



**PROGRAM PROGRESS PERFORMANCE REPORT FOR  
UNIVERSITY TRANSPORTATION CENTERS**

**Submitted to:** US Department of Transportation,  
Research and Innovative Technology Administration

**Federal Grant No:** DTRT13-G-UTC53

**Project Title:** Safety Research Using Simulation (SAFER-SIM)

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**Submitting Official:** Same as Program Director

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**Recipient Organization:** The University of Iowa  
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**Recipient Identifying Grant Program No.:** 15311500

**Project/Grant Period:** 10/21/13 – 9/30/2018

**Reporting Period End Date:** 03/31/2018

**Report Term or Frequency:** Semi-annual

**Signature of Submitting Official:**

## Overview

SAFER-SIM continues its high standard of work in safety research, leadership development, education and workforce development, technology transfer, collaboration, program efficacy, and diversity. As Safety Research using Simulation (SAFER-SIM) University Transportation Center nears the end of the 2013 grant performance period, significant successes can be noted. Of the 43 projects funded by this grant, 8 projects have submitted final reports in this period, with the final two expected to submit reports early in the next reporting period. Six (6) webinars featuring SAFER-SIM research were hosted that had a total of 174 registrants for the live presentations and 128 views of recordings. Five (5) students have earned degrees during this performance period and seven (7) have found employment. SAFER-SIM outreach has interacted with 37,815 students in the past reporting period. Subscriptions to our newsletter continues to grow and has reached 352 individuals from academia, government and industry.

A copy of this report can be found on the SAFER-SIM website on the “Reports” tab under “2013 UTC” or at the following URL: [http://safersim.nads-sc.uiowa.edu/reports\\_2015.php](http://safersim.nads-sc.uiowa.edu/reports_2015.php)

## 1. Accomplishments

### a. Goals and objectives of the program

The goal of the SAFER-SIM University Transportation Center is to use simulation techniques to address the safety issues prioritized by the US DOT. Specifically, our center has identified seven areas of activity:

#### 1. Research Activities

##### *Funded Projects*

SAFER-SIM research projects continued making progress on research tasks. Eight (8) research projects completed this period (*Table 1: Completed Research Projects this Period*). Overall, the UTC funded forty-three (43) individual and collaborative research projects as well as education-related projects. Thirty-three (33) have submitted all deliverables and are complete. Two (2) additional projects have completed in April and will be reported next period. The remaining eight (8) have submitted final reports and are in the review process. These active projects are in the final phases and will be complete by the end of the next period. The center did not issue an RFP this period and will not issue any more RFPs with the 2013 grant.

**Table 1: Completed Research Projects this Period**

Research Project Title	School(s)	Accession #
Effectiveness of In-Vehicle Virtual Traffic Control Devices  (Report title: <i>Examining the Effects of a Signless Roadway: Holographic Traffic Control Devices and their Potential for Replacing Traditional Post-Mounted Traffic Control Devices</i> )	UW	<a href="#">01624548</a>

Using Naturalistic Driving Data to Develop Simulator Scenarios	UI	<a href="#">01659823</a>
The Impact of Vehicle Automation on the Safety of Vulnerable Road Users (Pedestrians and Bicyclists)	UMA	<a href="#">01667139</a>
Analysis of Driver Performance and Operations at Intersections Auxiliary Through Lanes  (Report title: <i>Analysis of Driver Behavior and Operations at Intersection Short Lanes</i> )	UMA	<a href="#">01654255</a>
Visually Impaired Pedestrian Safety at Roundabout Crossings	UMA	<a href="#">01659824</a>
A Driving Simulator Evaluation of Cross-Sectional Design Elements and the Resulting Driver Behaviors	UMA	<a href="#">01654257</a>
Driving Simulator Evaluation of Countermeasures to Improve Pedestrian and Bicycle Safety  (Report title: <i>Evaluating Countermeasures to Improve Pedestrian and Bicycle Safety</i> )	UW	<a href="#">01653392</a>
Automating the Transportation Design to Simulator Model Process *	UI	<a href="#">01599018*</a>

**\*Final Report submitted to TRID but not posted yet**

Important information pertaining to SAFER-SIM research projects – including titles, abstracts, PIs, sites, and associated reports and summaries – can be accessed from the following webpage: <http://safersim.nads-sc.uiowa.edu> then clicking on the “Research” tab.

*Webinars*

SAFER-SIM continues sponsoring a monthly webinar series relating to SAFER-SIM research projects. These webinars highlight the expertise of consortium researchers to interested individuals, such as researchers from other consortium sites and universities, employees within the Department of Transportation and other agencies, and professionals from the transportation industry. Presenters gain experience sharing their research findings with an audience. The webinars are recorded and uploaded onto the SAFER-SIM YouTube channel so they can be viewed and shared anytime.

