

USDOT Awards the UF Transportation Research Center a \$3.5 Million Regional UTC



Fall/Spring 2011-2012

Message from the Director

In this Issue

Message from the Director	2
Workshops	3
CMS Projects	4
CMS Final Reports	5
Spotlight on Research: CMS Assists the Florida Department of Transportation with Freeway Management for I-95 and I-4	6
USDOT Awards the UF Transportation Research Center a \$3.5 million Regional University Transportation Research Center	8
K-12 Workforce Development in Transportation at UF Initiated through CMS Funded Project	11
WTS Transportation Symposium	12
Student Field Trip to Paynes Prairie	13
Student Awards	14
Student Spotlight Dimitra Michalaka	15

Dear colleagues,

This past academic year was probably one of the most intense at the CMS, as faculty, staff and partners from other institutions in the southeastern U.S. joined forces to compete for a regional USDOT/RITA University Transportation Center (UTC). With only three months to prepare for the regional UTC competition, the eight member transportation research team, which include Auburn University, Florida International University, Georgia Institute of Technology, Mississippi State University, North Carolina State University, the University of Alabama at Birmingham, and the University of North Carolina at Chapel Hill, worked diligently to deliver an outstanding proposal with a strong focus on the critical research needs in the southeast. In January 2012, I was notified that the Region 4 UTC was awarded to our consortium and ever since we have hit the ground running, issuing a call for proposals, creating a website, deploying K-12 workforce development programs and more. I am delighted to be working with our partners in the consortium as they bring a wealth of expertise to the new center. Pages 8 and 9 of this newsletter contain more information on the new regional UTC also known as the Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE).

This newsletter highlights CMS research completed during this past year, as well as other educational and tech transfer initiatives and activities undertaken. One of the key research areas at the CMS has been the study of freeway management strategies such as ramp metering, congestion pricing, and variable speed limits, which are implemented around the country and internationally. This issue highlights the research conducted in collaboration with FDOT to understand the impacts of these strategies and optimize their impact when they are implemented separately and in combination. If you are interested in



additional information, these research reports as well as all CMS research projects that have been completed are posted at <http://cms.ce.ufl.edu>.

In August 2011, the UF Transportation Research Center, the CMS and the McTrans Center, hosted once again an annual summer workshop focusing on the traffic simulation tool, CORSIM. The workshop attracted more than 40 transportation professionals from the public and private sectors. Information on this year's upcoming workshop (August 17, 2012, in Orlando, Florida) on freeway management strategies is provided on page 3.

This past year we also initiated a wealth of workforce development activities, including family engineering night for local schools, and the development and delivery of LEGO Robot Vehicle Lesson Plans (see page 10). We anticipate that these activities will continue and be expanded to other parts of the Southeast as part of the STRIDE Center.

I hope you find this newsletter informative and useful. Enjoy reading!

Sincerely,

A handwritten signature in black ink, appearing to read 'Lily Elefteriadou'.

Lily Elefteriadou, Ph.D.
CMS & STRIDE Director



Upcoming Workshop

Freeway Management Strategies

Friday, August 17, 2012
Royal Plaza Orlando Hotel
Lake Buena Vista, Fla.

The Transportation Research Center (TRC), CMS, STRIDE and McTrans at the University of Florida have developed a workshop on Freeway Management Strategies. Six professional development hours (PDHs) are offered to PE license holders in the state of Florida. This workshop is appropriate for freeway operations managers, analysts, researchers and educators. Participants will obtain the latest information regarding advanced management strategies for freeway systems, learn about bottlenecks, their types, and options for their mitigation, and review the tools used to perform freeway systems analysis.

Workshop Presenters

Lily Elefteriadou, *University of Florida*
David Hale, *University of Florida*
Clark Letter, *University of Florida*
Dimitra Michalaka, *University of Florida*
Holly Walker, *Florida Department of Transportation*
Scott Washburn, *University of Florida*

Workshop Registration

Early-bird \$245 (by July 15th)
Regular \$295
Workshop sponsors \$165

To register, visit http://trc.ce.ufl.edu/news_and_events/conferences_events.php

Sponsorship

A reduced registration rate is available for companies, organizations or agencies interested in sponsoring the Freeway Management Workshop. Various levels are available. Contact Ines Aviles-Spadoni at iaviles@ce.ufl.edu or call at 352-392-9537, Ext. 1409.

CORSIM



The UF Transportation Research Center, McTrans, and the Center for Multimodal Solutions for Congestion Mitigation, held a workshop on CORSIM, a traffic simulation tool that combines the ability to model arterials as well as uninterrupted flow facilities such as freeways and two-lane highways. The workshop was held on **August 19, 2011** in Orlando,

Fla. and was attended by 40 transportation professionals from the private and public sectors. The Transportation Research Center at UF offers workshops every August. Previous workshops focused on the roundabouts and the 2010 Highway Capacity Manual. For more information visit http://trc.ce.ufl.edu/news_and_events/corsim_workshop_2011.php

CMS Project Status

For a list of completed projects and final reports, visit http://cms.ce.ufl.edu/research/completed_projects.php

