# Program Progress Performance Report for University Transportation Centers

**Submitted to:** U.S. Department of Transportation
Office of the Assistant Secretary for Research and
Technology (OST-R)

**Grant Number:** DTRT13-G-UTC42

**Project Title:** Tier I University Transportation Centers
Center for Accessibility and Safety for an Aging
Population (ASAP)

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**Submitting Official:** Same as Program Director

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**Recipient Organization:** Florida State University
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**Signature of Submitting Official:**

# 1. Accomplishments

## 1.1 Major Goals and Objectives of the Center

### 1.1.1 Research

With motivation from Florida's large number of senior residents, the reported relatively high involvement of seniors in traffic crashes nationwide and their special needs for transportation, the theme of the Center is to promote safe and accessible transportation for the aging population. The center focuses on four interdisciplinary areas: Accessibility and community connectivity among older adults; human factors affecting the older population, especially regarding acceptance of emerging technologies; geometric design research, especially regarding elder crash mitigation; and health, wellness and safety of seniors as it relates to multimodal transportation and emergency operations.

### 1.1.2 Education and outreach

The Center faculty are committed to education and workforce development at all levels, including activities such as the following: Research assistantships; Annual graduate student research colloquia; Seed grants for student pilot projects; Dissertation fellowships; Monthly brown bag lunch and seminar series; Expanding existing NSTI summer program at Florida A&M University (FAMU) and developing NSTI program at Florida State University (FSU), to serve a larger student population over longer time frame; Conducting an annual K-12 Transportation Day; and developing online educational activities and games for inclusion on the Center website.

### 1.1.3 Collaboration and diversity

The Center is a collaborative effort among Florida State University (FSU), Florida A&M University (FAMU), and the University of North Florida (UNF), with FSU serving as the lead institution. The selection of these two collaborative institutions (FAMU and UNF) is special because of the uniqueness of the two institutions, with FAMU being an HBCU institution. The Center also collaborates with other public section organizations as well as with other Universities. There are both External and Internal Advisory Boards with members appointed from private industry, government agencies, e.g., federal, state, county, city, etc., and academic institutions. Our Center is uniquely equipped to address the challenges of broadening participation and attracting minorities to the transportation field. The Center is committed to increasing the number of students in STEM (science, technology, engineering, and mathematics) fields in general and the transportation field in particular.

## 1.2 Accomplishment under Major Goals and Objectives

### 1.2.1 Research

The Center has conducted three cycles of research proposal funding since its inception in late 2013. This report focuses on just the ongoing and recently-completed projects. There are two new research projects to be formally awarded in May 2017; these projects are not reported here. The Center's research projects have been multi-disciplinary in nature, thus involving principal investigators across colleges and universities in the consortium. With the Center's focus on safety and accessibility as it affects the aging population, each project was assessed in terms of the MAP-21 (Pub. L. 112-141 Sec. 52003) requirements as follows:

- o Section 52003 (b) (2) IMPROVING HIGHWAY SAFETY: Outcomes include: Safety assessments and decision-making tools, Innovative operational improvements and designs of roadway and roadside features, Safety measures for vulnerable road users, including bicyclists and pedestrians, and Human factors studies and measures.
- o Section 52003 (b) (4) STRENGTHENING TRANSPORTATION PLANNING AND ENVIRONMENTAL DECISIONMAKING: Outcomes include: Creation of models and tools for evaluating

transportation measures and transportation system designs, including the costs and benefits; and Transportation and economic development planning in rural areas and small communities.

A sample list of recently awarded, and ongoing or recently completed funded projects are summarized in the following sections with some details provided on each project. The specific accomplishments in terms of publications, conference presentations, etc. are listed later on in other sections (2.0 Products) of this report.

## Funding Cycle 3 Research Projects

**ASAP2016-001: Senior Community Resilience: Assessing the Interdependencies between Critical Transportation Infrastructures and Implications on Aging People's Households (FSU: Dept. of Civil & Env. Engrg; and FAMU: Dept. of Civil & Env. Engrg. ), (Project Duration: 9/1/2016 to 12/31/2017).**
There are increasing number of aging populations in the State of Florida for whom safe, reliable and accessible transportation is a very significant issue. This is highly dependent on the performance of Florida's roadways and critical assets such as bridges, intermodal facilities and other relevant structures. Their performance becomes especially critical in the presence of extreme events such as hurricanes where the connectivity between the critical structural and transportation assets, and the roadway network play a vital role in providing safety, reliability and accessibility to all roadway users including aging populations. Central to this challenge is the need to identify the interdependencies between these vital elements, and their effects on the aging people's communities and households, which is a very challenging problem. This problem becomes even more challenging since the aging populations are identified as one of the cohorts with a heightened vulnerability to climate change. In order to solve this problem, there is a need for a multi-disciplinary approach that should (a) evaluate the stochastic interactions between critical assets and roadways in terms of their exposure to different types of problems such as the system disruptions (e.g. day-to-day disruptions due to traffic congestion and accidents, or emergency disruptions related to flooding and debris due to hurricanes), and (b) develop mathematical solutions to minimize the effect of these disruptions on the communities and households (especially those urban and/or rural areas with aging populations). In order to respond to this challenge, the proposed project will present a holistic approach based on the implementation of uncertainty-based mathematical models. These models can provide solutions to handle the high risk associated with these disruptions, reduce their effect on the aging people's households and communities, and therefore improve the community resilience. The proposed approach will also be supported by an extensive evaluation of the interdependencies using geographic information systems (GIS)-based techniques. Realistic case studies will be built and used to evaluate the differences in mitigation strategies for different types of structural and roadway-related disruptions based on the impact point/area, the weather conditions (i.e., the effect of wind and rain), the aging population living in the affected area, and duration/type of the event.

**ASAP2017-001: A Comprehensive Assessment of Driver Characteristics for Efficient Emergency Evacuation in Areas with an Aging Population (FAMU: Dept. of Civil & Env. Engrg; FSU: Dept. of Civil & Env. Engrg; FSU: Dept. of Psychology; and UNF: School of Engrg), (Project Duration: 1/15/2017 to 7/15/2018).**
Disaster preparedness plays a crucial role in disaster relief operations, as it aims to prepare the population for potential disaster strikes in order to avoid or reduce human losses. Throughout the disaster preparedness process state and local authorities typically advise the population to evacuate from the areas with the highest expected impact using specific evacuation routes. Driving along evacuation routes may be quite challenging due to a dense traffic flow, aggressiveness of certain drivers, unexpected maneuvers from inexperienced drivers and other factors, especially for vulnerable population groups such as an aging population. However, to date existing transportation planning models, which can be used for assigning individuals to evacuation routes, mostly rely on the roadway characteristics and do not capture

driver-related characteristics. The latter drawback may negatively affect the evacuation process especially in the areas with a high percentage of an aging population, cause delays, and increase crash occurrence. This project aims to fill the existing gap in the state-of-the-art and the state-of-practice and derive a set of mathematical relationships that will allow estimating a wide range of driving ability performance indicators based on both roadway and driver-related characteristics. A pilot study will be conducted using the driving simulator available at the University Transportation Center for Accessibility and Safety for an Aging Population (ASAP) to assess how efficiently individuals of different age groups are able to drive along the evacuation routes under disruptive operational conditions. The data, collected from a pilot study, will be thoroughly analyzed to identify any patterns, develop the required mathematical relationships, and provide necessary recommendations, which can be further incorporated in transportation planning models to facilitate the evacuation process especially in the areas with vulnerable population groups.

