MarTREC

Maritime Transportation Research & Education Center

October 2019-September 2020

martrec.uark.edu

MarTREC STAFF

Heather Nachtmann, Ph.D.
University of Arkansas
Director

Kevin D. Hall, Ph.D., P.E.
University of Arkansas
MBTC Executive Director

Amy M. Shell, M.S.
University of Arkansas
Center Coordinator

Bethany Stich, Ph.D.
University of New Orleans
Site Director

Robert Whalin, Ph.D., P.E.
Jackson State University
Site Director

Brian Wolshon, Ph.D., P.E., PTOE
Louisiana State University
Site Director

Craig Philip, Ph.D.
Vanderbilt University
Site Director

Bruce Wang, Ph.D.
Texas A&M University
Site Director

CONTACT INFO

4190 Bell Engineering Center
University of Arkansas
Fayetteville, Arkansas 72701
Phone: 479.575.6021
Email: martrec@uark.edu

MarTREC

UNIVERSITY OF ARKANSAS

THE UNIVERSITY of NEW ORLEANS

JSU

LSU LOUISIANA STATE UNIVERSITY

VANDERBILT

TEXAS A&M UNIVERSITY

Cover photo courtesy of Markus Spiske, Unsplash

MESSAGE FROM MarTREC DIRECTOR

Like you, MarTREC faculty and students have all been impacted by COVID-19. Our campuses made rapid shifts to virtual learning and have continued to educate transportation students safely through hybrid, remote, and safe face-to-face learning options. Despite travel restrictions, our research programs have continued to progress through virtual team meetings and data collection. We all look forward to engaging on-site with our next generation transportation students and industry stakeholders as soon as it is safe to do so. I hope you enjoy reading about MarTREC and the accomplishments of our researchers in this report. We certainly achieved our quest for resilience over the past several months.

TABLE OF CONTENTS

Courtesy of ARDOT

MarTREC

Maritime Transportation Research & Education Center

ABOUT

MarTREC is a U.S. Department of Transportation Tier 1 University Transportation Center funded through the Office of the Assistant Secretary for Research and Technology. Under MAP-21, MarTREC built economic competitiveness through efficient, resilient, and sustainable maritime and multimodal transportation systems. MarTREC, through continued funding under the FAST Act, is working to preserve the Nation's transportation system through efficient, resilient, and sustainable maritime and multimodal logistics and infrastructure.

VISION

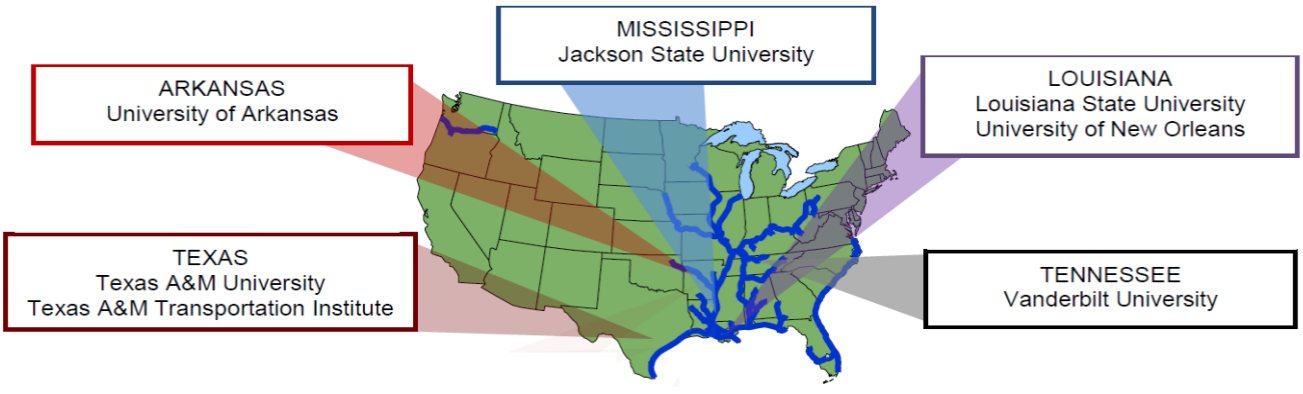
Our vision is to be recognized as the Nation's premier source for expertise on maritime and multimodal transportation research and education. The MarTREC consortium consists of renowned maritime transportation researchers dedicated to transferrable research and inclusive education and workforce development.

CONSORTIUM

Our consortium includes the University of Arkansas (UARK), Jackson State University (JSU), Louisiana State University (LSU), Texas A&M University/Texas A&M Transportation Institute (TAMU/TTI), University of New Orleans (UNO), and Vanderbilt University (VU). Each consortium member is strategically located to support MarTREC's theme: UARK, JSU, LSU, and UNO are located along the Mississippi River; VU along the Cumberland River; and JSU, LSU, UNO, and TAMU/TTI along the Gulf Coast.

RESEARCH

MarTREC conducts research activities in three topic areas: 1) Maritime and Multimodal Logistics Management to expand decision support and facilitate improved operations within the Nation's multimodal supply chain networks; 2) Maritime and Multimodal Infrastructure Preservation to advance state-of-the-art resilient multimodal transportation infrastructure preservation, repair, design, and construction; and 3) Disaster Response and Transportation Planning for Coastal and River Valley Communities to enable the resilience, safety, efficiency, and effectiveness of multimodal transportation systems during disaster response or other major events.



NEW MarTREC FAST Act PROJECTS

Dredging Projects Selection when the Random Shoaling Effect is Considered
Bruce Wang, PhD
Texas A&M University
October 2019-December 2021

Dredging is a constant operation necessary to maintain the waterway shipping capacity. The goal of this project is to provide decision support to achieve a maximum network capacity for dredging operations to support the regional and national economies within a given budget.

Development of AIS Model of Texas Gulf Intracoastal Waterway Travel Times
Jim Kruse, MBA
Texas A&M Transportation Institute
October 2019-April 2021

The focus of this research is to perform analysis on the Texas portion of the Gulf Intracoastal Waterway (GIWW). The Texas GIWW presents a level of complexity significantly greater than rivers mentioned above because of the intersections with ship channels and the fact that some barges go into and exit port areas while others pass through. The project will established origins and destinations, segment the waterway into links, analyze AIS data to identify vessel transits and associated transit times on the links, and develop a methodology for predicting travel times.

Planning for Managed Retreat: Decision Making in the Face of Climate Uncertainty
Leah Dundon, JD, PhD and Mark Abkowitz, PhD
Vanderbilt University
December 2019-May 2022

Sea level rise, increased frequency and intensity of flooding, and other extreme weather events have sparked a growing recognition that managed retreat must be among the solutions considered. This project examines the need for managed retreat and the significant challenges to implementing managed retreat as an adaptation strategy with a particular focus on transportation and its interdependencies with other critical infrastructure systems.

Bio-Inspired Stabilization of Levee Slope on Expansive Yazoo Clay at the Maritime and Multimodal Transportation Infrastructure in Mississippi
Sadik Kahn, PhD, PE
Jackson State University
April 2020 – June 2022

The existence of Yazoo clay in Mississippi frequently causes distress in levee and highway embankment slopes, which are an integral component of maritime and multimodal transportation infrastructure. This project investigates the effect of vetiver grassroots to stabilize levee slopes at the maritime and multimodal transportation infrastructures at Mississippi.

Evacuation Behavior and its Mobility Impacts in Coastal Communities from Across the Nation
Brian Wolshon, PhD, PE, PTOE
Louisiana State University
July 2020-June 2021

Coastal communities are at risk from a multitude of potentially disruptive events. Severe weather, climate change, and sea-level rise all pose serious and long term societal challenges. This research seeks to develop a better understanding of the travel flow principles that govern the evacuation process and its impact on the mobility of a community for different hazard types.