Completed Projects

Novel Approaches for Road Congestion Minimization
(Project # 2010-001)
PI: **Panos Pardalos**, Ph.D.
Department: *Industrial & Systems Engineering*

Protecting Public Interests in Public-Private-Partnership Arrangements for Highway Improvement Projects
(Project # 2010-002)
PI: **Yafeng Yin**, Ph.D.
Department: *Civil & Coastal Engineering - Transportation*

Enhancing CORSIM for Simulating High Occupancy/Toll Lane Operations
(Project # 2010-005)
PI: **Yafeng Yin**, Ph.D.
Department: *Civil & Coastal Engineering - Transportation*

Validity and Usability of a Safe Driving Behaviors Measure for Older Adults: Strategy for Congestion Mitigation
(Project # 2010-012)
PI: **Sherrilene Classen**, Ph.D.
Department: *Occupational Therapy*

The Effects of Impact Fees in Urban Form and Congestion in Florida
(Project # 2010-013)
PI: **Andres Blanco**, Ph.D.
Department: *Urban & Regional Planning*

Nonlinear Road Pricing for Congestion and the Environment
(Project # 2010-016)
PI: **Siriphong (Toi) Lawphongpanich**, Ph.D.
Department: *Industrial & Systems Engineering*

Impacts of Efficient Transportation Capacity Utilization via Multi-Product Consolidation on Transportation Network Usage and Congestion
(Project # 2010-018)
PI: **Joseph Geunes**, Ph.D.
Department: *Industrial & Systems Engineering*

Enhancement of a Network Analysis Tool to Accommodate Multiple Construction Work Zone Analysis
(Project # 2010-017)
PI: **Ralph Ellis**, Ph.D.
Department: *Civil & Coastal Engineering - Construction*

LEGO Robot Vehicle Lesson Plans for Secondary Education - A Recruitment Tool
(Project # 2011-001)
PI: **Nina Barker**, T² Center

On-going Projects

Development of an Analytical Methodology for Two-Lane Highway Facility Analysis
(Project # 2010-007)
PI: **Scott Washburn**, Ph.D.
Department: *Civil & Coastal Engineering - Transportation*

Route-Choice Modeling using GPS-Based Travel Surveys
(Project # 2011-008)
PI: **Siva Srinivasan**, Ph.D.
Department: *Civil & Coastal Engineering- Transportation*

Privacy Preserving Methods to Retrieve Origin-Destination Information from IntelliDriveSM Vehicles
(Project # 2011-009)
PI: **Yafeng Yin**, Ph.D.
Department: *Civil & Coastal Engineering- Transportation*

Florida Long Distance Travel Characteristics and Their Impacts on Transportation Systems
(Project # 2011-013)
PI: **Ruth Steiner**, Ph.D.
Department: *Urban & Regional Planning*

Strengthening the Resiliency of the Coastal transportation System Through Integrated Simulation of Stormsurge, Inundation, and Non-Recurrent Congestion in Northeast Florida
(Project # 2011-017)
PI: **Peter Sheng**, Ph.D.
Department: *Civil & Coastal Engineering- Coastal Engineering*

Modeling the Interaction among Urban Form, Accessibility, Congestion, and Travel Behavior using System Dynamics
(Project # 2011-019)
PI: **Ruth Steiner**, Ph.D.
Department: *Urban & Regional Planning*

The Impacts of Freight Mode Splitting on Congestion, Risk, and Delivery Reliability
(Project # 2011-023)
PI: **Joseph Geunes**, Ph.D.
Department: *Industrial & Systems Engineering*

CMS Final Reports Highlights

Protecting Public Interests in Public-Private-Partnership Arrangements for Highway Improvement Projects

Investigators: Yafeng Yin, Ph.D. Civil Engineering & Siriphong Lawphongpanich, Ph.D., Industrial & Systems Engineering
(Project # 2010-002)

Engaging private investors and entrepreneurs through public-private partnership (PPP) in constructing and operating transportation facilities has emerged as a viable option for developing and maintaining transportation systems. Facilities developed via PPP (i) do not require public funding in principle, (ii) are often delivered on-time and within specifications, (iii) allow government to share investment risks with the private sector and (iv) are typically better operated and managed. On the other hand, the tendency for private companies to maximize their profits may compromise public interests. Companies may impose toll rates too high or fail to offer quality service. Developments through PPP involve three stages. The first is the project selection stage where government agencies select projects that benefit society and are attractive for private investments. In the second stage, governments grant concessions to private companies, typically to those submitting the best bids at an auction. In the third and final stage, governments must negotiate the terms of contracts to protect public interests during the concession period. This project addresses the project selection stage, and it offers a mathematical procedure for selecting transportation projects to maximize the benefit to society. When it is used for selecting new (toll) roads to build, the proposed procedure also provides optimal tolls for the selected roads. The project report includes numerical examples of how to use the procedure.