**ASAP2017-002: An Investigation of Older Adult Preferences for Transit and Related Mobility Services (FSU: Dept. of Urban and Regional Planning, Project Duration: 1/15/2017 to 8/31/2017).**
The recent proliferation of alternatives to driving has presented many older adults with a complex menu of transportation options. Many older adults face challenges that can hinder their ability to drive, making these alternatives an attractive means of maintaining independent mobility. However, little study has been devoted to how older adults perceive and use these alternatives, or to what degree these alternatives can be adapted to better serve older riders. Using a community survey and interviews with older adults in Tallahassee, Florida, this paper explores the perceptions and preferences of older adults regarding several modes of transportation other than the automobile. Findings indicate that older adults in Tallahassee prefer to drive themselves if possible, and generally value the personalized services of demand-response transportation more than fixed-route transit or taxicabs. Many non-drivers appreciate the flexibility of demand-response transportation, and appreciate the safe and personalized service offered by that mode, but harbor reservations about the operators' commitment to customer service and the unique needs of older riders. The findings further indicate that older adults' transportation habits are shaped by external forces as well as individual impressions. This suggests that agencies seeking to adapt their services to better serve older adults must be mindful of both macro-level issues (such as the aging process and physical frailty) as well as the micro-level opinions and desires (such as each client's need to maintain dignity and independence) that draw older adults to one mode over another.

**ASAP2017-003: Driver Behavior Recognition and Prediction Models for Improved Highway Safety of Elderly Drivers (FAMU: Dept. of Electrical and Computer Engineering; FSU: Dept. of Electrical and Computer, (Project Duration: 08/01/2017 to 7/31/2018).**
This research focuses on improving highway safety for elderly drivers due to lane change or merge using analytical models of human driving behaviors to design intelligent driver assistance systems. In recent years there has been increasing research on incorporating intelligent driver assistance systems (IDAS) into vehicular platforms to help drivers make better driving decisions and to make the roadways safer. Current systems such as collision detection and obstacle avoidance use models of human behavior to improve reliability and to help decrease driver workload. In this work driver recognition models for varying demographics including aging drivers (65+), young drivers (15-24), and average drivers (25-59) will be developed using optimal feature extraction and data fusion methods based on behavioral and physiological inputs (e.g. eye-tracking, head position and heart-rate). The anticipated outcomes of this work include (1) identification of an optimal feature vector for evaluating elderly human driving behavior;

(2) incorporating feature extraction into a hybrid driver model that accurately characterizes elderly human driving behavior using vehicle dynamics, behavioral and physiological cues; and (3) recognizing lane change or merge intention of human drivers using the hybrid driver model  In addition, this research will help to support practical research experiences for undergraduate and graduate students, especially those from diverse backgrounds.

**ASAP2017-004: Age-Related Postural Abnormalities and its Effect on the Elderly Driving Ability (FAMU: School of Allied Health; FAMU: School of Architecture; and FAMU: Dept. of Mechanical Engrg.), (Project Duration: 8/1/2017 to 7/15/2018).**
An important issue facing the ageing population is the need to maintain an independent, active, and mobile quality of life despite declining physical abilities and skills.  For the elderly driver, the increasingly dependency on automobile for mobility can place them at a greater risk of death from motor vehicle accident than younger drivers.  In the aging adult, structural abnormalities of the spine can have influence on seated driving posture by excessive displacement of the center of mass (COM) that can add increased stress or strain on postural muscles of the neck and back.  A change in body proportion or position has been shown to alter alignment at the lumbo-pelvic-hip complex where in the older adult, a maligned or altered postural sitting position may advance existing mobility deficits and create driving challenges that can translate to a rise in accidents among older adults.  Postural malalignments can impair successful response time that may cause the body to fail and/or diminish in its ability to react to or adapt to new demands experienced within the immediate environment.  Efficient coordinated neuromuscular linkages are necessary for effective transfer of loads and forces up and down the kinetic chain.  Thus, a poor driving postural position may considerably elevate risk for neck and low back injury or death during an automobile accident.  Safe driving is important for appropriate information processing.  It is hereby proposed to carry out a systematic study on the driving ability of elderly drivers in the aging population in Florida.  This is done by evaluating the biomechanics of sitting postures and the impact postural impairments may have on the driving ability.  Data will be collected from different sitting posture types using 3D motion analysis of pelvic position and COM shifts associated with small and large anteriorly, posteriorly, and lateral force displacement on the sitting posture.  Additionally, a postural Harness-Restraint system may be incorporated.  A Foot Plate will be used to collect data on foot pressure and load transfer from upper extremity to lower extremity. This is used to evaluate driving response time and sitting posture plus the need for a postural Harness-Restraint system.  The results obtained from this study will be used to create a data base and produce models that relate postural impairments impact on driving ability and safety in older adult drivers.  Furthermore, it is envisaged that this research will assist in the cabin design of automobile for elderly drivers.  Another component of this project involves an outreach program in the form of health fairs, designed to provide educational workshops that address physical evaluations of static and dynamic posture.  This will be presented within the local community at churches and senior social groups.

## Funding Cycle 2 Research Projects
**ASAP2014-006: Transit-Oriented Development for Aging Adults: An Evaluation of Recent Trends, Best Practices, and Future Prospects (FSU: Dept. of Geography; and FSU Dept. of Urban and Regional Planning), (Project Duration: 5/1/2015 to 12/31/2016, with no cost extension to 6/30/2017)**
Fulfilling daily needs associated with successful aging portends many challenges. In particular, as their driving skills deteriorate, many aging adults will need to find alternative means of travel that will allow them to conduct basic out-of-home activities. One approach to addressing this problem is to create places that allow one to effectively reach a variety of activities without a car. Transit-oriented development (TOD) ostensibly provides this type of place. TOD is commonly defined as compact, walkable development immediately surrounding a major transit station. In this project, our key objective is to provide a nationwide examination of TOD from the perspective of how well it attracts and meets the needs of aging

adults. Our findings indicate that, for the most part, TOD is not being utilized as a strategy to better meet the transportation needs of older adults. Older adults are less likely to live in TODs and government agencies are not likely to consider TOD as part of their effort to better serve older adults. The lack of real-world examples makes it difficult to assess whether TOD can be an effective way to help older adult maintain a high quality of life. The lack of concreate examples of communities explicitly using TOD to address the mobility problem of aging does not rule out the possibility that it can be an effective strategy. To the contrary, it indicates the need to experiment with policies and practices that will attract older adults to TOD. Our case studies demonstrated that some of the stations with strong growth in older adults were in areas that had been explicitly planning for their needs (even if it this planning is coincidental to the presence of TOD). Further, our research indicates that the near-retirement cohort (55-64) already has a stronger presence in station areas than their older counterparts. This provides a strong impetus in the coming years for TOD planning that allows this population to remain in these places. The findings from this research can provide a starting point for this experimentation.

**ASAP2014-007:  Biomechanics of Older Drivers to Mitigate Injury in Automobile Accidents, (FSU: Dept. of Civil & Env. Engrg; and FAMU: Dept. of Civil & Env.  Engrg.), (Project Duration: 1/5/2015 to 8/5/2016 with no cost extension to 5/30/2017)**
The objective of this study is to understand accident mechanism of aging drivers and passengers, in order to mitigate injury should accidents occur. The main approach is to conduct vehicle crash simulations using Finite Element (FE) models of the vehicle and the occupant. FE dummy models are being developed for aging driver/passenger (occupants) in automobiles, based on the population-average dummy models by LS-Dyna computer software. For selected cases, aging occupants using the Total Human Model for Safety (THUMS) will be also studied. These models will incorporate the frailty aspects of the aging person and other attributes such as driving posture. After developing the FE dummy models for aging occupants, FE analyses will be conducted simulating vehicle accidents. The biomechanical responses from the model will include estimates of incidence and severity of injuries to head and thoracic parts of the body. It was found in literature review that older drivers tend to sit closer to the steering wheel as opposed to younger drivers who tend to sit further away. Sitting closer by contracting the torso approximately 3 degrees can increase HIC15, chest acceleration, and pelvis acceleration as much as 5%, 3%, and 4% respectively. Physical experiments using a simplified dummy were conducted to solidify these FE simulation results. With the knowledge of body areas susceptible to injury, we can focus on the Injury Mechanisms, Biomechanical Response, and Human Tolerance specifically for the aging human. The study will also develop survivability envelopes for vehicle impacts for aging occupants, and compare them with those for younger occupants. The study will enable biomechanics-based recommendations to minimize the severity of injury, should accidents occur. These mitigation approaches include efficient safety restraint, seating setup, and other vehicle modifications that can help lessen bodily injury.