Identifying Critical Waterway Infrastructure and Managing Risk Associated with Natural Disasters
Michelle Barry, PhD, PE and Shengfan Zhang, PhD
University of Arkansas
July 2020-June 2022

The transportation system in the U.S. is extremely vulnerable to disruptions and delays from natural disasters. There is a need for an assessment strategy capable of capturing the probability of failure and associated economic impacts for maritime and inland waterway infrastructure subjected to flooding and other natural disasters. The goal of this research is to develop a risk assessment framework that can be used to aid decision making and mitigation strategies for maritime infrastructure deemed critical to the U.S. transportation system and economy.

Modifying Ramp Management Strategies to Enhance Resiliency of Freeway Facilities
Brian Wolshon, PhD, PE, PTOE
Louisiana State University
July 2020-June 2021

Increased traffic demand of coastal areas during emergency evacuations have been shown to affect transportation systems negatively. Application of the ramp management algorithms modified by this method becomes increasingly important during emergency evacuation. This project will study and improve these ramp management strategies.

Port Infrastructure Resilience through Combined Wind-Surge Demand Characterization
Gary Prinz, PhD, PE
University of Arkansas
July 2020-June 2022

This project aims to understand the interactive effects of severe wind and storm surge demands on port infrastructure and to develop hazard demand models to aid improvements to infrastructure design. An integrated analytical and experimental research approach will combine information from detailed fluid-structure-interaction simulations and scaled wind-wave experiments to support port resilience.

Rapid Assessment of Internal Erosion Damage and Erodibility in Levees
Michelle Barry, PhD, PE and Clint Wood, PhD, PE
University of Arkansas
July 2020-June 2022

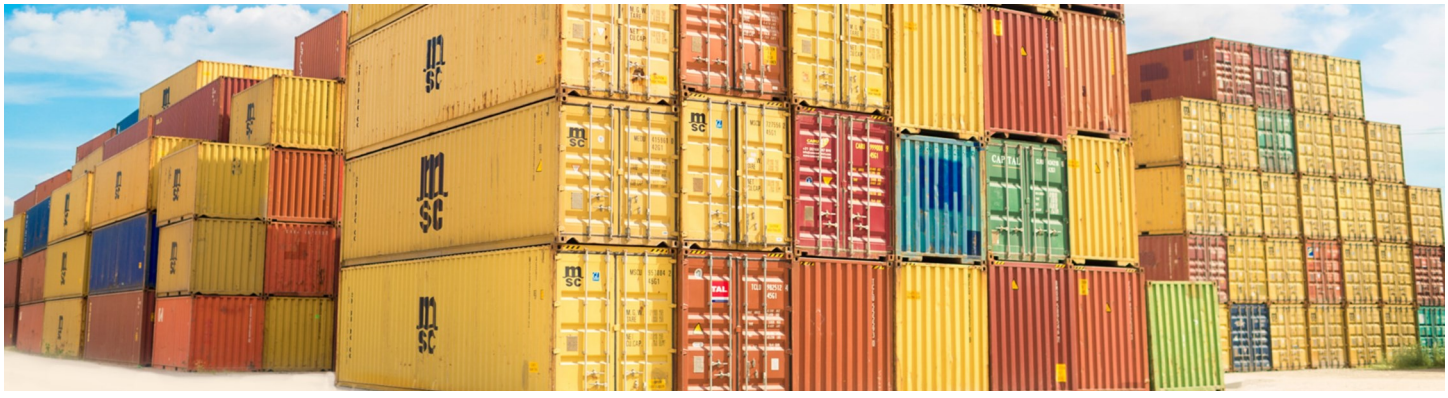
Recent flooding events have tested our nation's levee systems and highlighted the vulnerability of our transportation system. Traditional drilling and sampling techniques only provide discrete data points which can lead to ineffective repairs and wasted funds. The ability of geophysical methods to enable quick measurements of material properties over large areas was demonstrated in previous project. This project seeks to make a correlation between geophysical properties and vital engineering properties such as erodibility.

The Unintended Consequences of Flood Mitigation along Inland Waterways – A Look at Resilience and Social Vulnerabilities
Janey Camp, PhD, PE, GISP, CFM
Vanderbilt University
July 2020 – December 2021

The objective of this project is to evaluate different flood mitigation efforts in terms of the community costs such as residential buyouts or elevation of structures. This research utilizes agent-based models and empirical data from select communities where significant buyouts have taken place to simulate and estimate the extent to which buyouts may negatively affect community resilience.

Policy and Infrastructure Evaluation Model of Commodity Flows through Inland Waterway Ports
Sarah Hernandez, PhD, PE and Sandra Eksioglu, PhD
University of Arkansas
August 2020-December 2021

The purpose of this project is to guide strategic investment into port capacity through the development of a policy and infrastructure evaluation model of inland waterway commodity flows. A multi-stage stochastic optimization model will be developed to evaluate tradeoffs in strategic, long-term port infrastructure investment with mid-term capacity expansion decisions and provision of complementary highway infrastructure and shorter-term operational practices.



Courtesy of Frank Mckenna, Unsplash

ONGOING MarTREC FAST Act PROJECTS

Analysis of Blockchain's Impacts on and Applicability to Maritime Industry
Jim Kruse, MBA
Texas A&M Transportation Institute
May 2019-October 2020

It is unclear how relevant or critical the use of blockchain is for maritime business. It is clear to maritime shipping industry members that cargo tracking is an important function for customer satisfaction as it ties the physical movement of goods with payments, inventory management, and accountability. Since it is new to an industry that is international, fragmented, and complex, this project explores questions from the application of blockchain to maritime supply chains and logistics, in particular, the possible integration with existing technologies such as automatic identification and data capture technologies.

Courtesy of Logan Weaver, Unsplash

Assessment of Evacuation Network Performance under Different Evacuation Scenarios
Brian Wolshon, PhD, PE, and Scott Parr, PhD
Louisiana State University
July 2019-August 2021

This study will utilize data from Hurricane Irma (2017) to compare traffic characteristics during the evacuation with those observed during routine non-emergency operations. The research will be conducted in the coastal communities in the Florida Keys.

Changing Trade and Transportation Patterns: NAFTA, Cuba, and the US Gulf Coast
Bethany Stich, PhD
University of New Orleans
March 2018-December 2021

This research is working toward determining how changes in NAFTA has affected intermodal freight flows in the Gulf Coast region. In order to satisfy the current regulations and public policies, the transportation planning process can no longer solely rely on the basics of engineering; it is now forced to find the way in a sea of data, values and actors towards a comprehensive and integrated solution. As a consequence, the variety, quality, and quantity of data to be processed has become one of the big issues for transportation practitioners.

Combining Truck and Vessel Tracking Data to Estimate Performance and Impacts of Inland Ports
Sarah Hernandez, PhD, PE and Chase Rainwater, PhD
University of Arkansas
January 2019-December 2020

Performance-driven prioritization has shifted public sector focus to freight performance measurement. As a result, quality, multi-modal data is needed to support planning efforts, such as long-range freight travel demand modeling. The purpose of this project is to develop a method to fuse truck and marine vessel tracking data to better estimate performance of multi-modal supply chains that use inland waterway ports.

Development of Freeway Corridor Capacity Measure to Improve Transportation Resilience

Brian Wolshon, PhD, PE, PTOE
Siavash Shojaat, PhD
Louisiana State University
July 2019-August 2021

Although evacuations have a long track record of success, they can be complex, costly, and risky. Capacity is one of the most important characteristics of a freeway, which quantifies traffic carrying capability, and is a critical component to the resilience of transportation systems and the evacuation process. An approach which considers the whole freeway corridor as a system with bottlenecks and different characteristics is needed to assess traffic carrying ability. This study will introduce the concept of corridor capacity to estimate the resilience of freeway operation.

Engaging the Business and Tourism Industry in Visualizing Sea Level Rise Impacts to Transportation Infrastructure in Waikiki, Hawaii

Brian Wolshon, PhD, PE, and John Renne, PhD, AICP
Louisiana State University
March 2018-December 2020

This research builds upon another related project that focused on visualizing sea level rise impacts to transportation infrastructure in South Florida and extends and focuses on the business and tourism industry of Waikiki HI. Waikiki is facing major impacts from sea level rise, and transportation and community planners will engage with stakeholders through meetings to seek input and engagement on planning for the future including impacts of sea level rise on streets, buildings and neighborhoods.

