The Gulf Coast Research Center for Evacuation & Transportation Resiliency

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Director's Message

Dr. Brian Wolshon

The second half of 2011 was a time of transition for the Gulf Coast Research Center for Evacuation and Transportation Resiliency (CETR). Two of our most valued colleagues in the center moved on to faculty positions. Dr. Billy Fields, Associate Center Director at UNO, joined the Department of Political Science at Texas State University and Dr. Vinayak Dixit, the Associate Director of Research at LSU, accepted a Senior Lecturer position with the Department of Civil and Environmental Engineering at the University of New South Wales in Sydney, Australia. Although they will both be missed, the mission of the Center will continue to advance. John Renne takes over for Billy's duties at UNO and Carol Short continues to provide administrative support to CETR. Katie Spansel assumes Vinay's duties at LSU.

Great progress was also made on the Center-sponsored research initiatives. With the start of the fall semester, several projects were kicked off at the Center-supported LSU Driving Simulator Laboratory. Work also continued on Dr. Marwa Hassan's groundbreaking research into sustainable and resilient pavement materials. We are looking forward to seeing the results of this research at the 2012 Transportation Research Board's Annual meeting in Washington D.C. in January.

As we move into 2012, the Center will also be hosting the Second National Evacuation Conference in New Orleans on February 7 – 9, 2012. This event is held to bring together professionals from transportation and emergency management to discuss evacuation planning to accommodate the needs of all people before, during and after a major disaster. The goal of the conference is to foster an interdisciplinary exchange of ideas surrounding a broad range of evacuation issues, particularly mass evacuations prompted by disasters.

CETR Faculty and Staff News

Dr. Kate Lowe

UNO added Visiting Assistant Professor Kate Lowe, Ph.D. to its staff in 2011. Lowe received her PhD from Cornell University and is currently teaching Introduction to Transportation Studies and Regional Planning. Her research focuses on transportation policy and planning, as well as multi-level governance. She has a United States Department of Transportation and the Clarence S. Stein Institute fellowship to support her dissertation research, which analyzed how metropolitan planning organizations, state actors, and the Federal Transit Administration's New Starts program affect transit implementation. Lowe is also analyzing the links between policy and transit agency finance, while developing research on the accessibility and mobility patterns of low-income workers. In October, 2011, Lowe presented her research on "Ballot box planning: Rail referenda and coalition building" at the Association of Collegiate Schools of Planning's annual conference in Salt Lake City, Utah.

Tara Tolford

New research associate Tara Tolford received her Master's degree in Urban and Regional Planning from the University of New Orleans in May, 2011, with a dual specialization in transportation planning and land use. She has been involved with the CETR since 2009, and is currently responsible for leading all bicycle and pedestrian-related programs and research activities. This includes coordinating the Pedestrian Bicycle Resource Initiative, a joint project with the New Orleans Regional Planning Commission, and serving as the State Network Organizer for the Louisiana Safe Routes to School State Network, a coalition of more than twenty organizations and institutions around the state all working to

remove barriers to bicycling and walking for children grades K-8. Tolford's research background includes work in transportation resilience, active transportation planning, policy, and infrastructure design, smart growth, and transit-related economic development.

In other faculty news, CETR Associate Director Dr. John Renne achieved tenured status at UNO in August. In addition, Dr. Renne assumed the Director position of the Merritt C. Becker, Jr. UNO Transportation Institute (UNOTI). James Amdal continues to lend his experience and expertise to the Center as a UNOTI Senior Fellow.

Former CETR Associate Director Dr. Billy Fields, has accepted a position as Assistant Professor of Political Science at Texas State University in Austin, where he is teaching courses on public policy and administration. Fields' research continues to focus on understanding the key elements of resilient communities, from the perspectives of transportation, urban planning, and hazard mitigation. Fields continues to work with UNO and CETR on several collaborative efforts, including a recent lecture event and through co-editing responsibilities with Dr. Renne for the upcoming Island Press book, Transport Beyond Oil.