## 1.2.2 Education and outreach

- ❖ **FSU's Women in Math, Science, and Engineering (WIMSE):** On October 25, 2016, ASAP hosted a laboratory visit by some members of the FSU's Women in Math, Science, and Engineering (WIMSE). WIMSE is a living-learning community (LLC) on campus that supports the growth and development of women in the STEM fields at the Florida State University (FSU). Richard Twumasi-Boakye and Ryan Doczy, both doctoral candidates and Research Assistants at ASAP, took the group of six WIMSE students through research activities at the ASAP's Driving Simulator Laboratory at the FAMU-FSU College of Engineering. The laboratory visit lasted for one hour, involving three interactive sessions. The first session comprised a brief introduction to the research focus of the ASAP transportation center as well as the purposes, features, and uses of the DriveSafety Driving Simulator. The second session included a discussion of transportation engineering, with a clear narration of essential concepts related to driver decisions, such as vehicle speeds, permitted left-turn movements, and gap acceptance. After this brief "lesson" in transportation engineering, a short written "quiz" was done, which involved students being tested on decisions on whether or not to make a permitted left-turn movement based on their calculated headways from a given traffic flow. The final session included a presentation of on-going ASAP research projects which incorporated the use of the Driving Simulator, as well as the students being given turns to have a hands-on experience in operating the Driving Simulator.

- ❖ *Undergraduate Research Opportunity Program (UROP):* Mary Byrd, a sophomore in the College of Business, joined Dr. Ozguven's lab as part of the Undergraduate Research Opportunity Program (UROP) during the 2017 fall and spring semesters. Dr. Ozguven is an ASAP researcher. Dr. Ozguven's PhD students Mehmet Baran Ulak and Ayberk Kocatepe mentored her throughout her stay, and taught her the ArcGIS software. Her research topic was: "GIS-based Assessment and Comparison of Crash and Crime Hotspots in the City of Orlando with a Focus on Demographics and Socioeconomics". She successfully presented her research at the UROP poster presentation session on March 28, 2017. The research objective was (a) to identify the high crash and high crime risk locations (hotspots) in the City of Orlando, and (b) to compare these hotspots with different demographics and socioeconomics with a case study application set in Orlando. For this purpose, six years of crime data and two years of crash data were collected from the City of

Orlando and Florida Department of Transportation, respectively. Based on this data, a three-step GIS-based spatial analysis was proposed to investigate crime and crash characteristics with respect to population demographics and socioeconomics data obtained from US Census. After inputting the crime and crash data into ArcGIS, Local Moran's method is used to identify and compare the hotspots of both crimes and crashes. This information can be beneficial to citizens, police, and transportation agency personnel in the City of Orlando.
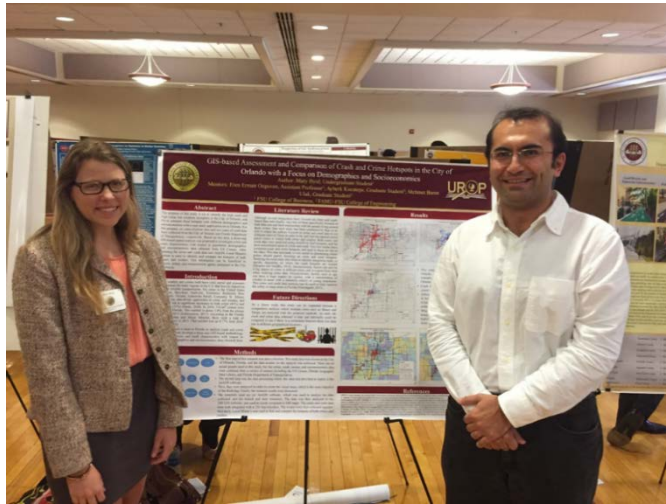


❖ The Center held its Third Annual Transportation Day at the FAMU-FSU College of Engineering on Friday, November 4, 2016. More than 125 community members, researchers, and K-12 students



enjoyed presentations and demonstrations related to the *Safety and Mobility in the Community* theme. The event was well attended with the Associate Dean of the College of Engineering kicking off the day's event by welcoming everyone in attendance. Dr. John Sobanjo, Center Director and FSU Professor of Civil Engineering, reviewed the Center's mission and research activities. Remarks followed by Representatives from FSU, Dr. Ross Ellington, the Associate Vice President of Research. Dr. Lisa Spainhour, ASAP's Education and Outreach Chair, and FSU Professor of Civil Engineering, presented Doctoral Research Fellow Awards to Emmanuel Kidando, PhD student in Civil and Environmental Engineering, Somayeh Mafi, PhD student in Civil and Environmental Engineering, Jacquiline Masaki, PhD student in Civil and Environmental Engineering, Nelson Roque, PhD Student in Psychology, Dustin Souders, PhD Student in Psychology, and Vitor Suguri, PhD Student in Urban and Regional Planning.

Activities were divided into two tracks. One focused on Aging and Mobility for seniors and included:

- A Panel Discussion on Aging and Mobility. Participants were: Dr. Anne Barrett, FSU, Dr. Gail Holley, FDOT State Traffic Engineering and Operations Office, Mr. Ivan Maldonado, Commission on Transportation Disadvantaged and Ms. Sheila Salyer, City of Tallahassee.
- Research presentations by: Dr. Eren Ozguven, FSU, Dr. Thobias Sando, UNF, Dr. Yassir Abdelrazig, FAMU, and Dr. Walter Boot, FSU.

The second track concentrated on Teens and Transportation. Sessions included:

- Teens & Texting: Driving Safety, Dr. Doreen Kobelo, FAMU
- Hands–on STEM Transportation: Urban Transportation & Planning Design, Dr. Lisa Spainhour, FSU.
- Careers in Transportation, Carey Shepherd, Federal Highway Administration.



Thirty six students (middle school) and chaperons from FAMU Developmental Research School (DRS) attended these sessions. Ms. Shelia Salyer, Senior Services Manager, City of Tallahassee was the Luncheon Keynote Speaker.

Students from FAMU and FSU, including members of the American Society of Civil Engineers and



ASAP Research Assistants, served as volunteers during the Transportation Day event. Between sessions attendees had an opportunity to visit with Booth Representatives from AAA, StarMetro, Florida Highway and Safety, CarFit, the FSU's Institute for Successful Longevity and others. Research posters were also available for viewing. The day ended with Driving Simulator Demonstrations at the ASAP Laboratory.

- ❖ At FSU, Dr. Walter Boot taught a graduate seminar in Human Factors in the fall semester of 2016, and an undergraduate course in Human Factors in the spring Semester of 2017. Consistent with the mission of ASAP, both of these courses featured modules on driver safety, specifically on how to design vehicles and roadways for aging road-users.
- ❖ On January 23, 2017 BSNF Railway Company hosted a workshop for undergraduate and graduate students at the FAMU-FSU College of Engineering. Dr. Maxim Dulebenets, an ASAP Affiliate, assisted with organization of the workshop. BNSF is one of the largest Class I railway companies in the nation. Throughout the workshop Mrs. Bernia Ivey, one of Human Resources officials at BNSF Railway Company, discussed potential internship opportunities and part-time/full-time positions available for the FAMU-FSU College of Engineering students.
- ❖ Undergraduate Research Opportunity Program (UROP): Maiya Hinton, a sophomore in the College of Business, joined Dr. Shonda Bernadin's lab as part of the Undergraduate Research Opportunity Program (UROP) during Fall 2017 and Spring 2018 semesters. She will conduct research on driver scenario and map design of a 10-mile stretch on Interstate-10 with an emphasis on driver responses to four different lane shift scenarios. Her research is instrumental for data collection experiments with elderly drivers.