Courtesy of Derek Lynn, Unsplash

Evaluation of Hydrogel–stabilized Expansive Soils in Mississippi for Sustainable Maritime Infrastructure Design

Yadong Li, PhD, PE
Jackson State University
August 2019-July 2021

Expansive soil causes a variety of maritime transportation infrastructure problem, such as cracks, damage to pipeline, and the differential settlement of foundation. This project seeks the feasibility of using innovative hydrogel treatment as alternative expansive soil stabilization. Hydrogel is a network of polymer chains that are hydrophilic, which has physical entanglement and chemical bonding to integrate solid and liquid properties. The hydrogel treatment may provide opportunities as cost-effective alternative.

Towards Integrating Resilience into Everyday Transportation in Coastal Communities

Brian Wolshon Ph.D., P.E., PTOE
Louisiana State University
August 2018-March 2021

Coastal communities have become increasingly vulnerable to sea level rise, hurricanes and other natural disasters. These events force the communities to evacuate in a relatively unpredictable way. This research will leverage technologies such as traffic simulation to help transportation agency entities maximize their resilience practices within their budgets.

Learning from USACE Open Data for Locks

Justin Chimka, PhD
University of Arkansas
August 2018-May 2021

In August 2017, the USACE began to enable unprecedented data access by publishing its Open Data for Navigation online. This project seeks to explore the new USACE Open Data for Locks, describe its relevant datasets, and inventory their contents, identify responses or variables across relevant datasets, and diagnose efficient statistical models of the usable subsets in order to make general statements about USACE lock data and public lock unavailability.

Fatigue Crack Control in Waterway Lock Gate Pintle Locations Subjected to Multi-Modal Fracture

Gary Prinz, PhD, PE
University of Arkansas
August 2018-March 2021

Lock gates are an important part of the transportation infrastructure within the United States, having many economic, safety, and environmental benefits over rail and highway transportation systems. Many existing lock gates throughout the U.S. have reached or exceeded their initial design life and require frequent repairs to remain in service. This project seeks to improve lock gate reliability by identifying and developing fracture mitigation strategies for multi-mode fatigue issues that arise near key pintle locations.

Informing Post-Disaster Restoration Through Modeling Interdependent Agriculture and Transportation Networks

Sarah Nurre, PhD, Kelly Sullivan, PhD, and Benjamin Runkle, PhD
University of Arkansas
August 2018-May 2021

Agriculture supply chains are of utmost importance for the function of society and are complex due to their interdependency with critical infrastructure systems including energy, water, and maritime and multimodal transportation. This complexity is increased due to the dependence on time-sensitive and capital-intensive operations, uncertain natural events, and volatile commodity markets. This project will develop models that determine how to effectively use transportation to make ag supply chains more resilient.

Informing Post-Disaster Restoration through Modeling Interdependent Agriculture and Transportation Networks-Phase II

Janey Camp, PhD, PE
Vanderbilt University
October 2018-May 2021

Agriculture is a critical part of the U.S. economy. Agriculture is interdependent on certain sectors, particularly transportation to get seed and fertilizers to fields at appropriate times and in getting products that may spoil to market efficiently. This project will develop models which determine how to effectively use transportation and coordinate restoration efforts to make ag supply chains more resilient .

Using CSA Cement for Novel Waterway Repair Materials

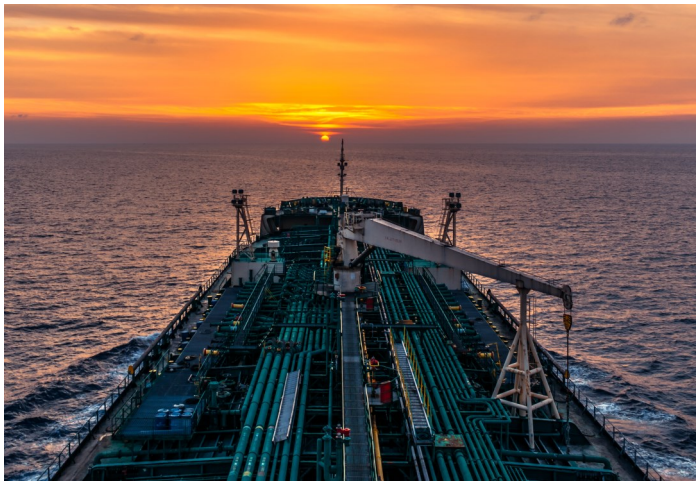
Cameron Murray, PhD &Michelle Bernhardt, PhD, PE
University of Arkansas
August 2018-May 2021

Calcium Sulfoaluminate-Belite (CSA) cement is a rapid setting hydraulic cement. Due to its rapid hardening characteristics and lower shrinkage and creep compared to typical portland cement, it is an ideal candidate as a repair material. The goal of this research is to develop new mixtures utilizing CSA cement that can be applied to waterway repairs. A grout mixture capable of setting up rapidly underwater and a soil-cement mixture that can rapidly stabilize slopes and waterway structures will be developed.

Modeling Dynamic Behavior of Navigable Inland Waterways

Heather Nachtmann, PhD and Justin Chimka, PhD
University of Arkansas
August 2018-June 2022

The inland waterway transportation system of the United States handles 11.7 billion tons of freight annually and connects the heartland of the United States with the rest of the world. The system is challenged with aging infrastructure and limited operations and maintenance budgets which can cause transportation delays and economic losses. We have developed gap research areas and questions to explore related to the McClellan-Kerr Arkansas River Navigation System (MKARNS) and the feasibility of developing container-on-barge transport in the United States.



Courtesy of Ayotunde Oguntoyinbo, Unsplash

COMPLETED MarTREC FAST Act PROJECTS

Economic Impact of the Gulf Intracoastal Waterway on the States It Serves
Jim Kruse, MBA and Brianne Glover, JD
Texas A&M Transportation Institute
September 2017-August 2018

This project examined the total economic impact of the GIWW across all sectors shipping goods along the waterway, in the states that it serves. Using IMPLAN (Economic Impact Analysis for Planning), this report estimated the economic impact of the GIWW to be $61.5 billion annually. Of this, $31.8 billion was generated in Texas, $23.1 billion in Louisiana, $4.5 billion in Mississippi, $1.9 billion in Alabama, and $0.2 billion in Florida. Furthermore, the GIWW supports 143,000 jobs and generates $14.5 billion in labor income annually, with the majority of this occurring in Texas and Louisiana. The GIWW complements the highway system and rail network, requiring less additional investment to add capacity.

A Multimodal Network Approach to the Inland and Coastal Waterway System
Bruce Wang, PhD
Texas A&M University
July 2017-November 2018

Two different maintenance operations are performed annually to rehabilitate the waterway system and keep it functional: dredging which removes sediments in the waterway to restore the lost navigational draft depth, and lock and dam repair due to aging and deterioration. This research solves this special knapsack problem considering the budget constraints, system randomness, and network connectivity to minimize the costs of operations in order to choose the most beneficial projects. By using the data from the Ohio River basin network, the model is solved with Cplex. The results show that the optimal solution is not dependent on the perceived value of time in vessel delay at locks and dams, nor on the costs of vessels. It shows a clear preference to locks and dams repair over dredging operations in the optimal allocation of the maintenance budget.

Large Scale Evaluation of Erosion Resistance of Biocementation against Bridge Scour and Roadway Shoulder Erosion
Lin Li, PhD, PE
Jackson State University
March 2018-February 2019

This study explored an alternative approach for armoring the riverbed with biocementation through MICP to mitigate soil erosion. Long-term erosion exposed to outdoor environment, rainfall induced erosion, and accelerated erosion were conducted on MICP-treated samples to prove the feasibility of the MICP technique for potential applications in prevention of bridge scour and road shoulder erosion. Results indicated that the bio-mediated particulate material based on MICP can provide an effective solution for problematic cases of sandy soil in prevention of bridge scour and road shoulder erosion.