Former Associate Director of Research at LSU, Dr. Vinayak Dixit accepted a Senior Lecturer position in the Department of Civil and Environmental Engineering at the University of New South Wales in Sydney, Australia. Dr. Dixit is teaching courses related to traffic operations and will continue his research in evacuation and emergency management. Despite this long distance move, Vinay will continue to work actively with LSU and CETR.

Technology Transfer: Active Transportation Symposium Held in New Orleans

The University of New Orleans Transportation Institute, the Regional Planning Commission, and Bike Easy co-hosted a symposium focusing on the current state of active transportation policy and infrastructure in New Orleans on November 21st.

This evening of lecture and discussion brought together prominent local active transportation experts and advocates, and focused on what improvements have been made to encourage and facilitate more biking and walking, how these improvements are impacting public health outcomes, and how we can build on recent progress and momentum to establish New Orleans as a national leader in active transportation. Concurrent with this event, a brief publication from Dr. Fields entitled "Establishing New Orleans as a Leader in Active Transportation: Solidifying Progress, Moving Towards an Active Transportation Culture" was distributed. This brief may be found at transportation.uno.edu/publications.

Speakers included: Dr. Billy Fields, assistant professor of political science at Texas State University; Jennifer Ruley, pedestrian and bicycle engineer; Kathryn Parker, assistant director of the Prevention Research Center at Tulane University, and Nicole Webre, Legislative Director for New Orleans City councilmember (District C) Kristen Gisleson-Palmer. The event was free and open to the public, and attended by students, local active transportation advocates, key decision-makers, and interested community members.

Dr. Billy Fields

Kathryn Parker, MPH

Jennifer Ruley, P.E.

Urban Resiliency Research in Paris

UNOTI senior fellow James Amdal traveled to Paris, France in November to present at the FloodProBe Urban Resilience Conference: "How the concept of resilience is able to improve urban risk management? A temporal and spatial analysis." This conference, sponsored by the *École des Ingénieurs de la Ville de Paris* (EIVP) was focused on turning the negative effects of flood events into positive outcomes by designing cities that are able to integrate flooding in their shapes and functions. Amdal's presentation and paper, entitled *Post-Hurricane Katrina-Rita Planning, Recovery, and Resiliency, New Orleans, Louisiana 2005-2011: Faith + Fortitute + Plans = Resurrection* is available at transportation.uno.edu/publications.

In addition, visiting UNOTI intern and EIVP graduate student Mireia Balsalls, who worked with Amdal over four months in New Orleans, conducting research on post-disaster urban resilience, successfully presented her master's thesis and will begin work on her Ph. D, jointly sponsored by EIVP and the University of Mons, Belgium in January 2012.

(From left) Mireia Balsalls, visiting intern Laurence Ringenbach, James Amdal, and EIVP Coordinator Damien Serre, Ph.D. at "The Trains Blue" Restaurant, Gare de Lyon, Paris, France

The Congress for the New Urbanism and the Claiborne Corridor Improvement Coalition, with support from UNOTI, the Greater New Orleans Foundation, the Louisiana Endowment for the Humanities, and Tulane University's School of Architecture, hosted an event to discuss the future of Claiborne Avenue on December 6th.

Local experts in community development, planning, transportation and architecture presented research and reflections on the future of Claiborne Avenue. UNO's Dr. John Renne presented recent research and a community survey conducted by his Spring 2011 Transportation Planning Students, while national street design expert Eric Dumbaugh discussed the Corridor's current design as well as present research on the efficiency and safety of connected street networks. Other participants included City of New Orleans Director of Place-based Planning William Gilchrist; Congress for the New Urbanism President and CEO John Norquist, City of New Orleans Councilmember Kristen Gisleson-Palmer, and Tulane University Professor of Architecture Jonathan Tate.