- ❖ Research Experiences for ECE Undergraduates (REEU): Rollin Scott, a senior in the Electrical and Computer Engineering Department, joined Dr. Shonda Bernadin's lab as part of an undergraduate research experience during Fall 2017 and Spring 2018. She will conduct research on effective in-vehicle conversational dialog systems with a focus on voice interfacing for aging drivers.
- ❖ Young Scholars Program: Two high school students, Odessa Deng and Alexia Mullings joined Dr. Ozguven's group, from June 13, 2017 to July 20, 2017, as part of the Young Scholars Program (YSP) of the Florida State University. Dr. Ozguven's students Mehmet Baran Ulak and Ayberk Kocatepe mentored the high school students for 6 weeks period. Their research topic was: "A GIS-based Impact Analysis of Hurricane Hermine: A Case Study in Tallahassee." They successfully presented their poster in the Young Scholars Program presentation session. Their project presented a GIS-based evaluation of the damage caused by Hermine, based on the spatial distribution of the disruption of power and transportation systems of communities, coupled with the demographics of communities, which heavily rely on these systems. Their study also placed a specific importance on evaluating the correlation between age and power outages, vehicle ownership and blocked roadways, and the locations of critical facilities (hospitals, fire stations, police stations and schools) and power outages.

## 1.2.3 Collaboration and diversity

There were collaborations with public agencies: Florida Department of Transportation (FDOT)'s Research Office; FDOT's Safe Mobility for Life Program; and FSU's Claude Pepper Institute for Aging. External and internal advisory boards have also been established with memberships from the private industry, government agencies, e.g., federal, state, county, city, etc., and academic institutions.

**External Advisory Board**

| Name | Title/Employer | Industry | Expertise |
|---|---|---|---|
| Karlene Ball | Prof. & Chair, Dept. of Psychology, Univ. of Alabama, Birmingham | Academic | Aging and Driving |
| Lynn Barr | Mobility Coordinator, Capital Region Transportation Planning Agency | MPO | Transportation Planning |
| Sara Czaja | Prof. Dept. of Psychiatry, Behavioral Sciences, and Industrial Engineering, Univ. of Miami, Florida | Academic | Aging |
| Heejo Ham | Senior Transportation Modeler *Stantec* | Industry | Transportation Planning |
| Gail M. Holley | Safe Mobility for Life Program and Research Manager, FDOT | State | Transportation Safety |
| Bill Horrey | The Liberty Mutual Research Institute, Boston, MA | Industry | Transportation Safety/Human Factors |
| Sylvester A. Kalevela | Acting Dean/Prof., Transportation Engineering, Colorado State Univ. | Academic | Transportation |
| Ivan Maldonado | Florida Commission for the Transportation Disadvantaged, Tallahassee, FL | State | Transportation |
| Trenda McPherson | FDOT Pedestrian Safety | State | Transportation Safety |
| Eric Sawyer | Retired City Traffic Engineer, Tallahassee | City | Transportation Traffic |
| Victor B. Wiley | FDOT Transit Safety | State | Transportation Safety |

**Internal Advisory Board**

| Name | Title/Employer | Industry | Expertise |
|------|----------------|----------|-----------|
| Bruce Harvey | Assoc. Prof., FAMU-FSU College of Engineering | Academic | Electrical & Computer Engineering |
| Michelle Rambo-Roddenberry | Assoc. Prof., FAMU-FSU College of Engineering | Academic | Civil & Environmental Engineering |
| John Sobanjo | Prof., FAMU-FSU College of Engineering | Academic | Civil & Environmental Engineering |
| Neil Charness | Prof., FSU Dept. of Psychology | Academic | Psychology |
| Mark Horner | Prof., FSU Dept. of Geography | Academic | Geography |

# 2. Products

## Publications, conference papers, and presentations

The following list shows for the reporting period, the publications, conference papers, presentations, etc., resulting from the research funding at the Center.

***The following papers have been published or in press for journal publication:***

[1] Alisan, O., Kocatepe, A., Tuydes-Yaman, H., Ozguven, E. E., & Ozel, H. (in press). Benefits of Managing Special Needs Shelters (SpNS) Capacities with Utilizing Cross-County Collaboration: A Case Study Application in Florida. *Transportation Research Record*, 19 pages.

[2] Bond, M., Brown, J. R., & Wood, J. (in press). Adapting to Challenge: An Examination of Older Adult Transportation in Rural and Small Communities. *Case Studies on Transport Policy*, 17 pages.

[3] Douglas, R., Kocatepe, A., Barrett, A., Ozguven, E. E., and Gumber, C., (in press) "Evacuating People and Their Pets: Older Floridians' Need for and Proximity to Pet-Friendly Shelters", *Journal of Gerontology: Social Sciences*, 2017.

[4] Dulebenets, M.A. CA Green Vessel Scheduling in Liner Shipping: Modeling Carbon Dioxide Emission Costs in Sea and at Ports of Call. *International Journal of Transportation Science and Technology*, Elsevier.

[5] Dulebenets, M.A., Moses, R., Ozguven, E., & Vanli, A., (2017). Minimizing Carbon Dioxide Emissions due to Container Handling at Marine Container Terminals via Hybrid Evolutionary Algorithms. *IEEE Access*, IEEE, pp. 1-17. DOI: 10.1109/ACCESS.2017.2693030.

[6] Dulebenets, M.A., (2017). Application of the Evolutionary Computation for Berth Scheduling at Marine Container Terminals: Parameter Tuning versus Parameter Control. *IEEE Transactions on Intelligent Transportation Systems*, IEEE, pp. 1-13. DOI: 10.1109/TITS.2017.2688132.

[7] Dulebenets, M.A., (2017). The Green Vessel Scheduling Problem with Transit Time Requirements in a Liner Shipping Route with Emission Control Areas. *Alexandria Engineering Journal*, Elsevier, pp. 1-12. DOI: 10.1016/j.aej.2016.11.008.

[8] Dulebenets, M.A., (2016). The Vessel Scheduling Problem in a Liner Shipping Route with Heterogeneous Vessel Fleet. *International Journal of Civil Engineering*, Springer, pp. 1-14. DOI: 10.1007/s40999-016-0060-z.

[9] Dulebenets, M.A., & Ozguven E.E., (2017). Vessel Scheduling in Liner Shipping: Modeling Transport of Perishable Assets. *International Journal of Production Economics*, Elsevier, Vol. 184, pp. 141-156. DOI: 10.1016/j.ijpe.2016.11.011.

[10] Dulebenets, M.A., Ozguven E.E., Moses, R., & Ulak, M.B., (2016). Intermodal Freight Network Design for Transport of Perishable Products. *Open Journal of Optimization*, Scientific Research Publishing, Vol. 5 (4), pp. 120-139. DOI: 10.4236/ojop.2016.54013.

[11] Dulebenets, M.A., (2016). Advantages and Disadvantages from Enforcing Emission Restrictions within Emission Control Areas. *Maritime Business Review*, Emerald, Vol. 2 (1), pp. 107-132. DOI: 10.1108/MABR-05-2016-0011.

[12] Dulebenets, M.A., (2016). A New Simulation Model for a Comprehensive Evaluation of Yard Truck Deployment Strategies at Marine Container Terminals. *Open Science Journal*, NGO Star, Vol. 1 (3), pp. 1-28.

[13] Fung, K., Jung, S. & Sobanjo, J. (Accepted for publication). Main Effects of Driving Postures Changes in Frontal Collisions Due to Aging. *International Journal of Vehicle Safety*.

[14] Horner, M. W., Ozguven, E. E., Marcelin, J. M., and Kocatepe, A. (Accepted for publication). Placing Special Needs Hurricane Shelters and the Aging Population: Development of a Methodology and a Case-study Application. *Disasters*.