Developing and Applying a Methodology to Identify Flow Generation Influences between Vessel and Truck Shipments
Mario Monsreal, PhD and Jim Kruse, MBA
Texas A&M Transportation Institute
December 2017-March 2019

Truck activity is logically connected to, and generated by, vessel activity at a port. In turn, vessel activity is generated by truck shipments. Although one might expect a 1-to-1 relation between the two types of shipments, that is unlikely the case. This study shed light on the relationship between multimodal flows (trucks and vessels), which will enable agencies and organizations to increase efficiency – and thus competitiveness – for industry, while minimizing negative impacts on a region. Specifically, this analysis provided estimates of specific traffic changes in specific roads, with specific directions of traffic flows and the time when those changes could be expected. These coefficients represent the main contribution of this study. Even though general results are intuitively straightforward, the magnitude of the impact and delays may not be obtained by simple observation.

Development and Implementation of Sustainable Transportation Resilience Indicators

Mark Abkowitz, PhD
Vanderbilt University
June 2017-June 2019

Much has been discussed about resilient transportation infrastructure as well as sustainable practices, but only recently have their interdependencies been brought to light in terms of a community's ability to develop sustainable (economic, social and environmental) resource capacity necessary to be resilient in the face of natural hazard events that could lead to catastrophic consequences. This research created a methodology that can be replicated by other counties and regions who wish to evaluate their flood resilience and improve decisions regarding future flood management. The transferability and scalability of this approach provides considerable value beyond the locale where the case study was implemented.

Interdependency of Port Clusters During Regional Disasters

Brian Wolshon, PhD, PE, and Scott Parr, PhD
Louisiana State University
January 2018-August 2019

Ports play a vital role in the economy of nations and provide a critical link in the supply chain. Often times, ports form the gateway by which essential goods are received within large geographic regions. Because of their function, ports are exposed to substantial risk of flooding, storm events, sea-level-rise, and climate change. This research quantified port resiliency that is applicable at the individual port level and regionally. In general, the results showed that regionally, ports are more resilient to disruptive events than the individual ports that make up the region. This was likely because as one port enters the disrupted state, another may be entering the recovery state or stable recovered state.

Exposure to STEM: Diversity in Maritime Transportation

Rick Coffman, PhD, PE
University of Arkansas
August 2018-September 2019

The goal of this project was to develop an educational model to open doors to all students, regardless of socio-economic background, who want to pursue careers in maritime and multimodal transportation. The project proved successful in exposing underrepresented students to STEM related concepts by using examples of maritime and multimodal transport infrastructure. First through fourth grade students were afforded with hands-on experiences with soils that fluoresce and panel dams to help make science fun. Ninth through twelfth grade students were provided with an opportunity to tour several lock and dam systems.

Shipping Container Chassis in the US: The Legacy of Ocean Carriers

Bethany Stich, PhD
University of New Orleans
March 2018-November 2019

Containerized shipping, which accounts for approximately 60 percent of all world seaborne trade while generating approximately 12 trillion United States (US) dollars in 2017, links trading partners between the water, rail, and air modes. If motor carriers could choose a lessor from among the chassis pools, based upon cost-competitiveness, rather than being mandated to one with legacy linkages to ocean carriers, the market would generate cost savings. A necessary condition to achieve this is the exit of the ocean carriers from the chassis node of the supply chain. A fuller answer is to encourage the developing practice of trucker ownership of chassis, this is the global model.

Liquefied Natural Gas Phase (LNG) II: The Future of LNG for the US and Gulf Coast Economies

Bethany Stich, PhD
November 2017-December 2019

The continued growth of Liquefied Natural Gas (LNG) production and long-distance trade has traditionally been taken as a given by global energy analysts, who have premised their positive estimates on gas being both relatively scarce and demand for it virtually unquenchable. Current conditions in the global energy market suggest that what many have predicted as a near perpetual increase in the volume of traded LNG is in fact a bubble that is now in the process of bursting. This project evaluated the feasibility and best practices of equipping the Port of New Orleans for potential storage and shore-side infrastructure for fueling vessels powered by LNG, as well as the feasibility of widespread use of LNG as marine fuel.

Liquefied Natural Gas Phase III: Export Competition in a Well Supplied, Flow-Shifting Global Economy
Bethany Stich, PhD
University of New Orleans
March 2018-December 2019

With trillions of cubic feet of shale reserves, the United States' (US) abundance of natural gas has prompted an increase in production of LNG as an export commodity. UNOTI continues to urge that U.S. natural gas energy policy best practice is not to focus on export and export alone, but rather adopt a diversified and climate responsible energy policy that focuses on the Ports of South Louisiana, the Gulf Coast, and the U.S. remaining globally competitive by investing in necessary LNG fueling infrastructure, as well as continued investment in the existing petrochemical sector of Coastal Louisiana and the Gulf Coast.

Effect of Permeability Variation of Expansive Yazoo Clay at the Maritime and Multimodal Transportation Infrastructure in Mississippi
Sadik Khan, PhD, PE
Jackson State University
September 2018-December 2019

Yazoo clay soil in Mississippi frequently causes pavement distress in multimodal transportation infrastructure. This study investigated the change in unsaturated vertical and horizontal permeability and its effect on the maritime and multimodal infrastructures such as pavement subgrade's moisture variation. The analysis improves the design of the undercut of the pavement, which is critical for deformation and deterioration of pavement of multimodal infrastructure.

Green Technology Approach for Capturing Pollution Washed from Transportation Infrastructures
Danuta Leszczynska, PhD
Jackson State University
March 2018-December 2019

The aim of this research was to produce and investigate a carbon-based substance, namely biochar, as a new material for the in-situ adsorption of pollutants carried by the stormwater runoff from the roads. This research has successfully generated results that are aligned with proposed objectives. New material, namely biochar, was manufactured from various waste biomasses, and investigated in correlation between sources of biomass, firing conditions, presence/absence of oxygen during production, time and temperature of pyrolysis

Trade-Off Analytics for Infrastructure Preservation
Greg Parnell, PhD and Ed Pohl, PhD
University of Arkansas
August 2018-December 2019

The objective of this project was to develop a course that could be taught to civil engineers, industrial engineers, and the maritime and multimodal infrastructure community for trade-off analytics as a tool to assist in their infrastructure preservation efforts. This course was also be packaged into a webinar to be delivered on-line for practicing professionals.

Visualizing Sea Level Rise Impacts in Transportation Planning
Brian Wolshon, PhD, PE and John L. Renne, PhD AICP
Louisiana State University
January 2018-December 2019

Transportation planners regularly engage communities through public meetings to seek input and engagement on planning for the future including impacts of sea level rise on streets and neighborhoods. New media options allow for three-dimensional (3D) imaging utilizing virtual and augmented reality. Such 3D visualizations are increasingly affordable. It is displayed on glasses that connect to smartphones. This project tested and compared new technologies in South Florida to see if 3D technology helps residents better understand the impacts of sea level rise on transportation infrastructure and communities.

Utilizing Graceful Failure As An Opportunity for Flood Mitigation Downstream to Protect Communities and Infrastructure
Janey Camp, PhD, PE and Craig Philip, PhD
Vanderbilt University
May 2018-March 2020

In 2011, prior research observed how "graceful failure" through planned damages to the Birds Point Levee by the U.S. Army Corps of Engineers (USACE) was enacted to alleviate extreme flooding on the Mississippi River. This action, reduced flooding and damage to waterway infrastructure and communities downstream. This research identified areas presently protected by levees that could be utilized for floodwater attenuation and storage along inland waterways.

Interdisciplinary Educational Outreach with Traffic Sensor Build Kits

Sarah Hernandez, PhD, PE
University of Arkansas

May 2019-May 2020

The purpose of this project was to develop learning modules that introduce students to new transportation data collection technologies that can be applied to better understand inland waterway port activity. The research developed a low-cost traffic sensor build kit that includes a mini inductive loop detector, detector card, and laptop. To accompany the build kit, we created lesson plans for (i) how loops function, (ii) how to build a loop, and (iii) two additional lesson plans with targeted activities for middle and high school students. Each lesson plan includes a colorful slide presentation that features a scenarios of port investment prioritization with examples local to Arkansas. Six complete build kits were assembled and in future work will be shared with summer camps at the UA and with professional transportation groups for outreach events. With its scalable components, the build kits are quickly adaptable to a variety of program types, lengths, and spaces, making the learning experience customizable to suit the needs of the local schools and summer programs.