Validity and Usability of a Safe Driving Behaviors Measure for Older Adults: Strategy for Congestion Mitigation

Sherrilene Classen, Ph.D., Occupational Therapy
(Project # 2010-012)

Understanding a driver's "level" of ability or difficulty with driving behaviors is a critical step that can help us identify at-risk drivers and provide an entry point for effective interventions. In this study we established the Safe Driving Behavior Measure (SDBM) properties and refined the measure informed by mixed methods including Item Response Theory (IRT) and qualitative research. Focus groups with older drivers, caregivers, and occupational therapists helped us create a web-based version of the SDBM that was user-friendly and provided useful safety recommendations. From a measurement perspective, we addressed content, construct and criterion validity. Content validity ratings from experts indicated that we had included relevant and theory based items on the measure. Construct validity, measured in part by the factor structure analysis, demonstrated that the items on the measure were addressing the construct of safe driving. We looked at item difficulty and person ability through item/person-level psychometrics. We determined the rater severity of the three rater groups (older driver, caregiver, and driving evaluator). Criterion validity of the SDBM examined how well the SDBM results predicted outcomes of the gold standard on-road driving evaluation. Lastly, we developed the SDBM as a web-based tool including keyforms (rating profiles), ratings-based driver categories (i.e. basic, routine and accomplished), and targeted recommendations for each driver category (i.e. next steps to assist in determining fitness to drive or to support driver health, knowledge and skills). The findings suggests that the SDBM may be useful for: (1) family members/caregivers to identify at-risk older drivers and to follow logical next steps based on keyform recommendations; (2) occupational therapy practitioners to identify an entry point for further interventions or referrals; and (3) Certified Driving Rehabilitation Specialists to develop realistic and targeted intervention goals to promote driving fitness. Improving fitness to drive among older adults has potential to reduce crashes thereby decreasing crash-related congestion.

The Effects of Impact Fees in Urban Form and Congestion in Florida

Andres Blanco, Ph.D., Urban & Regional Planning
(Project # 2010-013)

Impact fees are financial tools that generate revenue to construct or improve public facilities such as roads, water/sewer, parks and schools for serving new development. Impact fees could be effective in controlling growth rates and development location by increasing densities, thus encouraging compact city development because they could increase the marginal cost of development in the urban fringe. By incentivizing compact development, impact fees could be an effective way to reduce congestion. This study provided empirical evidence of this potential by analyzing the effects of impact fees on growth management and transportation-related revenue in Florida.

Impacts of Efficient Transportation Capacity Utilization via Multi-Product Consolidation on Transportation Network Usage and Congestion

Joseph Geunes, Ph.D., Industrial & Systems Engineering
(Project # 2010-018)

In practice, retail store inventories are often replenished using truckload shipments from regional distribution centers. The problem of determining how often to send a truckload shipment to a store, as well as the mix of products to send on the truck, turns out to be extremely challenging mathematically. The best known and most widely applied approaches for solving such problems in practice use approximations of the problem and, despite this, still cannot guarantee optimal solutions for problems of reasonable size. These approaches tend to ignore truck capacities and use only a rough approximation of costs associated with truckload shipments. In particular, these approaches tend to underestimate the costs of truckload shipments, which results in a greater number of shipments of smaller quantities. This, in turn, contributes to traffic congestion due to a greater number of truck trips from the distribution center to the retail store. This research provides a mathematical model for this problem class that accurately captures the economics of truckload shipments. This model determines which sets of products to ship together on common trucks, as well as how frequently to send these groups of items. In addition, this work provides solution methods for the resulting optimization problem using advanced optimization techniques. Using a broad set of randomly generated test instances with problem parameters consistent with those found in practice, the results show that the proposed model and solution methods result in much greater truck utilization and a corresponding reduction in the number of truckload shipments required to meet product demands.



Spotlight on Research

CMS Assists the Florida Department of Transportation with Freeway Management for I-95 and I-4

By Yafeng Yin, Ph.D., Associate Professor
Principal Investigators: Yafeng Yin, Lily Elefteriadou and Scott Washburn
Staff and Graduate Students: Vipul Modi, Clark Letter, Evangelos Mintsis, Di Wu, Ashish Kulshrestha, Dimitra Michalaka, Jie Lu

CMS has worked on two projects related to freeway operations along I-95 in Miami and I-4 in Orlando. The research for the I-95 focused on the congestion pricing system and its interaction with ramp metering, also installed along the same corridor. The research team also evaluated whether Variable Speed Limit (VSL) would be effective along the same stretch of road.

Congestion Pricing I-95 Express

The Florida Department of Transportation implemented high occupancy/toll (HOT) lanes, known as 95 Express, in the Miami and Fort Lauderdale regional area on I-95. The system will eventually be approximately 22 miles long, extending from the I-95 interchange at SR-112 north of the Broward Boulevard Park-and-Ride lot. The primary goal of 95 Express is to safely and efficiently maximize the throughput of the facility while providing free-flow services, more specifically, travel speeds greater than or equal to 45 mph, on the HOT lanes. To achieve these objectives, dynamic tolling is implemented.