[15] Kidando, E., Moses, R., Ozguven, E. E., & Sando, T. (2016). Bayesian Non-parametric Model for Estimating Multi-state Travel Time Distribution. *Journal of Advanced Transportation*, *2017*, 1-10. Retrieved from https://www.hindawi.com/journals/jat/2017/5069824/ doi:10.1155/2017/5069824

[16] Kidando, E., Moses, R., Ozguven, E. E., & Sando, T. (in press). Evaluating Traffic Congestion Using the Traffic Occupancy and Speed Distribution Relationship: An Application of Bayesian Dirichlet Process Mixtures of Generalized Linear Model. *Journal of Transportation Technologies*, 16 pages.

[17] Kidando, E., Moses, R., Abdelrazig, Y., & Ozguven, E. E. (in press). Safety Analysis Considering the Impact of Travel Time Reliability on Elderly Drivers. *Journal of the Transportation Research Forum*, 19 pages.

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[19] Kitali, A., Kidando, E., Sando, T., Moses, R., & Ozguven, E. E. (in press). Evaluating Pedestrian Crash Severity Using Bayesian Complementary Log-Log Model for Improved Prediction Accuracy. *Transportation Research Record*, 15 pages.

[20] Kitali, A., Sando, T., Ozguven, E. E., & Moses, R. (in press). Understanding the factors associated with severity of aging population-involved pedestrian crashes in Florida. *Advances in Transportation Studies*, 20 pages.

*[21]* Kitali, A. and Sando, T., Castro, A, Kobelo, D., and Mwakalonge, J. (in press). Appraisal of Safety Effects of Pedestrian Countdown Signals to Drivers Using Crash Modification Factors. *ASCE Journal of Transportation Engineering.*

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[31]Ulak, M. B., Kocatepe, A., Ozguven, E. E., Horner, M., & Spainhour, L. (2017). A GIS-based Spatial and Statistical Analysis of Severe Crash Hotspot Accessibility to Hospitals. *Transportation Research Record*, Vol. 2635, pp. 909-97, 2017.

[32]Souders, D. J., Best, R., & Charness, N. (2017). Valuation of active blind spot detection systems by younger and older adults. *Accident Analysis & Prevention*, 106, 505-514. DOI 10.1016/j.aap.2016.08.020

[33]Vemulapalli, S., Ulak, M. B., Ozguven, E. E., Sando, T., Horner, M. W., Abdelrazig, Y., & Moses, R. (in press). GIS-based Spatial and Temporal Analysis of Aging-Involved Accidents: A Case Study of Three Counties in Florida. *Applied Spatial Analysis and Policy*, 31 pages.

[34]Yazici, M. A., Kocatepe, A., & Ozguven, E. E. (2017). Breakdown of weather, intersection and recurrent congestion impacts on urban delay in New York City. Transportation Research Procedia, Vol. 22, pp. 399-408.

[35]Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. (2016). Aging Populations and Transit Oriented Development: Socioeconomic, Demographic, and Neighborhood Trends from 2000 and 2010. *Transportation Research Record* 2598, 75-83.

*The following papers have been submitted and are under review for journal publication:*

[1] Alisan, O., Tuydes-Yaman, H., Kocatepe, A., Ozguven, E. E., Performance and Cost of Cross-County Collaboration in Special Needs Shelter (SpNS) Planning, (under review in *Transportation Research Record*).

[2] Abdelrazig, Y., Doczy, R., Boot, W., Ozguven, E. E., & Moses, R., Elderly Drivers Left-turn Crash Risk Analysis using 3-D Visualization and Human Factors Simulation (under review in *Traffic Injury Prevention*).

[3] Bond, M., Brown, J. R., & Wood, J. (submitted). Adapting to Challenge: An Examination of Older Adult Transportation in Rural and Small Communities. *Case Studies in Transport Policy*. Manuscript submitted for publication, 17 pages.

[4] Cordova, J., Kocatepe, A., Zhou, Y., Ozguven, E. E., and Arghandeh, R. Casual Analysis of Traffic Load Flow and Electricity Consumption Dependencies in Urban Areas, (under review in *Transportation Research Record*).

[5] Cordova, J., Sriram, L. M. K., Kocatepe, A., Zhou, Y., Ozguven, E. E., and Arghandeh, R. Combined Electricity and Traffic Load Forecasting Using Causality Analysis, (under review in *IEEE on Intelligent Transportation Systems*).

[6] Douglas, R., Kocatepe, A., Barrett, A., Ozguven, E. E., & Gumber, C. Pet Evacuation Preparedness: An Examination of Older Adults' Needs for and Proximity to Pet-friendly Shelters in Florida, (under review in *Journal of Gerontology*).

[7] Dulebenets, M.A., Rahimi, A., & Mazaheri, A. Assessing the Effects of Indirect Left Turn on a Signalized Intersection Performance: A Case Study for the Tehran Metropolitan Area. *International Journal of Civil Engineering*, Springer.

[8] Dulebenets, M.A. An Adaptive Island Evolutionary Algorithm for the Berth Scheduling Problem. *Computers & Industrial Engineering*, Elsevier.

[9] Dulebenets, M.A. A Green Vessel Scheduling in Liner Shipping: Minimizing Carbon Dioxide Emission Costs. *International Journal of Transportation Science and Technology*, Elsevier.

[10] Dulebenets, M.A. A Comprehensive Multi-Objective Optimization Model for the Vessel Scheduling Problem in Liner Shipping. *International Journal of Production Economics*, Elsevier.

[11] Gilanifar, M., Cordova, J., Wang, H., Ozguven, E. E., and Arghandeh, R., "Advanced Traffic Load Forecasting using the Bayesian Spatio-temporal Data Fusion", (under review in *Transportation Research Record*).

[12] Haule, H., Sando, T., Kitali, A., and Richardson, R. Investigating Proximity of Crash Locations to Aging Pedestrian Residences. (under review in *Journal of Transportation Research Record*).

[13] Haule, H., Sando, T., Kitali, A., Angel, M., and Ozguven, E. Influence of Intersection Characteristics on Elderly Driver Crash Involvement. (under review in *Journal of Transportation Research Record*).

[14] Kitali, A., Kidando, E., Sando, T., Moses, R., Ozguven, E. Predicting the Likelihood of Aging Pedestrian Severe Crashes Using Dirichlet Random-Effect Bayesian Logistic Regression Model. (under review in *Journal of Transportation Research Records*).

[15] Kocatepe, A., Ulak, M. B., Ozguven, E. E., Horner, M., & Arghandeh, R., Socioeconomic Characteristics and Crash Proneness: A Case Study in Florida Using Two-step Floating Catchment Area Method, (under review in *Applied Geography*).

[16] Kocatepe, A., Ulak, M. B., Ozguven, E. E., Horner, M., Exposure of the Population to Severity-Weighted Crash Hotspots: An Integrated GIS and Random Parameter Model Approach, (under review in *Transportmetrica A*).

[17] Kocatepe, A., Ulak, M. B., Kakareko, G., Pinzan, D., Cordova, J., Ozguven, E. E., Jung, S., Arghandeh, R., and Sobanjo, J., "Assessment of Emergency Facility Accessibility in the Presence of Hurricane-related Roadway Closures and Prediction of Future Roadway Disruptions", (under Review in *Transportation Research Record*).

[18] Kocatepe, A., Ozguven. E. E., Horner, M., Ozel, H., Pet- and Special Needs-Friendly Shelter Planning in South Florida: A Spatial Capacitated p-Median-based Approach, (under review in *International Journal of Disaster Reduction*).

[19] Kocatepe, A., Ulak, M. B, Lores, J., Ozguven, E. E., Yazici, A., "Assessing the Factors that Affect the Public Engagement with Department of Transportation Twitter Accounts", (under review in *Transportation Research Record*).

[20] Lwambagaza, L., Sando, T., and Ozguven, E. Older Drivers' Behavior at On-Ramp Merging Areas (under review in *Journal of Transportation Research Record*).

[21] Njobelo, G., Sando, T., Sajjadi, S., Mtoi, E., Dulebenets, M., and Sobanjo, J. Enhancing The Green Light Optimized Speed Advisory System to Incorporate Queue Formation (under review in *Journal of Transportation Research Record*).