Measures of Freight Network Resiliency: An expanded data capture of Truck Drivers and Support Services under Pandemic Distress

Sarah Hernandez, PhD, PE
University of Arkansas

May 2020-September 2020

COVID-19 responses by public agencies and private citizens have affected drivers and driver support systems. This project considered an expanded definition of the freight network, beyond roads and warehouses, to include truck drivers and driver support systems. Driver support systems include physical infrastructure like public and private rest stops as well as operational protections like Hours of Service (HOS). The purpose of this research was to collect timely data on the impacts of the Covid-19 pandemic on truck driver and trucking operations with a specific focus on issues that affect driver health and safety. An online opt-in panel survey was developed using the Qualtrics survey platform. The survey questionnaire contained 65 questions with skip logic dependent on responses. A total of 523 responses were collected between the dates of May 19th and June 1st, 2020. The dates of the survey correspond to the period of lifted HOS restrictions. A complete data file of the responses is available on Zenodo at [Measures of Freight Network Resiliency During the Covid-19 Pandemic | Zenodo]

Courtesy of Jake Blucker, Unsplash

COMPLETED MarTREC PROJECTS

Maritime and Multimodal Logistics Management

Dynamic Decision Modeling for Inland Waterway Disruptions
Shengfan Zhang, Ph.D.
Heather Nachtmann, Ph.D.
University of Arkansas
December 2016
https://martrec.uark.edu/research/dynamic_decision_modeling_final_report.pdf

Economic Impacts of Lock Usage and Unavailability
Justin R. Chimka, Ph.D.
University of Arkansas
June 2016
https://martrec.uark.edu/research/chimka-final-report-2016.pdf

Efficient Dredging Strategies for Improving Transportation Infrastructure Resilience
Kelly Sullivan, Ph.D.
University of Arkansas
December 2016
https://martrec.uark.edu/research/efficient_dredging_stratagies_final_report.pdf

Multimodal Transport and TransLoad Facilities in Arkansas
Justin R. Chimka, Ph.D.
University of Arkansas
January 2015
https://martrec.uark.edu/research/multimodal-transport-and-transload-facilities-in-arkansas.pdf

Regional Economic Impact Study of the McClellan-Kerr Arkansas River Navigation System
Heather Nachtmann, Ph.D.
University of Arkansas
August 2015
https://martrec.uark.edu/research/mkarns_final.pdf

Supporting Secure and Resilient Inland Waterways
Heather Nachtmann, Ph.D.
Justin Chimka, Ph.D.
University of Arkansas
June 2018
https://martrec.uark.edu/research/ua_ssriwi_final.pdf

Supporting Secure and Resilient Inland Waterways: Phase Two
Heather Nachtmann, Ph.D.
Justin Chimka, Ph.D.
University of Arkansas
August 2018
https://martrec.uark.edu/research/ua_ssriwii_final.pdf

Maritime and Multimodal Infrastructure Preservation

Climate Impacts on Lock Use and Performance
Justin Chimka, Ph.D.
University of Arkansas
August 2018
https://martrec.uark.edu/research/ua_climate_final.pdf

Corrosion-Tolerant Pre-Stressed CFRP Fatigue Retrofits for Improved Waterway Lock Reliability
Gary Prinz, Ph.D., P.E.
Clint Wood, Ph.D., P.E.
University of Arkansas
September 2018
https://martrec.uark.edu/research/ua_corrision_final_report.pdf

Effect of Swell-Shrink Characteristics on Landslides in Yazoo Clay
Mohammad Sadik Khan, Ph.D., P.E.
Jackson State University
June 2018
https://martrec.uark.edu/research/jsu_final_effect.pdf

Exploration of Novel Multifunctional Open Graded Friction Courses for In-situ Highway Runoff
Yadong Li, Ph.D., P.E.
Lin Li, Ph.D., P.E.
Jackson State University
June 2016
https://martrec.uark.edu/research/yadong-li-final-report-2016.pdf

Evaluating the Performance of Intermodal Connectors
Sarah Hernandez, Ph.D.
University of Arkansas
September 2018
https://martrec.uark.edu/research/ua_evaluating_performance_final_report.pdf

Development of a Design Protocol: Sustainable Stabilization of Slope using Recycled Plastic Pins in MS
Mohammad Sadik Khan, Ph.D., P.E.
Jackson State University
October 2017
https://martrec.uark.edu/research/development_of_a_design_protocol.pdf

Identifying High-Risk Roadways for Infrastructure Investment Using Naturalistic Driving Data
Brian Wolshon, Ph.D., P.E., PTOE
Louisiana State University
June 2015
https://martrec.uark.edu/research/identifying_high_risk_roadways_corrected.pdf

In-Situ Monitoring and Assessment of Post Barge-Bridge Collision Damage for Minimizing Traffic Delay and Detour
Wei Zheng, Ph.D., P.E.
Jackson State University
June 2016
https://martrec.uark.edu/research/wei-zheng-final-report-2016.pdf

Innovative Bio-Mediated Particulate Materials for Sustainable Maritime Transportation Infrastructure
Lin Li, Ph.D., P.E.
Jackson State University
June 2017
https://martrec.uark.edu/research/jsu_innovative_bio-mediated_final.pdf

LNG Bunkering for Marine Vessels at the Port of New Orleans: Siting and Facility Components
Bethany Stich, Ph.D.
James R. Amdal
University of New Orleans
January 2016
https://martrec.uark.edu/research/uno_lng.pdf

Optimal Dredge Fleet Scheduling within Environmental Work Windows
Chase Rainwater, Ph.D.
Heather Nachtmann, Ph.D.
University of Arkansas
August 2016
https://martrec.uark.edu/research/optimal.pdf

Optimal Dredge Fleet Scheduling - Phase 2 Research
Chase Rainwater, Ph.D.
Heather Nachtmann, Ph.D.
University of Arkansas
November 2017
https://martrec.uark.edu/research/ua_optimal_dredge_phase2.pdf

Predicting Soil Type from Non-destructive Geophysical Data using Bayesian Statistical Methods
Michelle Bernhardt, Ph.D, P.E.
University of Arkansas
August 2018
https://martrec.uark.edu/research/ua_predicting_final.pdf

Quantifying Resiliency of Maritime Transportation Systems
Brian Wolshon, Ph.D., P.E., PTOE
Louisiana State University
June 2018
https://martrec.uark.edu/research/lsu_quantifying_final_report.pdf

Rapid and Non-Destructive Assessment of Levees for Strength and Liquefaction Resistance
Clinton Wood, Ph.D., P.E.
Michelle Bernhardt , Ph.D., P.E.
University of Arkansas
July 2017
https://martrec.uark.edu/research/ua_final_levees.pdf

Disaster Response and Transportation Planning for Coastal and River Valley Communities

Development of a Large-Scale Traffic Simulation Model for Hurricane Evacuation of Mississippi Coastal Region
Feng Wang, Ph.D., P.E.
Jackson State University
August 2015
https://martrec.uark.edu/research/martrec_final_report_development.pdf

Evaluating Coastal and River Valley Communities Evacuation Network Performance Using Macroscopic Productivity
Scott Parr, Ph.D., E.I.T.
Louisiana State University
May 2017
https://martrec.uark.edu/research/evaluating_coastal_lsu.pdf

Measurement of Traffic Network Vulnerability for Mississippi Coastal Region
Feng Wang, Ph.D., P.E.
Jackson State University
July 2017
https://martrec.uark.edu/research/jsu_final_measurement_of_traffic.pdf

National Inventory and Analysis of Transit Oriented Development in Proximity to Coasts and Port Facilities
John L. Renne, Ph.D., AICP
University of New Orleans
September 2017
https://martrec.uark.edu/research/uno_tod.pdf