UF researchers attempted to answer a variety of questions relevant to the operations and management of HOT lanes, including (1) whether a HOT-lane system under dynamic tolling exhibits hysteresis-like behavior that motorists periodically shift their departure times to cope with the volatility of the toll being charged; (2) whether dynamic tolling

necessarily performs better than static or time-of-day tolling; (3) whether and how the reduced lane, shoulder widths, delineators, and designs of ingress/egress points have affected the capacity and operations of the toll lanes and the general-purpose (GP) lanes of 95 Express; (4) enhancement and evaluation of the tolling algorithms for the current and future 95 Express; (5) exploring interactions between dynamic tolling and ramp metering and (6) whether variable speed limits could/should be considered for incorporation into 95 Express.

Simulation experiments show that at the current demand level of 95 Express, the system achieves a certain degree of equilibrium. However, if the demand increases to a level that leads to severe congestion, the system may exhibit hysteresis-like behavior where travelers are constantly shifting their departure times on a day-to-day basis. In that case, the system performance is unstable and volatile. The experiments also confirm

that the dynamic tolling algorithm of 95 Express is able to manage the traffic demand and maintain a superior performance on the HOT lanes. When the demand pattern is predictable, time-of-day or even static tolling could perform equally well, provided that the toll profiles are optimized against the demand pattern. However, since dynamic tolling is adaptive to demand fluctuations, its performance is more robust and stable.

In the second phase of the study, researchers examined the effect of certain features of 95 Express on capacity and operations. 95 Express HOT lanes were formed by separating them from the GP lanes with a series of plastic poles and reducing lane widths from 12 to 11 feet. A detailed examination of capacity before and after implementation of 95 Express was conducted. Data collected revealed no substantial impact on capacity due to lane widths, but the proximity of the plastic delineators reduced utilization of the adjacent GP lane.

The third phase of the study focused on enhancing the dynamic tolling algorithm of the current 95 Express and making recommendations for tolling of the future 95 Express. The researchers proposed a new approach to fine-tuning the parameters of the current tolling algorithm. They also reviewed the current practice of multi-segment HOT lane facilities across the country, compared the pros and cons of different toll structures for this type of facilities. Researchers then recommended the zone-based tolling structure for the future 95 Express. Two zoning designs were proposed and then evaluated using an enhanced version of the CORSIM micro-simulator.

The fourth phase of the study explored the interactions between dynamic tolling and ramp metering when both operate concurrently at the same facility. The analysis showed that an increase in the toll rate is rendering the HOT lanes less preferable, shifting traffic to the GP lanes. This causes the metering rate to become more restrictive. Based on the analysis conducted, the optimal operation of the system would rely on maximizing the utilization of the HOT lanes. Therefore, it is suggested that one of the objectives of the pricing algorithm should be the maximization of the utilization of the HOT lanes.

In the last phase of the study, researchers used the CORSIM simulation model to replicate variable speed limit operations along 95 Express. The throughput of the facility was found to increase for most of the scenarios tested by a maximum of 30 to 90 vehicles over a given 15 minute time period. It was concluded that variable speed limits have the potential to improve traffic operations along the I-95 corridor. Before implementing such a system, it is recommended that enforcement of speed limits is further considered.

Up to now, there are more than ten HOT facilities in operation around the country, and many others are in the planning or construction phase. The findings of this project will help ensure the operational success of and protect the significant investment in these projects.



Variable Speed Limits(VSL) along I-4 in Orlando

By Lily Elefteriadou, Ph.D., Professor

Principal Investigators: Lily Elefteriadou, Scott Washburn, and Yafeng Yin
Staff: Vipul Modi, Clark Letter, and Corey Hill

In this project, the research team explored the effectiveness of the existing VSL system, evaluated traffic operations and bottlenecks along the facility, and analyzed a variety of VSL configurations and algorithms.

The VSL system on the I-4 corridor in Orlando was implemented by Florida Department of Transportation in 2008, and since its deployment it has been discovered that the majority of traffic exceeds the speed limit by more miles per hour when the speed limit is reduced versus when it is at the baseline level. The overall objective of this project was to gain a better understanding of the drivers' perception of the I-4 VSL system, to evaluate operations along the VSL zone of the I-4, and to investigate VSL strategies that have the potential to improve operations along I-4.

Focus group studies as well as in-vehicle observation studies were conducted to evaluate driver perceptions. Participants indicated they would typically not reduce their speeds unless the drivers/motorists in their surroundings reduce theirs, and they suggested installing the VSL sign boards on both the sides of the roadway and if possible, on the over-head sign boards at each

lane. Through a combination of sensor data analysis and aerial reconnaissance, the research team identified bottleneck locations and congestion times. Based on these, a CORSIM simulation of the I-4 VSL zone was built in order to evaluate various potential VSL algorithms and their respective settings.

It was concluded that changing the detector configuration and using the data from the worst performing detector (rather than an average), does have the potential to reduce travel times through the corridor and to improve operations for some of the VSL scenarios tested. A VSL system along I-4 may be able to provide some limited operational improvement at specific bottlenecks and/or along the entire network. However, there is no clear pattern regarding the type of algorithm that would be most beneficial at a particular bottleneck, nor any clear patterns regarding the VSL sign configuration. The researchers observed that VSL may work only at specific types of bottlenecks, and be less effective at others. VSL were shown to be effective at diverge bottlenecks such as the one along I-95, but not as effective at merge and weaving locations.