This event drew a wide range of key stakeholders and community members to discuss present opportunities for re-envisioning and revitalizing this historic downtown corridor. Dr. Renne's research on Claiborne Avenue can be found at transportation.uno.edu/publications.

Dr. Renne speaks at "The Future of the Claiborne Corridor"

Dr. Wolshon Chairs the TRB Security Summit Workshop

In August, Dr. Wolshon chaired of the 2011 Transportation Research Board National Cooperative Highway Research Program (TRB/NCHRP) "Transportation Hazards and Security Summit Workshop" in Irvine, CA. This event brought together experts from across the United States to discuss issues directly related to the theme of the Center.

The theme of the TRB/NCHRP event was "Looking Beyond the 10th Anniversary of 9/11" and included speakers from government, academia, and the private sector. Dr. Wolshon, in an extension of his duties as Chair of TRB's Emergency Evacuation Subcommittee, served as the Technical Chair of the Conference as was responsible for coordinating a program of 24 technical sessions with topics covering the full range of hazards, modes, communications, coordination, management, planning, and control of emergency transportation resources and operations.

Attendees were treated to two and a half days of exploration and discussion of past, current, and emerging practices and results related to the implementation of security research over the past ten years; successful security practices; identification of barriers to instituting security practices; and development of future research and evaluation needs, including improvements to implementation of research.

Four New Orleans Schools Participate in International Walk to School Day

With help from the Louisiana Safe Routes to School State Network, a program hosted at UNOTI, hundreds of students at four New Orleans area elementary schools participated in International Walk to School Day on October 5th, 2011. GCRCETR staffers helped coordinate and promote these events, which encouraged students to increase their daily physical activity and practice safe pedestrian behaviors through this fun, celebratory event. Participating schools included the International School of Louisiana, ARISE Academy, Harney Elementary, and Medard H. Nelson Charter School, and events were attended by City of New Orleans Health Commissioner Dr. Karen De Salvo and her staff, Louisiana Safe Routes to School State Network Partner organizations, as well as students, parents, and school administrators.

Students at ARISE Academy in New Orleans after participating in International Walk to School Day events

LSU Senior Design Students Tour LA DOTD Project

In November, LSU Senior Design Project Class students were given a guided tour of the new Magnolia Bend Bridge under construction in the Baton Rouge area. During the tour, led by a team of Louisiana Department of Transportation and Development bridge, traffic, and construction engineers, the students were able gain first-hand knowledge of design, engineering, and construction techniques under real world conditions. The students were then able to bring this knowledge back to the classroom for successful completion of their projects and defend them to a group of local expert practitioners. Experiences like this are routinely used at LSU to best prepare students to make the transition from student to professional engineer.

DOTD Bridge Engineer Ray Mumphrey, P.E., explains construction processes for highway bridges in Louisiana

Project Updates

Transit-Oriented Development: A Cross-Sectional and Trends Analysis Utilizing the National TOD Database

Principal Investigator: John L. Renne, Ph.D., AICP

The Center for Transit Oriented Development (CTOD), funded by the Federal Transit Administration (FTA), released a national transit-oriented development database for free public access in 2010. This research builds upon previous work conducted by Dr. Renne and others into examining national cross-sectional performance and trends in TODs. This data is important as cities and regions seek to consider TOD as a viable land use pattern around existing and future rail stations. The project will seek to determine which factors are statistically significant impacting transit commuting, walking, and bicycling, using regression analysis techniques as well as by comparing trends in rail station precincts to trends across metropolitan regions. Utilizing data on residential density, employment density, mix of employment and walkability, Dr. Renne will attempt to create an index to determine rail station typologies across twelve possible station types.

Project Status: This project is in the data collection phase, with an anticipated completion date of August, 2012.