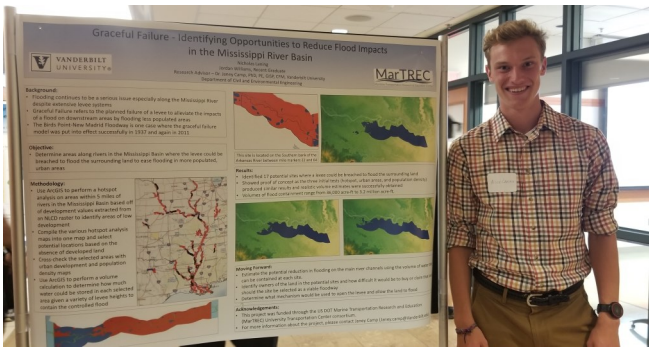
Quantification of Multimodal Transportation Network Vulnerability: A Pilot Study in Mississippi
Himangshu Das, Ph.D., P.E.
Jackson State University
April 2017
https://martrec.uark.edu/research/quantification_multimodal.pdf

Road Sign Recognition during Computer Testing versus Driving Simulator Performance for Stroke and Stroke+Aphasia Groups
Neila J. Donovan, Ph.D.
Louisiana State University
June 2015
https://martrec.uark.edu/research/road-sign-recognition-during-computer-testing.pdf

Statistical Analysis of Vehicle Crashes in Mississippi
Feng Wang, Ph.D., P.E.
Jackson State University
July 2017
https://martrec.uark.edu/research/jsu_final_statistical_analysis.pdf

Vulnerability of Fuel Distribution Systems to Hazards in Coastal Communities
John Pardue, Ph.D., P.E.
Louisiana State University
March 2017
https://martrec.uark.edu/research/vulnerability_fp.pdf

MarTREC STUDENT AND UNIVERSITY ACHIEVEMENTS



Nicholas Laning, Civil Engineering, Vanderbilt University, Laning began working on the MarTREC Graceful Failure Project in the Summer of 2019. The Vanderbilt School of Engineering hosts an undergraduate research program where students are engaged in research with faculty members. As part of the program faculty members select students based upon applications to work on research. Nick was selected by Dr. Janey Camp to participate in the program and work on the MarTREC project.

Julia Loshelder, Civil Engineering , University of Arkansas
NSF Graduate Research Fellow
The highly competitive awards are given to students in science, technology, engineering and mathematics and recognize academic excellence and the potential contribution that each student will make to their field and to society at large. Each fellowship is worth $34,000 per year and can be renewed for up to three years. Loshelder is a student under the advisement of Dr. Richard Coffman. Together they worked on MarTREC project, “Exposure to STEM: Diversity in Maritime Transportation.”

Logan Verkamp, Civil Engineering, University of Arkansas
MarTREC’s 2019 Outstanding Student of the Year
An Arkansas native, Verkamp graduated from the University of Arkansas at Fort Smith, receiving a Bachelor of Science in Mechanical Engineering. He then graduated in May 2020 with a Master of Science in Civil Engineering with a focus in Structural Engineering, while under the advisement of Dr. Gary Prinz. Together they worked on MarTREC project, “Fatigue Crack Control in Waterway Lock Gate Pintle Locations Subjected to Multi-Modal Fracture.” Verkamp is now employed with the United States Navy.

Jackson State University (JSU) is a top-ten HBCU, according to a recent report by Collegeconsensus.com. JSU describes itself as an essential tool for students in search of a college or university that best fits a variety of needs i.e., support and inclusion, inspirational and challenging academic environment, or networking opportunities. Of the 50 HBCUs listed, JSU is firmly cemented in the No. 7 spot. It is the only Mississippi HBCU with undergraduate and graduate engineering programs. Diverse Issues in Higher Education also noted JSU as one of the country’s leading producers of African-American graduates in science and education.

WOMEN IN THE WORKFORCE

Hiba Baroud, Assistant Professor of Civil Engineering, Vanderbilt University, received a 2020 NSF Faculty Early CAREER Development award

The grant will boost community resilience and sustainability through a three-pronged project that starts with a better understanding of how people and infrastructures interact during hazards. Baroud develops and utilizes analytical methods to measure the risk, reliability and resilience in critical infrastructure systems—in particular, to predict disruptive events and to model recovery processes. The NSF grant will support her work that fuses individual and community behavior with infrastructure performance using dynamic network models.

Janey Camp, Associate Professor, Civil Engineering, Vanderbilt University, creates hazard education for future community leaders

As secondary educators begin planning their fall course material, Janey Camp is leading the development of online-friendly teaching materials focused on risk education. The curriculum focuses on high school students to make sure that the region's future leaders are risk-informed adults equipped to make better decisions when it is their time to plan for their communities. Many leaders around the country have not had the kind of risk education training that could empower them to plan strategically. The goal of the curriculum is to inform leaders to educate others about risk and how to manage it.

Frances Griffith, Associate Director, Center for Training Transportation Professionals, recognized as "Extraordinary Women" by the Chancellor's Commission on Women

Founded in 2010, the mission of the Chancellor's Commission on Women is to be an advocate for the interest of the entire community of women at the University of Arkansas. These recognitions were established to honor people who are making a difference in the lives of women on our campus. The award criteria is someone that leads by example, is a role model, and is an inspiration for others. She empowers those around her and makes a positive impact on women's experiences on our campus in leadership or service.

Heather Nachtmann, Director, MarTREC, Making Headlines in 2020

Heather Nachtmann, received the Bernard Sarchet Award from the American Society for Engineering Management. The Sarchet Award is the highest award given by the society. It recognizes a lifetime of achievement in the engineering management field. Nachtmann also was selected as the next editor-in-chief of *The Engineering Economist* journal. In November, she was named senior associate vice chancellor for research and innovation at the University of Arkansas.

THE COVID IMPACT

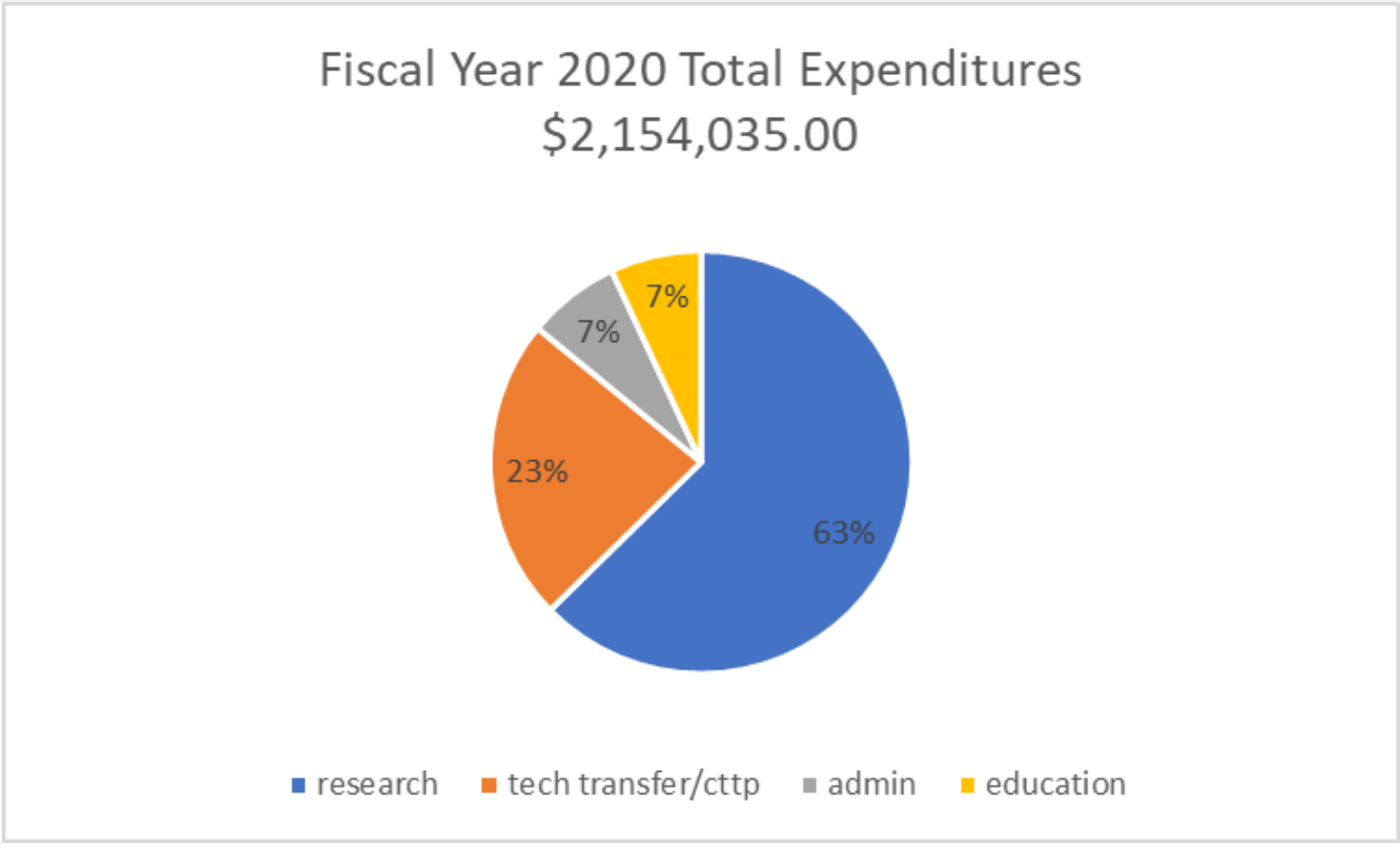
Mark Abkowitz, PhD, Vanderbilt University
Can Your Community Handle a Natural Disaster and Coronavirus at the Same Time?
Dealing with response and recovery from a disaster in the midst of the coronavirus pandemic raises new and unsettling questions. Before this year, few communities seriously considered the need to deal with a pandemic on top of a natural disaster. Now is the time to recognize how to become resilient when confronting multiple disasters simultaneously.
https://www.vanderbilt.edu/vector/2020/05/mark-abkowitz-authors-article-on-natural-disasters-during-the-coronavirus-pandemic/