USDOT Awards the UF Transportation Research Center a \$3.5 Million Regional University Transportation Research Center

STRIDE

Southeastern Transportation Research, Innovation Development and Education Center

A chapter is about to close in the history of University Transportation Research Centers (UTC) at the University of Florida as the Center for Multimodal Solutions for Congestion Mitigation (CMS), a Tier-1 federally funded UTC, draws to an end, but a new chapter has just opened with a recently awarded Regional University Transportation Research Center (UTC).

In January 2012, UF received a \$3.5 million grant from the U.S. Department of Transportation (USDOT) and its Research & Innovative Technology Administration (RITA) to establish a Regional UTC to conduct research, education, workforce development and technology transfer programs within federal Region 4 (southeast). The new regional UTC is called the Southeast Transportation Research, Innovation and

Education Center (STRIDE). The consortium includes Auburn University, Florida International University, Georgia Institute of Technology, Mississippi State University, North Carolina State University, the University of Alabama at Birmingham, and the University of North Carolina at Chapel Hill. To further leverage the consortium's resources, STRIDE will also receive another \$3.5 million in non-federal matching funds from state DOTs in the region.





“To have received this center is testimony to the quality of the researchers associated with the consortium” said Lily Elefteriadou, STRIDE’s director. “Having a regional center will undoubtedly enhance collaboration between the partner universities.”

She added that the much larger regional center will contribute to an increase in graduates entering the transportation field, a major goal of STRIDE and the U.S. Department of Transportation.

When USDOT/RITA issued the grant solicitation in fall

2011, Elefteriadou envisioned a strong interdisciplinary network of researchers and educators across the southeastern U.S. to tackle issues of importance to the region. The team was assembled, and after significant deliberations it was decided that the areas reflecting critical needs in Region 4 were: safety, livable communities and economic competitiveness. These areas were chosen because of their importance to the southeastern U.S. and the nation. They also represent the research expertise and experience of the members within the consortium and they align well with the USDOT/RITA research clusters.

“We hope there will be an increased awareness of the research going on at the universities regarding transportation and the increasing abilities of research results to improve the transportation network in the region,” Elefteriadou said.

The consortium researchers and educators will collaborate across the region and work closely with state departments of transportation, the U.S. Department of Transportation and its Research & Innovative Technology Administration. “I envision that the consortium will serve as a focal point for transportation research, education, workforce development, and technology transfer activities in the region” Dr. Elefteriadou said.



K-12 Workforce Development in Transportation at UF Initiated through CMS Funded Project

A robot that can be programmed to follow pathways, stop at obstacles, and respond to sounds has turned out to be quite promising at winning 6th and 7th graders over into engineering. That's what a final report on a CMS-funded project concluded.

"Robotics is a great way to get kids excited about science, technology, engineering, and math or STEM topics," said Leslie Washburn, workforce development coordinator for the Center for Multimodal Solutions for Congestion Mitigation and T2.

Washburn successfully spearheaded a K-12 outreach project, introducing middle school students to careers in transportation engineering, by using LEGO® robots as intelligent vehicles of the future. This program launched UF's K-12 workforce development program in transportation. The program and its activities are now one of the components of the newly funded STRIDE Consortium, a federal Region 4 University Transportation Center (UTC) at the University of Florida. Other activities include the highly successful Family Engineering Night, which is a favorite among after school programs, and the upcoming Transportation Career Day, which will begin fall 2012.

"We expect the lesson plans will foster interest in the transportation engineering profession as a career choice," Washburn said.

The title of the workforce development project is *LEGO Robot Vehicle Lesson Plans for Secondary Education - A Recruitment Tool* (CMS Project #2011-001). It includes a set of transportation-related lesson plans using LEGO® Mindstorms NXT robots. Engineering and transportation concepts are introduced by using a variety of multimedia and interactive discussions followed by

hands-on activities such as basic computer programming, mathematics and interaction with the robot. The activities focus on intelligent vehicles technology, a noteworthy area of the future of transportation, which aims to mitigate congestion through the use of sensors and computer programming. Lesson plans include: What do Transportation Engineers do?; Playing Sound, Use Display and Movement; Detect Emergency Vehicle and Calculate Travel Distance Exercise; Following a Route and Calculating Travel Time Exercise; and a Pedestrian and Vehicle Detection Exercise.

The hands-on lesson plans were reviewed by Adrienne Thieke, a middle school science teacher at one of the local elementary schools in Gainesville, Fla. She supports the lesson plans because of the practical approach to learning, its real-world connections, and exposure to transportation engineering.

"Anytime you link hands on activities, problem solving, and a real world link you have success," said Thieke. "It was a great opportunity to expose the students to this field of engineering. They don't hear much about engineering fields beyond civil and mechanical."

The plans were piloted at Lincoln Middle School to 6th- and 7th-grade Lyceum students. The Lyceum program at Lincoln Middle School is a highly competitive magnet program for academically-talented students.

"LEGO® was a great choice because it was easy to use, required thought, practice and skills to master, and directly related to transportation engineering as smart cars are the wave of the future," said Thieke. "I think the plans hit a good balance between hands-on fun and problem solving learning."