Incorporating the Lower Mississippi River Ports and Waterways System Capabilities into the Local Emergency Response System

Principal Investigator: James R. Amdal

The recent devastations caused by hurricanes Katrina, Rita, Gustav, and Ike as well as the BP oil spill of 2010 have severely impacted coastal Louisiana as well as the entire Gulf Coast of the U.S. These disasters have underscored the need for a more effective local emergency management system using all available assets and resources. A coordinated first response by emergency teams in the area using these local resources is the most effective means to minimize loss of human life as well as property and environmental damage. The objective of this research is to inventory the available assets of the 4 deep water ports within the jurisdiction of USCG Sector New Orleans, the associated waterways, as well as the maritime industry's response capabilities in times of disaster or in a maritime emergency. The scope of work includes the development of an inventory of physical resources in the maritime sector in both the public and private sectors that could meet different emergency needs, and explore an appropriate institutional framework that would allow these resources to be mobilized under emergency conditions. Hopefully, upon completion, these assets will be incorporated into the USCG Area Contingency Plan.

Project Status: The inventory of assets is 90% complete pending the addition of recently developed resources; final project report draft is 75% complete and will be available on evaccenter.lsu.edu in early 2012.

Job Access for Workers in Post-Katrina New Orleans

Principal Investigator: Kate Lowe, Ph.D.

Providing access to employment opportunities is one of transportation's most critical functions, but too often low-income workers struggle to reach job opportunities. Resilient transportation systems should support such mobility, even when facing challenges. The New Orleans transportation system had an acute shock with Hurricane Katrina and subsequent reductions in transit service. In addition, metropolitan New Orleans' job decentralization and fragmented regional transit provision create ongoing job access challenges for low-income workers, particularly those without vehicles. This study examines the resiliency of the transportation system for carless, low-income workers and their resilience through travel adaptations. More specifically, the research will first examine the accessibility of low-wage jobs for workers without automobiles. Second, the study will explore how low-income workers have changed their mobility patterns and adapted in response to acute and ongoing challenges. Third, the research will consider institutional efforts and infrastructure investments that affect job accessibility for these workers. Spatial Analysis of job locations and census data on commuting will provide knowledge on mobility trends in the region, while focus groups and key informant interviews will illuminate worker and institutional adaptations. For the field of transportation, findings will document mobility changes in an extreme case of transit service reduction, as well as the more general accessibility challenges posed by regionally fragmented transit and employment decentralization. For the region, findings will aid policy and programmatic efforts to enhance job accessibility.

Project Status: Ongoing. This project began in October 2011 and will continue through August 2012.

Rails to Recovery: The Role of Passenger Rail Transportation in Post-Katrina Louisiana
Principal Investigator: James R. Amdal

This research evaluates two projects-a proposed commuter train between Baton Rouge and the New Orleans CBD, and an ARRA funded new streetcar line between the existing New Orleans Union Passenger Terminal and Canal Street—in light of national best practices for both new commuter rail services and urban streetcar lines, and examines the relationship between the proposed lines and existing or planned real estate development. Maps illustrate the apparent disconnect between the investments being made or planned within the CBD and adjoining neighborhoods and the investments being built or proposed by these streetcar extensions, and public policy options that link public investment in public transit with development are discussed. With this study, another residual value is this freeze-frame of development prior to the construction and operation of any of the proposed streetcar extensions. This will also allow later researchers to quantify the actual impact the streetcars made on corridor development, neighborhood revitalization, etc. using a number of specific metrics: property value increase; sales tax revenue.

Project Status: Completed. The final report was distributed to key decision makers, including Secretary of Transportation Ray Lahood, at the groundbreaking ceremony for the Loyola Streetcar line at New Orleans Union Passenger Terminal in June, 2011. The report can be accessed at evaccenter.lsu.edu.