[22] Njobelo, G., Kitali, A., Machumu, K., and Sando, T. Calibration of VISSIM Discharge Headways Based on Field Measured Values and Naturalistic Driving Study Data (under review in *Journal of Transportation Research Record*).

[23] Twumasi-Boakye, R., Sobanjo, J., Inkoom, S., and Ozguven, E. E. Senior Community Resilience with a Focus on Critical Transportation Infrastructures: An Accessibility-based approach to healthcare, (under review in *Transportation Research Record*).

[24] Ulak, M. B., Ozguven, E. E., & Spainhour, L. Spatial Investigation of Crashes Involving Aging Drivers: A GIS-based Case Study in the Northwest Florida (under review in *Journal of Transport Geography*).

[25] Ulak, M. B., Ozguven, E. E., Moses, R., Sando, T., Boot, W., Abdelrazig, Y., & Sobanjo, J., Risk Propensity-Focused Assessment of Traffic Performance Measures and Safety: A Micro-simulation Based Analysis for an Unsignalized T-intersection (under review in *Transportmetrica B*).

[26] Ulak, M. B., Kocatepe, A., Sriram, L. M. K., Ozguven, E. E., and Arghandeh, R., Assessing the Hurricane-induced Power Outages from a Demographical, Socioeconomic and Transportation Perspective. (under review in *Transportation Research Record*).

[27] Ulak, M. B., Ozguven, E. E., Vanli, O., Dulebenets, M., Spainhour, L. Multimodal Investigation of Crashes Involving Aging Drivers, Passengers, Bicyclists and Pedestrians. (under review in *Transportation Research Record*).

[28] Ulak, M. B., Kocatepe, A., Ozguven, E. E., Horner, M. An Investigation of Crash Proximity to Residential Locations of Crash Occupants. (under review in *Transportation Research Record*).

[29] Pinzan, D., Kocatepe, A., Gilanifar, M., Ulak, M. B., Ozguven, E. E., and Arghandeh, R., "Data-driven and Hurricane-focused Metrics for Combined Transportation and Power Networks Resilience", (under review in *Transportation Research Record*).

[30] Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. Do Transit Oriented Development Provide Greater Local Neighborhood Access to Activities for Older Adults? (under review in *Journal of Transport and Land Use*).

[31] Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. Assessing Transit Oriented Development for Older Adults: Geographical, Modal, and Built Environmental Factors (under review in *Transport Policy*).

[32] Wood, J., Brown, J., & Marques, M. Older Adults and Transportation Preferences: Results from a Community Survey and Interviews. (under review in *Transportation Research Record*). 19 pages.

***The following papers were presented at conferences, meetings, workshops, etc.:***

[1] Alisan, O., Kocatepe, A., Tuydes-Yaman, H., Ozguven, E. E., & Ozel, H. (2017). Benefits of Managing Special Needs Shelters (SPNS) Capacities with Utilizing Cross-county Collaboration: A Case Study Application in Florida. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[2] Bommineni, V., Zhou, V., Ponnaluri, S., Ulak, M. B., Kocatepe, A., & Ozguven, E. E. (2017). A GIS-based Comparative Livability Analysis between Florida Counties with a Focus on 65+ Cohort. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[3] Bond, M., Brown, J. R., & Wood, J. (2017). Adapting to Challenge: Examination of Older Adult Transportation in Rural and Small Communities. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[4] Boot, W. R., Barajas, K., Mitchum, A., Stothart, C., & Charness, N. (2016). Ensuring the safety and accessibility of transportation for an aging population. In J. Zhou & Salvendy, G. (Eds). Human

aspects of IT for the aged populations: Design for aging. Second International Conference, ITAP 2016, Held as Part of HCI International 2016, Toronto, ON, Canada, July 17–22, 2016, Proceedings, Part I, P. 386-394. Springer.

[5] Charness, N. (2017). Panelist in Jean-Marc Fix (Moderator) Senior Citizen in 2050 (General Session VI), Society of Actuaries: Orlando, FL, January.

[6] Charness, N. (2017). Franklin V. Taylor and the Challenges for Engineering Psychology in an Aging World. Franklin V. Taylor Award address. American Psychological Association Meetings, Washington, DC, August.

[7] Douglas, R., Kocatepe, A., Barrett, A., Ozguven, E. E., & Gumber, C. (2017). Pet Evacuation Preparedness: An Examination of Older Adults' Needs for and Proximity to Pet-friendly Shelters in Florida. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[8] Dulebenets, M.A., Moses, R., Ozguven, E.E., & Sando, T. (2017). Improving Environmental Sustainability within Emission Control Areas in Liner Shipping: Review and Analysis of Different Regulations. INFORMS Annual Meeting 2017. Houston TX, October 22-25 - lectern session.

[9] Dulebenets, M.A. (2017). Minimizing Vessel Service Costs in Berth Scheduling via Evolutionary Computation with Deterministic Parameter Control. INFORMS Annual Meeting 2017. Houston TX, October 22-25 - lectern session.

[10] Dulebenets, M.A., Ozguven, E.E., Moses, R., & Sando, T. (2017). Vessel Scheduling Problem in a Liner Shipping Route with Perishable Products. INFORMS Annual Meeting 2017. Houston TX, October 22-25 - lectern session.

[11] Dulebenets, M.A., Ozguven, E.E., Moses, R., & Sando, T. (2017). Advantages of the Parameter Control Strategy over the Parameter Tuning: A Case Study for the Berth Scheduling Problem at Marine Container Terminals. INFORMS Annual Meeting 2017. Houston TX, October 22-25 - lectern session.

[12] Dulebenets, M.A., Abioye, O., Ozguven, E.E., Moses, R., Boot, W., & Sando, T. (2017). A Comprehensive Assessment of Various Factors on Driving Ability of Individuals. INFORMS Annual Meeting 2017. Houston TX, October 22-25 - lectern session.

[13] Dulebenets, M.A., Pujats, K., Deligiannis, N., Golias, M., & Mishra, S. (2017). Development of Tools for Processing Truck GPS Data and Analysis of Freight Transportation Facilities. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[14] Dulebenets, M.A. (2017). Evaluation of Various Carbon Dioxide Taxation Schemes in Liner Shipping. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[15] Dulebenets, M.A. (2017). Green Vessel Scheduling in Liner Shipping: Modeling Transit Time Requirements in a Route with Emission Control Areas. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12. Poster session.

[16] Dulebenets, M.A. (2017). Vessel Scheduling in Liner Shipping: Deployment of a Heterogeneous Vessel Fleet. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12. Poster session.

[17] Dulebenets, M.A. (2017). A Comprehensive Analysis of Yard Truck Dispatching at Marine Container Terminals. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12. Poster session.

[18] Dulebenets, M.A., Golias, M., & Amini, M. (2016). Management of Supply Chains with Perishable Assets. INFORMS Annual Meeting 2016. Nashville TN, November 13-16.

[19] Dulebenets, M.A., Golias, M., & Mishra, S. (2016). Environmental Considerations in Liner Shipping and Vessel Scheduling. INFORMS Annual Meeting 2016. Nashville TN, November 13-16.

[20] Kakareko, G., Jung, S., Ozguven, E. E., and Weresa, S. (2017). A New Approach for Road Closure Probability Estimation Caused by Hurricane Winds", Presented at the ASCE Engineering Mechanics Institute Conference, San Diego, CA, USA, June 4-7.

[21] Kitali, A., Kidando, E., Sando, T., Moses, R., and Ozguven, E. E., (2017). Evaluating Pedestrian Crash Severity using Bayesian Complementary Log-log Model for Improved Reduction Accuracy, Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[22] Kocatepe, A., Ulak, M. B., Lores, J., Ozguven, E. E., & Yazici, M. A. (2017). Assessing the Factors that Affect the Public Engagement with Department of Transportation Twitter Accounts. Paper to be presented at The International Symposium on Location-Based Social Media Data and Tracking Data, ICA Commission on Geospatial Analysis and Modeling & ICA Commission on Location-based Services, Washington, D.C., USA, July 1-2.

