple way to simulate the regenerative braking levels observed in the Tesla. Future work would be to more completely model the dynamics of the Tesla vehicle and powertrain.

## 1.5 Collaboration

### *1.5.1 Attendance at the SAFER-SIMposium*

Nothing to report

### *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)

### *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)

### *1.5.4 Collaborations with industry partners and government agencies*

| *Organization Name* | *Location* | *Contribution* |
|---|---|---|
| 1. Aisin Technical Center of America | Northville, MI | Financial support |
| 2. AAA Foundation for Traffic Safety | Washington D.C. | Financial support<br>Collaborative research |
| 3. InSight Learning Technologies | Pacific Palisades, CA | Personnel exchange |
| 4. Mandli Communications Inc. | Madison, WI | In-kind support<br>Facilities<br>Collaborative Research |
| 5. Continental Mapping Consultants Inc | Madison, WI | In-kind support<br>Facilities<br>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*

Nothing to report

### *1.5.10 Graduates hired at other SAFER-SIM or UTC sites*

Nothing to report

## 1.6 Diversity

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

1. Safely and Effectively Communicating Non-Connected Vehicle Information to Connected Vehicles through Field- and Driving Simulator-Based Research – UW
2. Augmented Reality for Safer Pedestrian-Vehicle Interactions – UW
3. Detailed Analysis of Roadway Users Interactions at Intersections with Flashing Yellow Arrows - UW
4. V2I Infrastructure Placement and Safety Implications of CAVs in an Interconnected Network - UCF
5. Assessing the Effectiveness of Connected Vehicle Technologies based on Driving Simulator Experiments - UCF
6. Enhancing School Zone and School Bus Safety - UPR
7. Assessing the Impact of Smartphone Usage While Driving in Work Zones - UPR
8. Evaluation of Safety Enhancements in School Zones with Familiar and Unfamiliar Drivers – UPR
9. Study of Gap Acceptance and Walking Speeds of Pedestrians using Virtual Reality Simulation - UPR
10. DRIVER' SAFETY ASSESSMENT IN TWO-LANE RURAL ROADS WORK ZONES - UPR
11. ASSESSING A TWO-STEP POSTED SPEED REDUCTION AS A POTENTIAL COUNTERMEASURE TO IMPROVE SAFETY IN SCHOOL ZONES USING DRIVING SIMULATION - UPR
12. Drivers' Performance and Brain Workload Activities after Alcohol Consumption using Driving Simulation – UPR
13. The Impact of Driver's Mental Models of Advanced Vehicle Technologies on Safety and Performance – UM
14. Training to Improve Situational Awareness Regarding Operational Design Domain in Driving Automation Systems – UM
15. Multi-modal Distributed Simulation Combining Cars, Bicyclists, and Pedestrians – UM
16. Development and Testing of an In-Vehicle Interface for Use in Automated Driving Contexts – UM
17. Protected Intersection Design for Safer Cycling – UM
18. Risk Awareness and Perception Training using Virtual Reality (RAPT-VR) – UM
19. Integrating Traffic Control Devices via Augmented Reality – UM
20. To Trust or Not to Trust? A Simulation-based Experimental Paradigm – UM
21. Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists – UM
22. The Influence of Unmanned Aerial Systems on Driving Performance – UM
23. Using Simulation to Study Communication between Autonomous Vehicles and Vulnerable Road Users – UI
24. Multi-modal Distributed Simulation Combining Cars, Bicyclists, and Pedestrians - UI
25. Understanding Bicyclists' Behaviors Through Learning from Big Trip Data – UI
26. Using Simulation to Assess and Reduce Conflicts between Drivers and Bicyclists – UI
27. Extended Evaluation of Training Programs to Accelerate Hazard Anticipation Skills in Novice Teen Drivers – UI

28. Mobile Applications to Help Older Adults Make Safe Street-Crossing Decisions – UI

### *1.6.2 # U/M events attended*

1. Shannon Roberts served on a panel focused on Women in Science for undergraduate female students on April 17.
2. Shannon Roberts and Yalda Ebadi presented concepts on Human Factors and Transportation Safety to 18 middle school females who participated in the Girls, Inc. Eureka Program on July 8 and 9. The students also had an opportunity to experience the driving simulator as well as microsimulation
3. On June 18, 2019 and as part of an event organized by the Society of Women Engineers, a group of 75 high school girls visited the driving simulator. The event was part of a larger event known as Engineering Tomorrow's Careers Camp held at UW-Madison.
4. Advancing Women In Transportation
5. Femineers Summit – 31 students

### *1.6.3 # U/M students at attended events*

124

### *1.6.4 Graduating U/M student placement*

1. Enid M. Colón Torres, Master of Science in Civil Engineering (MSCE), completed all the requirements in June 2019. Current job Federal Highway Administration (FHWA), Nashville, TN.