SAFER-SIM sponsored six (6) webinars during this reporting period (

Table 2: Webinars Presented this Period). The remaining webinars are scheduled and will be presented in the final reporting period.

**Table 2: Webinars Presented this Period**

<b>Title</b>	<b>Date</b>	<b>School(s)</b>	<b>Registrants</b>	<b>YouTube Views</b>
Enhancing Non-Motorized Safety by Simulating Non-Motorized Exposure using a Transportation Planning Approach	10/3/2017	UCF	49	17
Automating The Transportation Design to Simulator Model Process	12/5/2018	UI	20	Recording issues
Distributed Simulation to Support Driving Safety Research	12/12/2018	UI	28	30
Using Driving Simulation for Virtual Road Safety Audits	2/27/2018	UW	29	46
Examining Distracted Drivers' Underestimation of Time and Overestimation of Speed	3/13/2018	UMA	23	17
Global Road Safety Online Course Development	3/27/2018	UI	25	18
<b>Total</b>			<b>174</b>	<b>128</b>
<b>Total Registrants and YouTube Views</b>				<b>302</b>

These webinars and past webinars can be found on the SAFER-SIM YouTube channel at the following URL: [https://www.youtube.com/channel/UCE8CN3JX8\\_mkAf8d8-UPzKQ](https://www.youtube.com/channel/UCE8CN3JX8_mkAf8d8-UPzKQ). The channel currently has thirty-three (33) videos total with 2263 views.

*Projects funded by other agencies*

- University of Wisconsin – Madison
  - Project Title: Evaluation of Change and Clearance Intervals Prior to the Flashing Yellow Arrow Permissive Left-Turn Indication. Funding Agency: NCHRP. Project Id: NCHRP 03-125

## 2. Leadership Development

*Students involved in SAFER-SIM projects*

SAFER-SIM students are an integral part of the University Transportation Center. The students learn under faculty/staff researchers and build a solid research foundation. By the time they graduate, they are skilled professionals with quality experiences and invaluable connections gained through SAFER-SIM. Forty-eight (30) college students worked on SAFER-SIM projects this period (*Table 3: Student Breakdown*). As projects funded by this grant become complete, it is expected the number of students supported will decline. For example, at the University of Iowa, all projects involving students have completed and so none are reported for this period.

**Table 3: Student Breakdown**

Site	# Students	Postsecondary Level
University of Iowa	0	0
University of Wisconsin – Madison	9	8 Masters 1 Undergraduate
University of Massachusetts – Amherst	14	1 Doctoral 12 Masters 1 Undergraduate
University of Central Florida	3	2 Doctoral 1 Masters
University of Puerto Rico – Mayaguez	4	4 Masters
<b>Totals</b>	30	3 Doctoral 25 Masters 2 Undergraduate

## *SAFER-SIM Symposium*

SAFER-SIM symposia have been held at all five sites since the beginning of the grant. The final symposium was held at the **University of Iowa** in October 2016. Due to the success of previous symposia, SAFER-SIM continues these symposia under the 2016 grant to encourage collaboration and leadership development among UTC researchers and students.

### *Peer Review Publications – 13 publications*

- University of Central Florida
  - Karaaslan, E., Noori, M., Lee, J., Wang, L., Tatari, O., and Abdel-Aty, M. (2017). “Modeling the effect of electric vehicle adoption on pedestrian traffic safety: an agent-based approach.” Accepted to Transport Part C
  - Wu, Y., Abdel-Aty, M., Ding, Y., Jia, B., Shi, Q., & Yan, X. (2017). Comparison of proposed countermeasures for dilemma zone at signalized intersections based on cellular automata simulations. Accident Analysis & Prevention.
  - Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, and Ling Wang (2018). Access Design Safety Analysis for Managed Lanes Including Accessibility Level and Weaving Length. Transportation Research Board 97th Annual Meeting, Accepted.
  - Qing Cai, Moatz Saad, Mohamed Abdel-Aty, Jinghui Yuan, and Jaeyoung Lee (2018). Safety Impact of Weaving Distance on Freeway Facilities with Managed Lanes Using Both Microscopic Traffic and Driving Simulations. Transportation Research Board 97th Annual Meeting, Accepted.
  - Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, and Ling Wang (2018). “Determining the optimal access design of managed lanes considering dynamic pricing.” Road Safety on Five Continents (RS5C), Accepted.
  - Qing Cai, Moatz Saad, Mohamed Abdel-Aty, Jinghui Yuan, and Jaeyoung Lee (2018). Safety Analysis of Access Zone Design for Toll Managed Lanes on Freeways. Poster Presentation during UCF SaferSIM symposium, February 2018.
  - Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, and Ling Wang (2018). Fusion Of Safety And Operation Analysis For Toll Managed Lanes Access Design. ITS World Congress, Submitted.
  