The lesson plans have been disseminated at various entities and individual such as

LEGO® Education, public school teachers in Florida, the USDOT, and outreach coordinators. The project was featured in the May edition of the Florida Technology Transfer Quarterly. And recently, it was introduced as a showcase display at the National Transportation Workforce Summit in Washington DC April 24-25, 2012.

"In general, I consider the lesson plans to be a success," Washburn said. "Based on lesson reviews and questionnaires completed by the students, it was clear they understood the definitions and concepts, that they liked learning about transportation."

The lesson plans are posted on the CMS' website at http://cms.ce.ufl.edu/workforce_development/ and can be downloaded for free.





UF doctoral student Shanti Rachmat talks to students about urban cities using LEGO®.



Children at GatorTRAX build LEGO® cars to race them.

The WTS UF Student Chapter Participates in K-12 Workforce Development Activities

Months after U.S. Department of Transportation Secretary Ray LaHood signed a Memorandum of Cooperation with the Women's Transportation Seminar (WTS) to encourage women to pursue math and science careers in transportation, the WTS UF student chapter teamed up with the CMS at the UF Transportation Research Center (TRC) to respond to the USDOT's Transportation You initiative. An action plan, replete with various activities, was created and submitted to WTS/USDOT representatives, and the first of many activities such as Family Engineering Night, was scheduled in fall 2011.

Transportation YOU is an outreach/workforce development program geared toward girls ages 13 – 18, which introduces them to a variety of transportation concepts and careers. Math, science and technology concepts are incorporated into each hands-on activity sponsored by the WTS UF student chapter, which is supervised by CMS/STRIDE workforce development coordinator Leslie Washburn.

Engineering Fair February 21 & 23, 2012

The WTS UF and UF ITE student chapters teamed up with the UF College of Engineering to participate in National Engineers Week. Overseeing the various activities of the transportation-specific student organizations was Leslie Washburn, CMS workforce development coordinator, who was awarded a grant from the Education Blueprint Association to utilize LEGO® Education products to visually demonstrate concepts such as air resistance, center of gravity, momentum and the impact of an inclined plane on speed to students K-12 students. Activities were hands-on, interactive and fun for students. The student chapters also demonstrated the concept of urban design by creating a city built out of LEGO® pieces. The WTS student chapter was awarded the UF Engineering & Science Fair 2012 Best Visual Presentation for their efforts.

Family Engineering Night February 15, 2012

Parents and their children attended an evening abounding with fun STEM focused activities at Lawton Chiles Elementary School in Gainesville, Fla. (Alachua County). The event was hosted by the WTS UF and UF ITE student chapters and the UF Transportation Research Center (TRC) and supervised by Leslie Washburn, workforce development coordinator for the CMS. Sponsors included the UF College of Engineering and the

Children test the speed of their LEGO® cars.

City of Gainesville. Seventy-three families attended with a total of 120 elementary aged students participating in the various activities offered. Activities were designed to encourage children to think of engineering concepts and were designed to be team-driven by children and their parents. Family Engineering Night has been so popular that many others have requested this type of activity be brought to their school.

GatorTRAX March 17, 2012

GatorTRAX is a student organization-led effort at the UF College of Engineering focusing on teaching math concepts to K-12 students by incorporating hands on activities. It is held one Saturday per month during the regular school semester, and the topics differ per month. This year, the WTS UF Student Chapter and the UFITE Student Chapter hosted one of these events, and once again utilized LEGO® Education products.





is not comfortable with a task such as writing, then it is that very skill that the individual should focus on and challenge themselves with.

Cramer, also a UF graduate, works on wildlife crossings (ecopassages) as a means to preserve species and provide safety for drives avoiding collisions with wildlife. She discussed the role of women in college and the workplace, with emphasis on the changing roles of gender in the engineering industry.

Although Downs was not physically present, she provided the audience with a video recorded message where she spoke about women working in engineering, her decision to become an engineer in spite of various school teachers advising her against it, the importance of making transportation a more interdisciplinary field and the students as the future workforce of transportation.

As owner of her own engineering consulting firm, StreetSmarts and a chocolate inspired café called Chocolate Perks in Duluth, Ga., Anderson-Bomar showed that women can be both intellectually solid and creative at the same time. During the panel discussion, she shared insights into life beyond simply the engineering world, the importance of balancing family life with work and that, yes, a woman can make it to the top. This woman has truly been successful, and it shows. In October 2010, the publically traded design firm Stantec (STN), acquired Anderson-Bomar's well-respected StreetSmarts as a means to further leverage the design capability and service of both companies to the clients they serve. She is now a principal with Stantec.

The WTS hopes to continue to offer transportation symposiums in the future, especially to educate female students on transportation as a career.

WTS Transportation Symposium

The WTS UF Student Chapter held a Transportation Symposium in October 2011 at the University of Florida. The purpose of the symposium was to gather women who have found success in transportation-related fields to talk about their careers, transportation and offer tips for women working in traditionally male dominated fields.

The guest panelists were: Marsha Anderson-Bomar (principal, Stantec); Patricia Cramer (research assistant professor at Utah State University); Noranne B. Downs (FDOT District 5 secretary); and Debora M. Rivera (director of Transportation Operations FDOT District 6).