[23] Kocatepe, A., Ulak, M. B., Ozguven, E. E., Horner, M., & Spainhour, L. (2017). Socioeconomic Characteristics and Crash Proneness: A Case Study in Florida Using Two-step Floating Catchment Area Method. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[24] Kocatepe, A., Ozguven, E. E., Ozel, H., Horner, M. W., & Moses, R. (2016). Transportation Accessibility Assessment of Critical Emergency Facilities: Aging Population-focused Case Studies in Florida. In Jia Zhou, & Gavriel Salvendy (Eds.), Second International Conference, ITAP 2016, Held as Part of HCI International 2016 (pp. 407-416). Toronto, Canada. Retrieved from http://www.springer.com/us/book/9783319399485

[25] Kitali, A., Sando, T., Castro, A., and Mwakalonge, J. (2017). "Developing Crash Modification Factors to Quantify Impacts of Pedestrian Countdown Signals to Drivers". Presented at the Transportation Research Board's 96th Annual Meeting, Washington DC, January 8-12.

[26] Lwambagaza, L., Sando, T., Mtoi, E., Ozguven, E. E., & Sobanjo, J. (2017). Age-Based Simulation of Driver Merging Behavior at Freeway Merging Ramps. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[27] Moses, R., Kidando, E., Abdelrazig, Y., & Ozguven, E. E. (2016). Travel Time Reliability on Elderly Drivers Crash Severity. Paper presented at 18th International Conference on Civil, Construction and Safety Engineering, World Academy of Science, Engineering and Technology, Singapore, SG.

[28] Omidvar, A., Ozguven, E. E., Vanli, A., and Tavakkoli-Moghaddam, R. (2017). A Two-Phase Safe Vehicle Routing and Scheduling Problem: Formulations and Solution Algorithms", Accepted for Presentation at the INFORMS Transportation Science and Logistics Conference, Chicago, IL, USA, July 26-29.

[29] Ozguven, E. E. (2016). Integrated Assessment of Safety, Accessibility and Reliability for Aging Roadway Users: Case Studies in Florida. In David Eby, James Sayer, and Jack Hu (Chair), *Safe Transportation & Aging Symposium*. Presented at Symposium conducted at the meeting of Advancing Transportation Leadership and Safety (ATLAS), Ann Harbor, Michigan, USA.

[30] Sriram, L. M. K., Cordova, J., Ulak, M. B., Ohlsen, M., Ozguven, E. E., Arghandeh, R., and Kocatepe, A. (2017). Advanced Electricity Load Forecasting Combining Electricity and Transportation Network, Presentation at the 49th North American Power Symposium, September 17-19, Morgantown, West Virginia, USA.

[31] Souders, D.J. & Charness, N. (2017). "Issues Surrounding the Use of Advanced Driver Assistance Systems and Autonomous Vehicles to Aid Safe Mobility for Life." Lectern presentation at the Safe Mobility for Life Coalition Winter Meeting, Tallahassee, FL., February.

[32] Souders, D.J., & Charness, N. (2017). "Can Advanced Driver Assistance Systems Support Accessibility and Safety for an Aging Population?" Lectern presentation at the Mid-Year Meeting for TRB's Committee on Safe Mobility of Older Person (ANB60), Wood's Hole, MA. August.

[33] Stothart, C., Boot, W. R., Simons, D., Charness, N., & Wright, T. (2016). Age effects on inattentional blindness: Implications for driving. In J. Zhou & Salvendy, G. (Eds). Human aspects of IT for the aged populations: Design for aging. Second International Conference, ITAP 2016, Held as Part of HCI International 2016, Toronto, ON, Canada, July 17–22, 2016, Proceedings, Part I, P. 441-448. Springer.

[34] Ulak, M. B., Kocatepe, A., Ozguven, E. E., Horner, M., & Spainhour, L. (2017). A GIS-based Spatial and Statistical Analysis of Severe Crash Hotspot Accessibility to Hospitals. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[35] Ulak, M. B., Ozguven, E. E., Moses, R., Sando, T., Boot, W., Abdelrazig, Y., & Sobanjo, J. (2017). Aging Driver-Focused Assessment of Traffic Performance Measures and Safety with a Micro-simulation Based Analysis in Florida. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[36] Valdez-Torres, Y., Duncan, M., Horner, M. & Wood, B. (2017). Promoting Transit Oriented Development for Older Adults: A Survey of Transit Agencies and Local Governments in the US. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[37] Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. (2017). Assessing Transit Oriented Development for Older Adults: Geographical, Modal, and Built Environmental Factors. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[38] Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. (2017). Do Transit Oriented Development Provide Greater Local Neighborhood Access to Activities for Older Adults? Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

[39] Yazici, M. A., Kocatepe, A., & Ozguven, E. E. (2017). Urban Travel Time Variability in New York City: A Spatio-Temporal Analysis within Congestion Pricing Context. Presented at Transportation Research Board, 96th Annual Meeting. Washington DC, January 8-12.

***The following papers have been submitted and are under review for conferences, meetings, workshops, etc.:***

[1] Charness, N., Roque. N, Boot, W., Paedae, A. B., Kaschak, M., Arpan, L., Cortese, J., Clayton, R., Barajas, K., Stothart, C., &. Holley, G. M. Empirical Validation of Tip Card Designs for Aging Road Users. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 – submitted.

[2] Charness, N., Roque. N, Boot, W. Paedae, A. B., Kaschak, M., Arpan, L., Cortese, J., Clayton, R., Barajas, K., Stothart, C., &. Holley, G. M. Using Human Factors Studies to Educate Aging Road Users about Traffic Control Devices in Florida. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 – submitted.

[3] Deng, O., Mullings, A., Kovankaya, Y., Byrd, M., Ulak, M., Kocatepe, A., and Ozguven, E. E. Geographic Information System-based Impact Analysis of Hurricane Hermine: Case Study in Tallahassee, Florida. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 – accepted.

[4] Dulebenets, M.A. A New Collaborative Agreement for an Effective Vessel Scheduling in Liner Shipping. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 – submitted.

[5] Dulebenets, M.A. Vessel Scheduling in Liner Shipping: A Multi-Objective Optimization Model for a Comprehensive Analysis of the Conflicting Objectives. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[6] Dulebenets, M.A., Rahimi, A.M., & Mazaheri, A. The Access Management Application for Improving Performance of a Signalized Intersection. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[7] Dulebenets, M.A., Moses, R., Ozguven, E.E., & Vanli, A. Berth Scheduling at Marine Container Terminals: Minimizing Carbon Dioxide Emissions due to Container Handling. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[8] Dulebenets, M.A., Moses, R., Ozguven, E.E., & Sando, T. Minimizing Vessel Service Costs in Berth Scheduling at Marine Container Terminals via Parallel Evolutionary Algorithms. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[9] Dulebenets, M.A., Ozguven, E.E., Moses, R., & Ulak, M.B. Intermodal Freight Network Design Problem: Consideration of the Product Perishability. Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[10] Dulebenets, M.A., Abioye, O., Ozguven, E.E., Moses, R., Boot, W., & Sando, T. Assessing the Effects of Various Factors on the Driving Ability of Individuals: A State-of-the-Art Review of the Existing Practices. University Transportation Center (UTC) Conference for the Southeastern Region. Gainesville, FL, November 16-17, 2017 - submitted.

[11] Dulebenets, M.A., Ozguven, E.E., Moses, R., Boot, W., Sando, T., Abioye, O., & Lewis, K. Development of Statistical Models for Prediction of Various Driving Performance Indicators under Emergency Evacuation. University Transportation Center (UTC) Conference for the Southeastern Region. Gainesville, FL, November 16-17, 2017 - submitted.

[12] Duncan, M., Valdez-Torres, Y., Horner, M. & Wood, B., Modeling the Presence of Older Adults at US Transit Stations (submitted for presentation at the ACSP 57th annual conference).