- University of Iowa
  - Rahimian, P., O’Neal, E. E., Zhou, S., Plumert, J. M., and Kearney, J. K. (2017). Harnessing vehicle-to-pedestrian (V2P) communication technology: Sending traffic warnings to texting pedestrians. Manuscript submitted for publication
  
- University of Massachusetts – Amherst
  - Tainter, F., Ryan, A., Fitzpatrick, C., Christofa, E., Knodler, M. (Accepted for Publication). “Evaluation of Downstream Merge Behaviors Resulting from Driver Lane Choice: A Driving Simulator Study” Transportation Research Record: Journal of the Transportation Research Board.

- Fitzpatrick, Cole D., Siby Samuel, and Michael A. Knodler Jr. "The use of a driving simulator to determine how time pressures impact driver aggressiveness." *Accident Analysis & Prevention* 108 (2017): 131-138.
- Valdés, Didier, Benjamín Colucci, Michael Knodler, Donald Fisher, Bryan Ruiz, Johnathan Ruiz, Ricardo García, Enid Colón, and Foroogh Hajiseyedjavadi. "Comparative analysis of toll plaza safety features in Puerto Rico and Massachusetts with a driving simulator." *Transportation Research Record: Journal of the Transportation Research Board* 2663 (2017): 1-11.
- Keklikoglou, Andronikos, Fitzpatrick, Cole D., and Michael Knodler. "Examining Distracted Drivers' Underestimation of Time and Overestimation of Speed." *Transportation Research Record* (accepted for publication). 2018
- AAP Special Issue-Simulation of Traffic Safety in the Era of Advances in Technologies 2018: "Effectiveness of Visual Warnings on Young Drivers Hazard Anticipation and Hazard Mitigation Abilities"

#### *Conference Presentations and Papers – 16 presentations and papers*

- University of Central Florida
  - Yasmin. S., T. Bhowmik, M. Rahman and N. Eluru (2018). "Enhancing Non-Motorized Safety by Simulating Non-Motorized Exposure using a Transportation Planning Approach", Presented at the Transportation Research Board (TRB) Annual Meeting, Washington D.C., 2018.
  - Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee (2018). Analysis of Driving Behavior at Expressway Toll Plazas Using Driving Simulator. Poster Presentation during UCF SAFER-SIM symposium, February 2018.
  - Moatz Saad, Mohamed Abdel-Aty, Jaeyoung Lee, and Ling Wang (2018). Safety Impact of Weaving Distance on Freeway Facilities with Managed Lanes Using Both Microscopic Traffic and Driving Simulations. Presentation during UCF SAFER-SIM symposium, February 2018.
  - Juneyoung Park, Mohamed Abdel-Aty, Yina Wu, Ilaria Mattei. Optimization of in-vehicle warning and assistance information design under reduced visibility in connected vehicle environment (18-00716), Submitted for Presentation at 97th Annual Meeting of the Transportation Research Board, Washington, D.C.
  - Yina Wu, Mohamed Abdel-Aty, Juneyoung Park, Jiazheng Zhu. Effects of Connected-Vehicle Warning Systems on Rear-End Crash Avoidance Behavior under Fog Conditions (18-01064), Submitted for Presentation at 97th Annual Meeting of the Transportation Research Board, Washington, D.C.
  
- University of Iowa
  - Rahimian, P., O'Neal, E. E., Zhou, S., Yon, J.P., Franzen, L., Plumert, J.M., & Kearney, J.K. (January, 2018). Vehicle-to-pedestrian (V2P) communications technology: Do cell phone warnings improve road-crossing safety for texting pedestrians? Poster presented at the 97th Transportation Research Board annual meeting, Washington, D.C.
  