Sarah Hernandez, PhD, University of Arkansas
Measures of Freight Network Resiliency: An Expanded Data Capture of Truck Drivers and Support Services under Pandemic Distress
COVID-19 responses by public agencies and private citizens have affected drivers and driver support systems. This research project considers an expanded definition of the freight network, beyond roads and warehouses, to include truck drivers and driver support systems. Driver support systems include physical infrastructure like public and private rest stops as well as operational protections like Hours of Service.
https://martrec.uark.edu/research/completedprojects/index.php

Tara Tolford, AICP, University of New Orleans
Survey For Proposed New Orleans-Baton Rouge Rail Service
The University of New Orleans Transportation Institute is conducting an anonymous survey to determine interest in a New Orleans-Baton Rouge passenger rail service and to determine travel patterns post COVID-19. The survey aims to understand the public's interest in regional transit, identifying recommendations for improving connections to proposed rail stations, existing intercity bus services, walking and bicycling.
https://www.uno.edu/news/2020-06-08/uno-transportation-institute-launches-

Brian Wolshon, PhD, Louisiana State University
Traffic Impacts of the COVID-19 Pandemic: Statewide Analysis of Social Separation and Activity Restriction
The COVID-19 pandemic resulted in significant social and economic impacts throughout the world. In addition to the health consequences, the impacts on travel behavior have also been sudden and wide ranging. The technical paper describes the drastic changes in human behavior using the analysis of highway volume data as a representation of personal activity and interaction.
https://ascelibrary.org/doi/full/10.1061/%28ASCE%29NH.1527-6996.0000409

MBTC FINANCIALS FY2020



LIFE WITH COVID-19 IN 2020

Courtesy of UA resource space

COMPLETED MBTC RESEARCH PROJECT

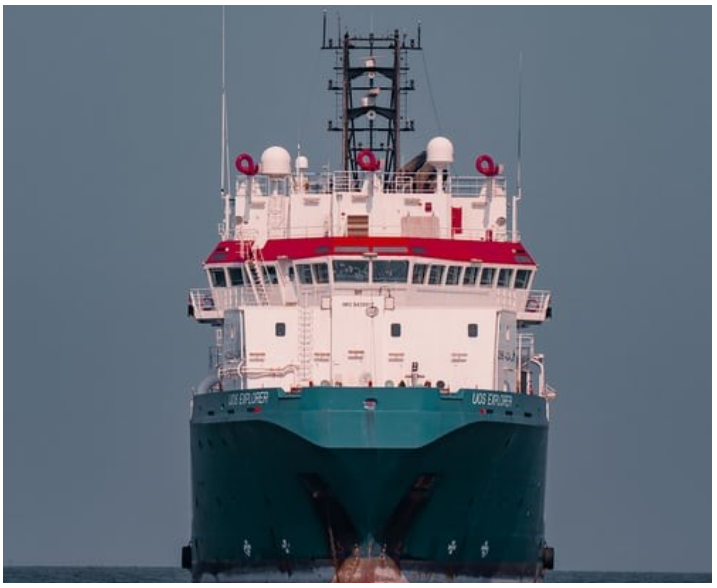
Data Simulation to Support Interdependence Modeling in Emergency Response and Multimodal Transportation Networks

Haitao Liao, Ph.D. and Heather Nachtmann, Ph.D.
University of Arkansas
September 2017-August 2020

The inland waterways in the United States (U.S.) are used to transport approximately 20% of America's coal, 22% of U.S. petroleum products, and 60% of farm exports making these waterways a significant contributor to the U.S. multimodal transportation system. General freight movements via the inland waterways are expected to increase in the upcoming years due to economic and logistic drivers, nonetheless, current studies addressing the impacts of disruptions on waterways operation and multimodal commodity flow along with the economic analysis are limited. One reason for the limited number of studies is the lack of tools to facilitate research in this area by providing data-driven models. For a full utilization of the nation's multimodal transportation infrastructures and the improvement of their effectiveness and safety in response to extreme conditions, a data-driven system needs to be put in place to quantify the interdependency of different modes of transportation, coordinate their operations, and evaluate how disruptions of interrelated ICIs affect economic outcomes. In this study, data about natural extreme events affecting inland waterways were collected and used to predict possible occurrences of such events in the future using a spatio-temporal statistical model. We investigated the waterways disruptions effect on interconnected transportation systems using a simulation tool built on a statistical model. The developed methods are centered on inland waterways but can be used broadly for other local, regional and national infrastructures. A case study based on the Mississippi River and McClellan–Kerr Arkansas River Navigation System (MKARNS) illustrates the use of the simulation tool in interdependence modeling and decision making for the operation of a multimodal transportation network.

ONGOING MBTC RESEARCH PROJECT - TransMAP

Conducted through the Maritime Transportation Research and Education Center (MarTREC), the Transportation and Maritime Analytics Partnerships Hub (TransMAP) project is supported by the Maritime Administration of the U.S. Department of Transportation. The team, led by the University of Arkansas in partnership with the Texas A&M Transportation Institute, is working to make available large-scale data and visualization tools related to maritime freight transportation on infrastructure, systems, and networks accessible to humans and machines through the Internet of things, in order to enable improved resilience, planning, investment and operational decisions. TransMAP's goal is to develop a 'visual decision space' for effective planning, management, and advancement of efficient, resilient, and sustainable multimodal transportation systems including highway, rail, maritime, and pipeline. Efficient, resilient, and sustainable multimodal transportation is a national priority. To meet the challenging environment of the Nation's complex and ever-changing transportation system, large-scale data sets need to be captured and analyzed to support research and planning, and made available for real-time access for use by government agencies, industry and citizens. Intelligently using big data is critical to manage, improve, maintain, design and build our transportation infrastructure.