Rivera, a UF graduate, stressed the importance of having good listening skills, especially when working with others in a team. She also said that in order to stand out from the rest, a person should focus on working on their weaknesses. For example, if a person





Student Field Trip to Paynes Prairie Ecopassages

If ever you thought a wildlife ecologist had no place in transportation engineering, then think again. With more than 1.5 million wildlife-vehicle collisions occurring each year in the U.S. (TR News, 262, May-June 2009, page12-19), there is a need to address safety concerns for humans. Likewise, when multiple wildlife vehicle crashes occur, local animal species survival is threatened, placing into jeopardy the ecosystem. The goal is to preserve human life while accommodating for wildlife populations. And, this is where a wildlife/transportation ecologist comes in.

In October 2011, Patricia Cramer, Ph.D., a research assistant professor in the Department of Wildland Resources at Utah State University was invited by the CMS to present her work on managing wildlife and transportation systems to students at UF. Cramer also took the students on a field trip to Paynes Prairie, the location of various wildlife ecopassages along U.S. 441, located 10-miles from the UF campus.

Cramer's presentation, Planning and Designing for Wildlife

in Transportation Systems: What Works, exposed students to how the transportation model is being modified to include concerns for the natural world. She explained how transportation ecologists, engineers, planners, and designers can better accommodate for wildlife and natural processes. Cramer's presentation contained countless images and footage of wildlife culverts and passages constructed under or over various corridors in the U.S. The seminar and images definitely struck a chord as more than 20 students attended the field trip.

A 2-mile stretch of U.S. 441, which runs through the prairie, contains four culverts that are used by alligators, panthers, bison, wild horse, deer, raccoon, badgers and other Florida wildlife. Cramer led students to two locations along the two-lane highway, which contained culverts. She described how in 1998, the Florida Department of Transportation (FDOT) enlisted wildlife practitioners and engineers to design a system of barrier walls and underpasses to reduce human and wildlife mortality.



Ruth Steiner, former Congresswoman Karen Thurman, Lily Elefteriadou and Alex Bond.



Vipul Modi, Shruti Modi and Miguel Lugo at TRB 2012.

UF Reception at TRB

For nearly ten years, the UF Department of Civil & Coastal Engineering and the Transportation Research Center have hosted a reception during the annual meeting of the Transportation Research Board in Washington, D.C. The reception has traditionally been a place where alumni, faculty, students and transportation professionals from the private and public sectors gather to network and catch up with colleagues and friends. Once again this year, graduate student posters were on display, showcasing the latest in transportation research at UF. More than 200 people gathered at the reception's usual location, the Mezzanine of the Marriott Wardman Park hotel.

Awards

Yafeng Yin, Ph.D.

*Associate Professor
Department of Civil and Coastal
Engineering
Transportation Program
Doctoral Dissertation Advisor/
Mentoring Award*

Grady Carrick

*Doctoral student
STC Poster Competition at
TRB, (January 2012)*

Amy Cavarelta

*Master's student
Thomas J. O'Bryant Fellow
Eno Center for Transportation
2012*

Nagendra S Dhakar

*Doctoral student
International Road Federation
(IRF) Fellow, IRF (2012-
2013)
Third Place, Student Poster
Competition "Calibration of
the Highway Safety Manual
to Florida Conditions," 2011
Florida Section / District 10
ITE Annual Meeting*

Phillip Haas

*Doctoral student
CMS Outstanding Student of
the Year, January 2012
Third Place, Student Poster*

Competition "Calibration of
the Highway Safety Manual
to Florida Conditions," 2011
Florida Section / District 10
ITE Annual Meeting

Miguel Lugo

*Doctoral student
UF/NSF LSAMP Bridge to
Doctorate Fellow 2011-2012*

Dimitra Michalaka

*Doctoral student
International Road Federation
(IRF) Fellow, IRF (2012-
2013)
Poster Presentation Award
(1st place) at the District 10/
Florida Section ITE 2011
Annual Meeting (December
2011)
Alec Courtelis Award (1st
place), International Center,
University of Florida (2011)
Outstanding International
Student Award, College of
Engineering, University of
Florida (2011)
Future Industry Leader
Spotlight Award, American
Road & Transportation
Builders Association
(ARTBA) (September 2011)
Gator of Engineering*

Attribute Graduate Student
Award for Leadership,
College of Engineering,
University of Florida (August
2011)

Benjamin Reibach

*Master's student
Graduate Student
Participation Grant for the
8th National Aviation System
Planning Symposium*

Danielle Soriano

*Undergraduate Student
Future Industry Leader
Spotlight award 2012*

Donald Watson

*Master's student
2012 Dwight David
Eisenhower Graduate
Fellowship*

Ruoying Xu

*Master's student
2012 Dwight David
Eisenhower Transportation
Fellowship*

Our Recent Graduates: Where are they now?