Sec. LaHood, Mayor Mitch Landrieu, and officials at the groundbreaking for the Loyola Streetcar Line

Louisiana Intermodal Transportation Infrastructure Study: Feasibility Analysis for Inland Waterway Container Transport Systems within the Lower Mississippi Region and the New Orleans Metropolitan Area
Principal Investigator: James R. Amdal

The primary objective of this study is to conduct an analysis of successful inland waterway container transport in selected U.S. locations and to assess the feasibility of this transportation mode within the Mississippi River corridor. A "marine highway" initiative is being proposed by the USDOT to encourage a shift of cargo movements from traditional surface transportation modes to maritime systems.

This research is conducted in partnership with the New Orleans Regional Planning Commission (RPC). As a Metropolitan Planning Organization (MPO), the RPC has the distinct advantage of providing a regional perspective on transportation systems. This project allows the RPC to expand their traditional perspective to include the region's extensive maritime transportation assets. The study also provides a perspective of resilient freight transportation utilizing inland waterways as an alternate freight delivery system.

Project Status: Completed. This project has been accepted by the New Orleans Regional Planning Commission and will be published on their website at www.norpc.org.

Improving the self-healing properties of concrete materials by using composite action with fiber reinforced polymers and shape-memory alloys
Principal Investigators: Dr. Michele Barbato and Dr. Marwa Hassan

Bridges are expected to provide satisfactory performance and fulfill a lengthy design life. The delay or disregard of bridge maintenance may result in a reduced service life and increased costs. As a result, continuous and systematic maintenance will likely extend the service life of a bridge and reduce operating costs.

What if cracks found in concrete structures could self-heal like human skin after a small cut? Dr. Michele Barbato and Dr. Marwa Hassan are conducting research based on the innovative idea of combining composite action and self-healing materials to improve the autonomous healing of reinforced concrete bridges. Currently, this capability is

limited to closing small surface cracks in controlled environments only. However, it is envisioned that the combination of confinement with fiber reinforced polymers (FRPs) and shape memory alloys (SMAs) can help close larger cracks. The integration of these new materials shall increase the durability and longevity of concrete structures.

Project Status: On-going. The preparatory work has been completed, including the literature review. The next step is to develop the first batch of microcapsules, which is expected to be completed by the end of the month.

Minimizing Driver Errors: Examining Factors Leading to Failed Target Tracking and Detection

Principal Investigators: Dr. Melissa Beck

Research pertaining to the distractions that drivers experience tends to focus on distractions inside of the vehicle. Dr. Melissa Beck, Department of Psychology at LSU, aims to understand which stimulus and driver factors are the most important to improve target tracking and detection, outside of the vehicle. A series of driving experiments will be built into the LSU driving simulator's virtual environment to observe how drivers perform while tracking targets in a realistic environment. These targets may include unexpected obstructions in the roadway, such as pedestrians, construction barricades, etc.

The results of the experiment will provide valuable safety related findings on driving behavior while tracking moving objects. The findings may also have a significant impact on driving safety by improving current practices in roadway design and driver training.

Project Status: On-going. The literature review is being completed along with identifying which variables to manipulate and measure. The programming of the simulator will begin in the Spring of 2012.

Setup of Driving Simulator for Behavioral Research

Principal Investigator: Dr. Sherif Ishak

LSU is now home to a high-tech driving simulator, which was developed by Realtime Technologies, Inc. Both undergraduate and graduate students will have the opportunity to conduct studies that may impact driving safety. The addition of the simulator allows LSU to enter the world of simulation research.

The simulator will allow for research in the following areas:

- Human factors in driving tasks
- Driving performance under various environmental conditions
- Assessments of gadgets inside of the vehicle
- And many more

Also, the simulator has been featured on the University and College of Engineering main websites and has been used in numerous promotional and development materials used by LSU.

Project Status: Completed.

The simulator is like driving in a real vehicle
(Photo Courtesy of University Relations)

Environmental Effectiveness of Photo-Catalytic Asphalt Pavement Surfaces Incorporating Ultrafine/Nano Titanium Dioxide

Principal Investigator: Dr. Marwa Hassan

As a result of Dr. Hassan's research, three journal articles were accepted for presentation and publication by the Transportation Research Board. In addition, Dr. Hassan will present her research at the 2012 Association of Asphalt and Paving Technologists Conference.