- University of Massachusetts – Amherst

- Tainter, F., Ryan, A., Fitzpatrick, C., Knodler, M., (2018). "Evaluation of Downstream Merge Behaviors Resulting from Driver Lane Choice: A Driving Simulator Study" Transportation Research Board of the National Academies, Washington D.C. 97th Annual Meeting.
  - Nicholas Fournier, Eleni Christofa, and Michael A. Knodler. Bicycle Infrastructure from the Driver's Seat: Evaluating Bicycle Infrastructure Using a Driving Simulator. No. 17-01981. 2017.
  - Tainter, F., (2018). "All-Red Clearance Intervals for Use with Flashing Yellow Arrows in the Left-Turn Application" Transportation Research Board of the Academies, Washington D.C. 97th Annual Meeting.
  - Elizabeth Casola. "Driver Understanding of the Flashing Yellow Arrow and Dynamic No Turn on Red Sign for Right Turn Applications" Presented at SaferSim UTC Symposium, February 2018
  - Sabhanayaga, A., Khalighi, F., Hajiseyedjavadi, F., Christofa, E., Knodler, M., 2017. Impact of S-Curves on Speed in a Modern Roundabout, Road Safety & Simulation International Conference, 17-19th October, The Hague, Netherlands. [accepted]
  - Keegan, A., Gonzales, E.J., Christofa, E. (2018). Evaluating the effect of freight deliveries on arterials and optimizing real-time signal control. Paper Number 18-05141. Transportation Research Board 97th Annual Meeting, 7-11 January, Washington, D.C.
  - "The Use of Driving Simulation to Determine How Perception of Time Impacts Driver Aggressiveness" Presenter. Doctoral Student Research in Transportation Operations and Control, Transportation Research Board Annual Meeting, January 2017.
- University of Puerto Rico – Mayaguez
    - Ruiz, B., J. Ruiz, R. García, E. Colón, Valdés, D. and B. Colucci. Operational and Safety Performance of Signage and Pavement Markings Managed Lane Using a Driving Simulator. Transportation Research Board, 18-06230.
  - University of Wisconsin – Madison
    - Alsghan, K. R. Santiago-Chaparro, A. R. Bill, and D. A. Noyce, "Evaluating Countermeasures to Improve Pedestrian and Bicycle Safety," presented at the Transportation Research Board 97th Annual Meeting, Washington, DC, 2018.
    - I. Alsghan, K. R. Santiago-Chaparro, A. R. Bill, and D. A. Noyce, "Evaluating Countermeasures to Improve Pedestrian and Bicycle Safety," presented at the SaferSim Symposium, Orlando, FL, Feb-2018.

#### **Awards – 3 awards**

- University of Central Florida
  - Keya N., S. Anowar, and N. Eluru (2018), "Freight Mode Choice: A Regret Minimization and Utility Maximization Based Hybrid Model," forthcoming Transportation Research Record – Best Paper Award Recipient of the Transportation Research Board (TRB) Freight Transportation Planning and Logistics (AT015) Committee
  - Lee, J., Abdel-Aty, M., Cai, Q., Wang, L. (2018). Analysis of Fatal Traffic Crash-Reporting and Reporting-Arrival Time Intervals of Emergency Medical Services. TRB 97th Annual



Meeting. 2017 – Best Paper Award from the Transportation Research Board (TRB) Committee on Transportation Safety Management (ANB10)

- University of Iowa
  - Elizabeth O’Neal – Safety Research Using Simulation (SAFER-SIM) CUTC Student of the Year

*Invited Presentations – 13 presentations*

- University of Central Florida
  - Abdel-Aty, Mohamed. Assessment of the Safety Benefits of Connected Vehicles Technologies, Distinguished Transport Lecture Series 2018, University of Honk Kong, March 2018.
  - Abdel-Aty, Mohamed. Keynote speech, Big Data Applications in Pro-Active Traffic Management, The Eighth Traffic Safety Conference, Amman, Jordan, Dec. 12-14.
  - Abdel-Aty, Mohamed. Plenary speech and panelist, Connected-Autonomous Vehicles (CAV): Background, Challenges and Opportunities, International Road Federation Congress, Dubai, Oct 2017.
  - Lee, Jaeyoung. Invited lecture, “Transportation Safety Planning and Effects of Policies on Traffic Safety”, South China University of Technology, Feb 2018.
  - Lee, Jaeyoung. Invited presentation, “Analysis of Fatal Traffic Crash-Reporting and Reporting-Arrival Time Intervals of Emergency Medical Services”, Transportation Safety Management Committee (ANB10), Transportation Research Board, Jan 2018
  - Lee, Jaeyoung. Invited presentation, “Transportation Safety Planning: Recent Methodologies, Applications, and Implications”, Transportation Safety Planning Subcommittee (ANB10(3)), Transportation Research Board, Jan 2018
  - Lee, Jaeyoung. Invited lecture, “Transportation Safety Management: Proactive and Reactive Countermeasures”, Tongji University, Dec 2017.
  - Lee, Jaeyoung. Invited lecture, “Transportation Safety Management: Safety Planning, Policy, and Emergency Medical Services”, Southwest Jiaotong University, Dec 2017.
  - Lee, Jaeyoung. Invited seminar, “Transportation Safety Planning: Integration of Travel Behavior and Safety”, Korea Railroad Research Institute, Dec 2017.
- University of Massachusetts – Amherst
  - Invitation for Eric Gonzales to speak at Northwestern University, Evanston Illinois, April 26, 2018.
  - Invitation for Cole Fitzpatrick (faculty) to give a seminar at Oregon State University May 2018
- University of Wisconsin – Madison
  - On November 17, 2017 Andrea Bill made a presentation about the research activities that take place at the TOPS Lab (including the VRSA project) to the Oregon Middle School in Wisconsin.