[13] Kocatepe, A., Ozkul, S., Ozguven, E. E., Sobanjo, J., Moses, R., The Value of Freight Accessibility in the Tampa Bay Region, Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[14] Ulak, M.B., Ozguven, E.E., Vanli, A., & Dulebenets, M.A. Comparative Investigation of Crashes Involving Aging Drivers, Passengers, Bicyclists, and Pedestrians: A Tobit Model-based Approach. 20th Euro Working Group on Transportation Meeting, EWGT 2017. Budapest (Hungary), September 04-06, 2017 - submitted.

[15] Sanusi, F., Sobanjo, J., Ozguven, E., and Sando, T. Preliminary Assessment of Potential Impacts of Connected Autonomous Vehicles on Mobility and Conflicts in a Work Zone; A Micro-simulation Based Approach, Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[16] Chityala, S., Sobanjo, J., Ozguven, E., Sando, T., and Twumasi-Boakye, R. Driver Behavior in Mixed Connected-Automated and Conventional Vehicle Traffic at a Freeway Merge, Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[17] Twumasi-Boakye, R., Sobanjo, J., Inkoom, S., and Ozguven, E. E. Senior Community Resilience with a Focus on Critical Transportation Infrastructures: An Accessibility-based approach to healthcare, Transportation Research Board, 97th Annual Meeting. Washington DC, January 7-11, 2018 - submitted.

[18] Wood, B., Horner, M., Duncan, M. & Valdez-Torres, Y. Do Transit Oriented Development Provide Greater Local Neighborhood Access to Activities for Older Adults? (Submitted to 2017 World Symposium for Transport and Land Use).

## Website(s) or other Internet site(s)

Hosted on a computer server at FSU, a website has been developed and maintained to provide information about the Center (http://www.utc.fsu.edu/).  A Facebook page is being maintained (https://www.facebook.com/The-Center-for-Accessibility-and-Safety-for-an-Aging-Population-1444922912427725/).  A twitter account is also maintained at (http://twitter.com/UTC_FSU).

## Technologies or techniques

Nothing to report.

## Inventions, patent applications, and/or licenses

Nothing to report.

## Other products

Nothing to report.

# 3. Participants & collaborating organizations

❖ Our UTC is a member of the *Council of University Transportation Centers (CUTC)*.

❖ There are *collaborations with public agencies:* Florida Department of Transportation (FDOT)'s Research Office; FDOT's Safe Mobility for Life Program; and FSU's Claude Pepper Institute for Aging. Also, through their membership in the external and internal advisory boards, the agency or organization (employer) of the various members were involved in the Center's activities. Some of our partners reviewed research proposals and draft final reports from the Center, and have also served as speakers at the Center's seminars and conferences.

❖ A research project was funded by the *National Science Foundation, involving one of ASAP researchers, Dr. Eren Ozguven, as a co-Principal Investigator:* Arghandeh, R. (PI), Ozguven, E. E. (Co-PI), Hou, J., UHDNetCity: User-Centered Heterogeneous Data Fusion for Multi-Networked City Mobility, Award Amount: $233,123.00, Award Period: 09/01/2016-02/28/2018.

❖ A research project was funded by the **National Science Foundation**, involving one of ASAP researchers, Dr. Eren Ozguven, as a co-Principal Investigator: Yazici, A. (PI), Ozguven, E. E. (Co-PI), Mondros, J. (Co-PI), Boot, W. (Co-PI), Eby, D. (Co-PI), One Bridge at a Time: Bridging the Digital Divide for the Well-Being of Aging Populations in Smart and Connected Communities, Award Amount: $499.999.00, Award Period: 09/01/2017-08/31/2021.

❖ Support research project funded by the *Florida Department of Transportation (Research Office)* and used for cost sharing at our Center is listed as follows.

- Michael Duncan, PI: Enhanced Mobility for Aging Population Using Automated Vehicles, BDV30 977-11 (since June 2014).
- Neil Charness, PI, Co-PIs Walter Boot, Michael Kaschak, Laura Arpan; Co-Is Juliann Cortese, Russell Clayton: Human factors guidelines to develop educational tip cards for aging road users, BVD30 TWO 977-15.

❖ For the reporting period, the following Center's affiliated faculty and graduate students have the listed *award, services, and are on the listed national, regional and local committees*:

### *Awards:*

*Shonda Bernadin: Inspiring Leaders in STEM award, Insight into Diversity (2017).*

*Jeffrey Brown: Charley V. Wootan Award for Best Paper in Transportation Policy, presented by Transportation Research Board, 2016. Presented for Morris, E., Brown, J. R., & Taylor, B. D. (2016). Negotiating a Financial Package for Freeways: How California's Collier-Burns Highway Act Helped Pave the Way for the Era of the American Interstate Highway. Transportation Research Record 2552, 16-22. doi:10.3141/2552-03.*

*Walter Boot: Elected Fellow, American Psychological Association (2016); Elected Fellow, Gerontological Society of America (2017). The Earl Alluisi Award, by the American Psychological Association's Division 21 (Applied Experimental and Engineering Psychology) (2017).*

*Neil Charness and Walter Boot: APA Prize for Interdisciplinary Team Research, American Psychological Association (2016).*

*Neil Charness: The Franklin V. Taylor Award for Outstanding Contributions in the Field of Applied Experimental / Engineering Psychology, from Division 21 (Applied Experimental and Engineering*

*Psychology) of the American Psychological Association, (2016). M. Powell Lawton Distinguished Contribution Award for Applied Gerontology, from Division 20 (Adult Development and Aging) of the American Psychological Association, (2016). Director, Institute for Successful Longevity (ISL), (2016).*

**Maxim Dulebenets:** *First Year Assistant Professor (FYAP) Award, FAMU-FSU College of Engineering – 2016; Biologistics Fellow, FedEx Institute of Technology, the University of Memphis – 2016.*

**John Sobanjo:** *Elected Fellow, American Society of Civil Engineers (ASCE) (2016).*

**Thobias Sando:** *Topic Expert in the Fatigue Committee of the Florida Transit Safety Network (2016).*

**Dustin Souders:** *University Transportation Center Student of the Year (2017).*

### *Service and committees:*

**Walter Boot:** *Associate Editor, Journal of Experimental Psychology: Applied, 2014–present.*

**Jeffrey Brown:** *Member, ABG50 Transportation History Committee, Transportation Research Board (TRB); Member and Review Coordinator, AP075 Light Rail Transit Committees, Transportation Research Board (TRB).*

**Maxim Dulebenets:** *Membership Coordinator, Standing Committee on Ports and Channels (AW010) of the Transportation Research Board – since 2016; Invited Young Member, Standing Committee on Ports and Channels (AW010), Transportation Research Board – since 2015; Editorial Board Member, International Engineering Science Technology Online Conference, Jan 2017 – to date.*

**Michael Duncan:** *Member of TRB standing committee AP045 (Intermodal Transfer Facilities).*

**Mark Horner:** *Chair, ADD20 Social and Economic Factors of Transportation, Standing Committee, Transportation Research Board (TRB); Member, ABJ60, Geographic Information Sciences and Applications, Standing Committee, Transportation Research Board (TRB). U.S. Co-Editor, Transportation (Springer).*

**Eren Ozguven:** *Member, Time, Speed and Reliability (TTSR) Subcommittee, Transportation Research Board (TRB).*

**John Sobanjo:** *Member, Editorial Board, ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, American Society of Civil Engineers (ASCE) / American Society of Mechanical Engineers (ASME), 2014 – Present; Associate Editor, ASCE Journal of Bridge Engineering, American Society of Civil Engineers (ASCE), 2014 - Present.*

**Dustin Souders,** *Student Representative, the ANB60 TRB Committee.*

# 4. Impact

There is not much to report at this time on the impact.

# 5. Changes/Problems

Nothing to report.

# 6. Special reporting requirements

Nothing to report.