Project Status: Complete. Final report has been submitted to RITA and will be posted on the www.evaccenter.lsu.edu website.

Assessing the Long-term impact of Subsidence and Global Climate Change on Emergency Evacuation Routes in Coastal Louisiana

Principal Investigator: Dr. Joshua Kent

This project will model subsidence for coastal Louisiana. The end result of the research will be to investigate the impact of subsidence on major evacuation routes in Louisiana. The model that will be produced should be able to forecast subsidence for coastal Louisiana through 2100.

Project Status: On-going. The analysis is complete and Dr. Kent is compiling the results into usable maps and data for use by the parish.

Student Involvement Spotlight

UNO Urban Planning Student Wins Prestigious Graduate Fellowship

Max Williamson

University of New Orleans master's in urban and regional planning student Max Williamson was awarded a 2011 Dwight David Eisenhower Graduate Fellowship in March. The fellowship, through the Federal Highway Administration, is for the pursuit of a master's degree in transportation-related fields. Williamson will receive a minimum of $5,000, which he is using to work on his thesis on how to make New Orleans a more bicycle-friendly city. Williamson, a native of St. Augustine, Florida, has a bachelor's degree in geography and political science from Florida State University.

The objectives of the Eisenhower Graduate Fellowship Program are to attract the nation's brightest minds to the field of transportation, to enhance the careers of transportation professionals by encouraging them to seek advanced degrees and to retain top talent in the transportation industry of the United States. The program is intended to bring innovation and enhance the breadth and scope of knowledge of the entire transportation community in the U.S.

2011 Student of the Year

Scott Parr, a PhD student at Louisiana State University, received the 2011 Student of the Year award. Scott was honored for his research involving the impacts of police traffic control during emergencies and planned special events. He will be recognized for his accomplishments at the TRB Annual Meeting in Washington, D.C. later this month.

CETR Scholarship

The LSU CETR awarded two scholarships to students pursuing doctoral degrees in transportation related fields. The students, Samuel Cooper and Meisam Akbarzedeh, are studying sustainable pavement materials under Dr. Louay Mohammad and travel demand modeling mass evacuation scenarios under Dr. Chester Wilmot, respectively. The scholarships will be used to support their travel to the 91st Annual Meeting of the Transportation Research Board in Washington, D.C.

Publications

CETR Faculty and staff researchers published scores of books, papers, and technical reports in a wide variety of fields related to the themes of the Center. Among the two most noteworthy were a new book that addresses lessons learned from Katrina and Rita and a new US Nuclear Regulatory Commission (NRC) report that sets forth guidance for the development of nuclear power plant (NPP) evacuation time estimates (ETE).

Dr. John Renne was a contributing author in the Brookings Institution's new book, *Resilience and Opportunity: Lessons from the US Gulf Coast after Katrina and Rita.* This book, edited by Amy Liu, Roland V. Anglin, Richard M. Mizelle Jr. and Allison Plyer, was published by Brookings Institution Press and launched at an event held Aug 29th –the 6th anniversary of the landfall of Hurricane Katrina— at the University of New Orleans. Dr. Renne was also a featured panelist at this event.

Center Director Dr. Brian Wolshon was a coauthor of US NRC Reports NUREG/CR-7002 SAND2010-0016P *Criteria for the Development of Evacuation Time Estimate Studies*. This document coauthored by Joe Jones and Fotini Walton of the Sandia National Laboratories has established the official federal requirements for the preparation of NPP ETE studies in the US. In addition to providing clear, consistent, and uniform guidance for estimate methodologies, the document also updates guidance relative to the application and review of traffic simulation modeling upon which future emergency protective action decision-making is to be based.

For more information about the Center and its activities, contact the Director:

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