- Andrea Bill has been invited to present the status of the FYA research at UW-Madison to the attendees of the upcoming Traffic Engineering Workshop and Transportation Planning Forum in April 2018

*Journal editing and reviewing activity – 20 journals, 14 reviewers*

- Accident Analysis and Prevention
- Advances in Transportation Studies
- American Journal of Public Health
- Case Studies on Transport Policy
- IEEE Intelligent Transportation Systems Magazine
- Injury Prevention
- International Journal of Sustainable Transportation
- Journal of Network and Computer Applications
- Journal of Safety Research
- Journal of Traffic and Transportation Engineering
- Journal of Transportation Engineering: Part A
- Journal of Transportation Safety & Security
- KSCE Civil Engineering
- Preventive Medicine
- Safety Science
- Traffic Injury Prevention
- Transportation Research Part B
- Transportation Research Part C
- Transportation Research Record
- Transportmetrica A: Transport Science

*Leadership positions in professional organizations –24 leadership positions*

- Francis Tainter
  - Institute of Transportation Engineers (ITE), 2014-Present, Student – UMass ITE Student Chapter President (2015-2017)
- Alyssa Ryan
  - Institute of Transportation Engineers (ITE), 2014- Present, Student – UMass ITE Student Chapter President (2017-2018)
- Ricardo García
  - President of the ITE UPRM Student Chapter, August 2017 to present, student.
- Enid Colón
  - Secretary of ITE UPRM Student Chapter, August 2017 to present, student.
- Benjamín Colucci
  - Vice-President of the Board of Trustees of the Society of Engineers of Puerto Rico, 2017-2020, faculty.

- President of the International Relations Commission of the College of Engineers and Surveyors of Puerto Rico (CIAPR), 2017-2019, faculty.
- President of the Pan-American Transport Systems Committee, UPADI, 2016-2020, faculty.
- Vice-President Caribbean Region of the Pan-American Union of Engineers in Association (UPADI), 2015-2019, faculty.
- Vice-President of the International Society for Maintenance and Rehabilitation of Transport Infrastructures (iSMARTi), 2016 to present, faculty.
- Spokesperson for the Decade of Action Road Safety of Puerto Rico 2011-2020, faculty.
- Co-Chair of the Traffic Enforcement Committee, International Road Federation, 2014-present, faculty.
- UPRM Manager of the Dwight D. Eisenhower Transportation Fellowship Program for Hispanic Serving Institutions, 1994 to present, faculty.
- Director of Abertis Chair of Puerto Rico, 2012 to present, faculty.
- Member of the Board of Director of the College of Engineering of Surveyors of Puerto Rico-Mayaguez Chapter, 2016-Present, faculty.
- Founder and Director of the Puerto Rico Transportation Technology Transfer Center (PR-LTAP), 1986 to present, faculty.
- Every Day Count (EDC) Program Technical Oversight Director of Puerto Rico PRHTA and U.S. Virgin Island DPW, 2012 to present, faculty.
- El Puente Newsletter, Puerto Rico LTAP Editor-in-Chief, 1986 to present, faculty.
- Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, Editor-in-Chief, 2015- Present, faculty.
- Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
- LACCEI International Multi-Conference for Engineering, Education, and Technology
- Dimension Journal of the College of Engineers and Surveyors of Puerto Rico, Editor-in-Chief
- Didier Valdés
  - Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
  - LACCEI International Multi-Conference for Engineering, Education, and Technology
- Mohamed Abdel-Aty
  - Editor-in-Chief, Accident Analysis & Prevention

*Invitations to Panels and Advisory Committees – 23 panels and committees*

- University of Iowa
  - Dawn Marshall
    - Member of TRB Standing Committee on User Information Systems (AND20)
    - Chair of TRB Human Factors of In-Vehicle Systems, AND20(1), Joint Subcommittee of AND20, AND10
  - Timothy Brown
    - Member of TRB Standing Committee on Alcohol, Other Drugs, and Transportation (ANB50)
  - Chris Schwarz
    - Member of TRB Standing Committee on Vehicle-Highway Automation (AHB30)

- John Gaspar
  - Member of TRB Standing Committee on User Information Systems (AND20)
- Omar Ahmad
  - Co-chair of TRB Standing Committee on Simulation and Measurement of Vehicle and Operator Performance (AND30) (co-chair)
  - Member of TRB Section - Users Performance (AND00)
  - Member of TRB Standing Committee on Motorcycles and Mopeds (ANF30)
- University of Massachusetts – Amherst
  - Francis Tainter
    - All-Red Clearance Intervals for Use with Flashing Yellow Arrows in the Left-Turn Application – TRB Eisenhower “Every Day Counts” Panel
  - Mike Knodler
    - Member of TRB AND50 Standing Committee on Traffic Control Devices
  - Eleni Christofa
    - Member of TRB AHB25 Traffic Signal Systems Committee, 2013-2020
    - Member of TADD55 Task Force on Arterials and Public Health, 2015-2018
  - Eric Gonzales
    - Member of TRB Standing Committee AHB45 Traffic Flow Theory and Characteristics
    - Member of TRB Standing Committee AP060 Paratransit
- University of Puerto Rico – Mayaguez
  - Didier Valdés
    - Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
  - Benjamín Colucci
    - Applied Human Factors and Ergonomics (AHFE 2017-Present) Scientific Advisory Board.
    - Panel Member of NCHRP Project (SN4811): Practices in One Lane Traffic Control on a Two-Lane Rural Highway
    - Member Best Paper Award TRB Committee AHB55 Work Zone Traffic Control
    - Member of the Advisory Committee of the Puerto Rico-State Transportation Innovation Council (STIC)
    - Member of the Advisory Committee of the US Virgin Island-State Transportation Innovation Council (STIC)
    - Latin American and Caribbean Consortium of Engineering Institution (LACCEI) International Multi-Conference for Engineering, Education, and Technology Scientific Advisory Board
    - Co-Chair of the Traffic Enforcement Committee, International Road Federation.