Grady Carrick, Ph.D., Spring 2012,
Commander, Florida Highway Patrol

Lu Ma, Ph.D., Fall 2011 Assistant
Professor, Beijing Jiaotong University,
PR China

Robin Osborne, M.S., Spring 2012,
Traffic Analyst Kimley-Horn

Ziqi Song, Ph.D., Fall 2011, Research
Associate, UF TRC

Di Wu, Ph.D., Summer 2011,
Operations Research Scientist,
Amazon.com, Inc.

Xiaoyu Zhu, Ph.D., Summer 2011,
Faculty Research Associate, University
of Maryland



Student Spotlight

Dimitra Michalaka

By Ines Aviles-Spadoni, M.S.
CMS/STRIDE Coordinator

From time to time, stars make long journeys across the skies, leaving behind them tales of impressive magnitude. We have seen the evolution of such a star, and this one soon will be off into the professional world, her intellect trailing in sync with her fantastic personality.

Our star is Dimitra Michalaka, who was born in Lesvos, one of the many beautiful Greek islands in the Aegean Sea. Dimitra is one of two daughters born to loving parents with a passion for olive trees, producing their own olive oil.

"I feel really blessed growing up in such a loving and caring family environment," Michalaka said. "Growing up in a small community did not prevent me from following my dreams, but instead gave me the tools and the determination to pursue them."

From the Aegean to the Peninsula

Dimitra's journey as a university student began at the National Technical University of Athens (NTUA), where she received a bachelor's degree in civil engineering in 2006. The civil engineering program at NTUA is one of the best in Greece. The decision to pursue civil engineering materialized early on in her high school

days. She felt she wanted to do something to make it better for society.

At NTUA, Michalaka was introduced to many disciplines within the civil engineering field, but she said transportation engineering was the one that appealed to her the most. She found it to be "the one field which makes the most direct and immediate impact on society and the one field most in need of improvement."

A bachelor's degree was simply not enough for Michalaka. A storm was brewing in her mind. She felt a desire to gain more knowledge, to explore deeper into her chosen field of transportation engineering. She soon left Lesvos after being accepted to transportation engineering graduate program at UF.

Michalaka completed her degree in 2009 and won the Pikarsky Award for Outstanding M.S. Thesis in Science and Technology from the Council of University Transportation Research Centers.

With a second academic degree to her name, she was soon offered a position as a transportation engineer at the UF Transportation Research Center (TRC) by Lily Elefteriadou, professor and director of the TRC. She began her Ph.D. shortly thereafter.

"Dimitra worked for me for about a year as a full time staff member and her work was superb," Elefteriadou said. "I was hopeful she would decide to continue for her Ph.D. because I could see how capable she is. I am so glad she decided to do so, and I am happy to see that also led her to her passion, teaching."

Michalaka's efforts in her doctoral studies have led her to focus on congestion pricing. Her program adviser and mentor, Yafeng Yin, an associate professor in civil engineering, feels that she can make great contributions to this area.

"Dimitra's dissertation research was to improve dynamic tolling algorithms for managed toll lanes and also enhance a microscopic traffic simulator to evaluate and compare those improved algorithms," Yin said. "In my opinion, her dissertation has a proper blend of theory and practice and will help traffic engineers operate those



managed-lane facilities more efficiently."

As a doctoral student, she was tasked with teaching the Transportation Engineering class, where she won the admiration and respect of many of her students. As an instructor, she was able to motivate students into considering transportation engineering as a potential career path. In 2011, she won the ARTBA Future Industry Spotlight Award for her outstanding academic record and extraordinary leadership skills as a student and in the community.

The Balancing Act

Michalaka's skills do not end at her academic talents. This smart woman has the capability of harmonizing school work with activities outside the academic environment. In 2010, she carried the baton for the recently created Women's Transportation Seminar (WTS) student chapter at UF, serving as its current president and helping to coordinate various K-12 activities. She also has been involved with the UF Institute of Transportation Engineers (ITE), the honorary engineering society Tau Beta Pi (TBP), the International Student Speakers' Bureau (ISSB), and the Civil and Coastal Engineering (CCE) Graduate Student Advisory Group, in which she has often taken leadership positions. "In addition to studying and working hard, I want to be a well-rounded person," Michalaka said. "I am involved in many extracurricular organizations, and being part of them has given me the opportunity to offer back to the community, to organize several events and activities, to improve my communications skills and network with professionals."

Dimitra Michalaka's journey as a student will soon end as she prepares to graduate with a Ph.D. in summer 2012. I believe this





Center for Multimodal Solution for
Congestion Mitigation
512 Weil Hall
P.O. Box 116580
Gainesville, FL 32611-6580

Phone: 352.392.9537, Ext. 1450
Fax: 352.846.1699

<http://cms.ce.ufl.edu>

Non-Profit Org.
US Postage
PAID
Gainesville, FL
Permit No. 94

CMS

Register with Us!
http://cms.ce.ufl.edu/contact_us

Publisher
Lily Elefteriadou, Ph.D.
*CMS Director, Kisinger
Campo Professor of Civil
Engineering*
elefter@ce.ufl.edu

Managing Editor
Ines Aviles-Spadoni, M.S.
CMS Coordinator
iaviles@ce.ufl.edu

Graphic Artist
Christina Cozart