### **3. Education and Workforce Development**

SAFER-SIM consortium members continue to engage students of all levels in transportation, safety, and STEM (science, technology, engineering, and math). Sites organize and participate in

events focusing on students and members of the workforce. A description of each event can be found on the SAFER-SIM website: [http://safersim.nads-sc.uiowa.edu/education\\_2015.php](http://safersim.nads-sc.uiowa.edu/education_2015.php).

*Employment status of past students – 7 students employed*

- Mehdi Nuri (Ph.D, UCF, 2015), Post-Doctoral Associate, Massachusetts Institute of Technology
- Elizabeth Casola, May 2018, HNTB (UMASS – For next period)
- Aaron Keegan (not yet graduated) has started working at Green International Affiliates, Inc., Westford, Massachusetts.
- Bryan Ruiz Cruz, graduating June 2018, CMA Architects & Engineers LLC
- Johnathan Ruiz Gonzalez, graduating June 2018, CMA Architects & Engineers LLC
- James Markosian, Employed at Kittelson & Associates (UW)
- Ibrahim Alsgnan has a contract to return as a faculty member in Saudi Arabia upon completion of his PhD in Summer 2018.

*Degrees in Transportation Disciplines– 5 degrees*

- Alyssa Ryan, Bachelor of Science (CEE), December 2017
- Mitchell Page, Bachelor of Science (CEE), December 2017
- Bryan Ruiz Cruz, Master of Science in Civil Engineering, completed all the requirements in February 2018, graduation date June 2018.
- Johnathan Ruiz Gonzalez, Master of Science in Civil Engineering, completed all the requirements in February 2018, graduation date June 2018.
- Hiba Nasserredinne completed her Masters Degree in December 2017 and is continuing her PhD.

*Schools and Career Fairs Visited– 37,815 K-12 and college students\**

\*These students are counted in both 2013 and 2016 SAFER-SIM PPR because outreach activities are not associated with a specific research project and are supported by both grants.

*K-12 Outreach – 37,806 students*

- University of Iowa – 25 students
  - Oelwein Family STEM Festival - 397
  - PLTW Tours - 59
  - Girl Scout STEM Event - 71
  - Discovery: Iowa River Landing - 175
  - Johnson County Career Fair - 67
  - Cedar Valley STEM Festival - 281
  - Girls Tech Career Day - 42
  - STEM Institute - 135
  - Washington County Regional STEM Festival -145
  - WiSE Femineers Tour - 17
  - Newton High School PreCalculus Tour - 15

- Career Caravan - 160
- Lone Tree Mock Interviews - 6
- Solon Presentation - 138
- Cedar Rapids STEM Institute - 366
- Lone Tree Engineering Tour - 40
- Linn County STEM Fest - 321
- Fort Dodge Physics Tour - 28
- Traffic Safety Merit Badge – 8
- UI Mobile Museum – 35,305
  - The UI Mobile Museum is a traveling museum. SAFER-SIM provided funding for a driving simulator on the museum. It traveled 7,753 miles, did 59 events, and visited 28 counties in Iowa
- University of Puerto Rico
  - UPRM Driving Simulator and Drink Buster Goggles - 30

*College Student Outreach – 9 students*

- University of Massachusetts – Amherst
  - UMass Civil Engineering Career Fair – 5
- University of Iowa
  - IISE Tour - 4

#### **4. Technology Transfer**

*Final Research Reports – 8 reports*

The eight (8) research projects that completed this period submitted final research reports and corresponding 2-page summaries. The technical reports vary in length but provide enough information for fellow researchers to understand the research questions, methods, and results. The final reports have been shared with TRID. The 2-page summaries of each project are available for a quick overview of the projects. These summaries focus on recommended practices for transportation professionals providing easier access to key information than the technical report.

*Webinars – 6 webinars*

SAFER-SIM has hosted six (6) webinars over the course of this reporting period. Students, researchers, and industry professionals from the United States and other countries view the SAFER-SIM webinars. A breakdown of the webinar can be found in

Table 2: Webinars Presented this Period above. Some highlights below:

- 6 webinars
- 174 registrants
- 128 YouTube Views

*Online Presence*

Website – The website for SAFER-SIM is used to host research final reports and summaries and used to share recent news and progress. The website has been updated to reflect the information in the 2016 UTC grant. The website homepage is located at the following URL:

<http://safersim.nads-sc.uiowa.edu>

News Digest – Another method SAFER-SIM uses to reach more individuals is through a news digest. Three hundred fifty-two (352) subscribers receive the news digest; twenty-two (22) from government, thirty-six (36) from automotive industry, and the remaining two hundred ninety-four (294) from academia as faculty, staff, or students.

The center shares content featuring SAFER-SIM news, webinars, and final reports, transportation safety news, and also info about conferences, competitions, and career opportunities. The news digest was sent out seven (7) times during this performance period. Below are the counts of the number of times the content was shared:

Content	This Period	Total*
SAFER-SIM News Articles	0	62
SAFER-SIM Webinars	9	55
SAFER-SIM Final Reports	5	30
Transportation News	51	211
Conferences	16	44
Competitions	1	7
Career Opportunities	11	28
<b>* Total counts will also appear in 2016 PPPR</b>		

Social Media – SAFER-SIM is active on Twitter, Facebook, and YouTube. These accounts help followers keep up to date with the most recent webinars, final reports, and other news and events. Social media allows the UTC to reach a larger audience.

- Twitter handle @SaferSimUTC; <https://twitter.com/SaferSimUTC>
- Facebook page URL <https://www.facebook.com/SaferSimUTC/>
- YouTube channel [https://www.youtube.com/channel/UCE8CN3JX8\\_mkAf8d8-UPzKQ](https://www.youtube.com/channel/UCE8CN3JX8_mkAf8d8-UPzKQ)

*Tours of Facilities*

- Cole Fitzpatrick gave three tours of the driving simulator during his Fall 2018 General Engineering course. These tours weren't specifically related to this project but rather all of the projects he has been part of over the years. (University of Massachusetts – Amherst)

- Facilities visited during this tour: Transportation Laboratory Visiting group: High school Students. Date of tour: March 2018 Number of attendees: 40 (University of Puerto Rico - Mayaguez)
- Facilities visited during this tour: Transportation Laboratory Visiting group: College Students. Date of tour: March 2018 Number of attendees: 30. (University of Puerto Rico - Mayaguez)

#### *Others Using Simulation Techniques*

- This project utilized Aimsun microsimulation with Surrogate Safety Assessment Model (SSAM). Others are using these tools and techniques, but none have applied them to urban freight (University of Massachusetts – Amherst)
- As part of the development of our research project we have learned from and also exchanged our techniques with other universities in our consortium in particular with the University of Massachusetts Amherst and the University of Wisconsin Madison. (University of Puerto Rico - Mayaguez)

#### *Others Using Data Analysis Techniques*

- The data collection techniques developed for the project will or are currently been used by the University of Massachusetts – Amherst and the University of Oregon.

### **5. Collaboration**

A main focus of SAFER-SIM UTC is collaboration, both within consortium sites and across disciplines. Consortium members engage in regular web conferencing, teleconferences, and email communications, as well as face-to-face interactions via site visits and time set aside during symposia. Site directors participate in a conference call once a month to share information about the progress at each university.

Regular updates to the SAFER-SIM website and social media accounts allow for up-to-date project information and outreach activities to spur ideas across sites. The webinar format builds greater engagement and a broader exchange of ideas among students, faculty, and industry professionals. SAFER-SIM also emails a biweekly news digest to 352 individuals holding academic, government, and transportation industry positions. Researchers and students stay connected with each other through various platforms to conduct research and to share ideas.

SAFER-SIM researchers have a diverse range of professional backgrounds that span across many colleges throughout the universities. The variety of expertise within the consortium creates a collaborative environment to address safety issues from different perspectives. Some backgrounds include:

- Engineering
- Public Health
- Psychology
- Pharmacy



- Computer Science
- Emergency Medicine
- Science Education
- Orthopedic Surgery

*Joint Tech Transfer Activities and Programs*

- University of Massachusetts Amherst utilized tactics developed at University of Wisconsin – Madison to develop simulator environment
- University of Massachusetts Amherst utilized the Intersector™ device to capture left-turning vehicle trajectories – as compared to the University of Wisconsin-Madison.

*Events with other UTCs*

- SAFER-SIM created a TRB Annual Meeting program showing SAFER-SIM related presentations and posters. This program was sent to everyone in the UTC as well as researchers involved in other UTCs.

**6. Program Efficacy**

SAFER-SIM funded projects are successfully coming to completion; 33 are complete, 8 have reports in the review process, and 2 are expected to submit reports early in the next reporting period. All projects are on track to have completed reports online before the end of the grant performance period. SAFER-SIM shows significant success in education and outreach involving well over 37,000 students. The number of subscribers to the SAFER-SIM newsletter has increased, webinar registrations and views of recording remains strong supporting technology transfer.

**7. Diversity**

SAFER-SIM impacts underserved and underinvested populations by bringing more minority students into the transportation sector. The minority groups represented include various people of color, Asian and Hispanic ethnic origins, and women. Twelve (12) individuals from these groups worked on SAFER-SIM projects this period (*Table 4: Minority Students*).

**Table 4: Minority Students\***

Site	# Minority Students
University of Iowa	0
University of Wisconsin – Madison	4

<b>University of Massachusetts – Amherst</b>	3
<b>University of Central Florida</b>	1
<b>University of Puerto Rico – Mayaguez</b>	4
<b>*Total</b>	12

**\*These students are already counted in the totals of *Table 3: Student Breakdown*.**

A SAFER-SIM consortium member, **the University of Puerto Rico – Mayaguez** is a minority serving institution. In addition, minority students make up one-third of the student population at the **University of Central Florida**. SAFER-SIM is dedicated to educating the next generation of safety professionals, building the transportation workforce for tomorrow, and fostering a vibrant community of simulation researchers.

SAFER-SIM also provides outreach events to underserved and underinvested populations. The following activities were offered to groups focusing on females in engineering and technology.

- Girl Scout STEM Event
- Girls Tech Career Day
- WiSE Femineers Tour

## b. Products

SAFER-SIM projects have produced several products during the current reporting period. Details about these products are provided in the research activities, leadership development, and technology transfer sections above.

- 8 technical reports for research projects
- 13 peer reviewed publications
- 16 conference presentations and papers
- 6 webinars

## c. Participants & collaborating organizations

Significant collaboration continues across departments and institutions within SAFER-SIM and with other partners. The symposia held by SAFER-SIM have provided transportation students and faculty with valuable networking and collaboration opportunities. The relationship forged during these events branch out into the transportation workforce as students involved in SAFER-SIM projects join the workforce or pursue additional education at other institutions. Consortium institutions collaborate with state DOTs and other organizations on events that focus on transportation safety and mobility.

## d. Impact

### *Research Impact*

The impact of SAFER-SIM research projects will lead to a better understanding of road-user behavior and the advancement of simulation techniques and technologies. SAFER-SIM will share knowledge learned through six (6) webinars featuring SAFER-SIM research were hosted that had a total of 174 registrants for the live presentations and 128 views of recordings.

#### *Leadership Development Impact*

The impact of leadership development among SAFER-SIM researchers and students will lead to improved research, increased publications, and overall improvement in safety research using simulation. During this reporting period:

- 30 students were supported by SAFER-SIM projects
- 13 peer reviewed publications
- 16 conference presentations and papers
- 3 individuals received awards
- 13 invited presentations
- 14 individuals served as reviewers for 20 journals
- 24 leadership positions held
- 23 panels and committees

#### *Education and Workforce Development Impact*

The impact of SAFER-SIM education and development will create curious students and employees in the transportation industry that will lead to advanced innovations and improved safety.

During this reporting period:

- 5 students received degrees in transportation disciplines
- 7 students found employment
- 37,815 students from K-12 and college attended outreach events

#### *Technology Transfer Impact*

The impact of SAFER-SIM technology transfer will result in the spread of safety research and information, and individuals will be more conscious about transportation safety.

During this reporting period:

- 8 project technical reports were published
- 6 webinars, with 174 registrants and 128 views of recordings
- 7 newsletters reaching 352 individuals from academia, government, and industry

#### *Collaboration Impact*

The impact of SAFER-SIM collaboration will lead to a large network of interdisciplinary, safety professionals driving transportation forward in all industries and locations.

During this reporting period:

- 2 joint technology transfer activities and programs occurred

#### *Program Efficacy Impact*

The impact of SAFER-SIM program efficacy will lead to continued funding of the center and the University Transportation Center Program. Thirty-three (33) projects have completed and shared results with other transportation safety professionals.

#### *Diversity Impact*

The impact of SAFER-SIM diversity will lead to improved transportation safety in less privileged communities and will open the door for future, minority transportation professionals. Nearly half, 12 of the 30 students supported by SAFER-SIM were from underserved and under represented populations.

#### e. Changes/Problems

Only one project still has a past due technical report. Administrators met with the principal investigators and agreed on a plan for draft report submission by June 2018 with publication complete by August 2018. It is fully expected that all projects will have complete deliverables within the grant performance period.

## 2. Plan for Next Reporting Period

SAFER-SIM will complete all project, submit all written deliverables, and plans to present all webinars by September 2018. SAFER-SIM continues education and outreach programming, yet the events and numbers will be reported in the 2013 UTC PPPR the 2016 UTC PPPR as these activities are not associated with specific projects.

- Complete remaining 2 research projects
- Submit all deliverables
- Complete all webinars
- Continue regularly scheduled director calls
- Continue online communications