Courtesy of Julian Gaud, Unsplash

2019 JACK BUFFINGTON OUTSTANDING STUDENT POSTER

Awarded to Basem Alkheel and Jose Carlos Hernandez Azucena for their poster on "Data Simulation for Interdependence Modeling, Coordination and Emergency Response with Application in Multimodal Transportation". Alkheel and Azucena are Ph.D. Industrial Engineering students under the supervision of Dr. Haitao Liao, Professor of Industrial Engineering.

2020 ARKANSAS GOOD ROADS SCHOLARS

Josie Baker, Mariah Crews, Grant Ferguson, Lizbeth Juarez, Justin Odom, and Mark St. Pierre Jr. were selected as the 2020 Arkansas Good Roads scholarship recipients. The organization grants scholarships to outstanding civil engineering students in their junior or senior year. Recipients of the scholarship commit to work in the transportation field in Arkansas for a minimum of one year after graduation.

CENTER FOR TRAINING TRANSPORTATION PROFESSIONALS

Frances Griffith, **Stacy Williams**, **Roselie Conley**, **Mary Fleck**, **Talley Faulkner**, **Katie Juniel**, **Austin Williams**.

The Center for Training Transportation Professionals (CTTP) is a multi-faceted training and certification program designed to serve the transportation industry by providing quality education relating to the materials, procedures, and equipment used in all aspects of highway construction. Though originally designed to serve the state of Arkansas, CTTP has grown to be a training resource for the transportation workforce around the globe. In 1996, the CTTP program was developed in response to the federal requirement that all laboratories, along with personnel performing sampling and testing for quality control or quality acceptance (QC/QA) purposes must be 'qualified' to perform such actions.

A typical CTTP class is a 2 ½ - day short course that includes classroom instruction, laboratory demonstrations, individual hands-on practice time, and homework assignments. Successful completion of a closed-book written exam and individual performance exam results in a 5-year certification. Classes are generally limited to 20 participants, although class size has been reduced as a result of the COVID-19 pandemic. Each class includes agency employees (ARDOT) and contractors/consultants, and this framework has generated one of CTTP's greatest advantages, which is that agency and contractor personnel come to a neutral location where all participants receive the same information.

While live instruction is largely preferred, CTTP understands that an online presence is absolutely critical to its long-term success and the current pandemic has proven this to be truer than ever before. The CTTP website, www.cttp.org, contains a complete suite of mobile-friendly training materials for each certification course, complete with training modules, knowledge checks, videos, practice problems, study guides, and quizzes. When face-to-face training sessions were suspended earlier this year, CTTP quickly shifted to online training as an alternative mechanism for temporary certifications that could be extended to the full 5-year certification as soon as conditions allowed for in-person exams.

CTTP online products have been accessed by technicians across the U.S. and internationally, and the CTTP YouTube channel receives approximately 500 views each day from locations all over the world. The CTTP online modules were featured in the National Cooperative Highway Research Program (NCHRP) Synthesis 503 entitled "Leveraging Technology for Transportation Agency Workforce Development and Training" and an associated 2017 webinar.

NEW MBTC BOARD MEMBERS

Cassandra Caldwell, Executive Director, Waterways Commission

Casandra Caldwell, comes to Arkansas from the Oklahoma Department of Transportation as their Administrative Programs Officer. Casandra is a graduate of Rogers State University in Medical and Molecular Biology and also has an Associate of Science in Biology and Legal Studies. She has served in the United States Navy and is a certified Inland Maritime Port Manager.

Chad Johnston, Protective Security Advisor-Arkansas, Region VI, Cybersecurity and Infrastructure Security Agency

Chad Johnston has worked for the Department of Homeland Security over 18 years. Chad holds a Bachelor of Science in Emergency Management from Arkansas Tech University. He hails from his hometown of Atkins, Arkansas. He is a certified Emergency Manager, Grants Manager, Continuity Practitioner and Project Manager.

Caren Kraska, President and Chairman, Arkansas & Missouri Railroad

Caren Kraska is a graduate of the Massachusetts Institute of Technology, and holds a Bachelor of Science degree in civil engineering (with emphasis in transportation), as well as a Master's degree in mechanical engineering from Stanford University. Caren was born and raised in New York. Her career includes over fifteen years of experience in the railroad industry.

BRIEF HISTORY OF MBTC

The Mack-Blackwell Transportation Center (MBTC) has served the state of Arkansas and the nation for over 25 years by providing state-of-the-art research, quality transportation education, and technology transfer.

In 1987, Congress authorized the U.S. Department of Transportation (USDOT) University Transportation Center (UTC) program, which led to the establishment of ten regional UTCs, one in each of the ten federal regions. The UTC program was designed to improve transportation research and education in the United States by advancing technology and expertise across multiple modes of transportation and addressing vital workforce needs for the next generation of transportation leaders. The center was named in the Intermodal Surface Transportation Efficiency Act of 1991, which was signed into law by President George H. W. Bush. Dr. Bob Elliott coined the center name cited in the bill – the National Rural Transportation Study Center.

In 2007, MBTC was designated as one of seven members of the U.S. Department of Homeland Security National Transportation Security Center of Excellence, in accordance with HR1, implementing the recommendations of the 9/11 Commission Act of 2007. The center fulfilled transportation security research needs for six years under this designation.

In 2013, MBTC partnered with Jackson State University, Louisiana State University and the University of New Orleans to form the Maritime Transportation Research and Education Center (MarTREC), which was competitively selected as a USDOT Tier 1 University Transportation Center under the MAP-21 transportation bill. With continued funding in 2016, the MarTREC consortium added Texas A&M University and Vanderbilit University and, through the FAST Act, and is working to preserve the Nation's transportation system through efficient, resilient, and sustainable maritime and multimodal logistics and infrastructure.

DAN FLOWERS AND NAMED LECTURE SERIES

The **Dan Flowers** Distinguished Lecture series was established in 2007 to honor the transportation service of Dan Flowers, former Director of Arkansas Department of Transportation. Flowers was selected by the Arkansas Highway Commission to become Director of the Arkansas State Highway and Transportation Department effective January 3,1994. He is a registered professional engineer, a member of the University of Arkansas' Academy of Civil Engineering, and serves on the Mack-Blackwell Transportation Center's Professional Advisory Board at the University of Arkansas.

Jim Kruse
Director of the Center for Ports and Waterways, Texas A&M Transportation Institute

Jim Kruse was our distinguished speaker on November 14, 2019. Lecture topic was, *Don't Look Back, The Past isn't Where We Are Headed. A Look At How The Marine Freight World is Changing.* Kruse is the MarTREC site director at Texas A&M Transportation Center, where he has led several informative projects. He is also on the TransMap team, a joint project between MarTREC and the United States Maritime Administration.

MESSAGE FROM MBTC EXECUTIVE DIRECTOR

What more can be said about 2020 that has not already been said? Certainly in this year of challenges, one very clear item emerged: the importance of transportation as it relates to critical supply chains. While some transportation sectors continue to endure historic downturns (like airline travel), others contribute to ensuring availability of food, medication, and other essentials. Much has been speculated regarding the 'new normal'; will the post-pandemic world resemble that of the years "pre" pandemic? Regardless of what results from this current reality, one thing is clear: the importance of transportation research. Like many other fields, transportation researchers have been called upon to increase efficiency, reliability, and resiliency of transportation systems – to be able to react and respond to changing conditions ranging from decisions at the local level to worldwide crises. Another clarity stemming from 2020: the inter-relationship and inter-dependency of transportation systems across modes, technologies, geography, and geo-political entities. I continue to be amazed at the ongoing, incredible work of researchers related to MarTREC and the Southern Plains Transportation Center, and to the Workforce Development professionals at the Center for Training Transportation Professionals (CTTP). Their work continues (relatively) unabated, and we see advances and solutions every day. We look forward to the coming year – please stay safe!

TABLE OF CONTENTS

Courtesy of ARDOT

MBTC STAFF

Heather Nachtmann, Ph.D.
Director

Kevin D. Hall, Ph.D., P.E.
Executive Director

Amy M. Shell, M.S.
Center Coordinator

Stacy G. Williams, Ph.D., P.E.
CTTP Director

Frances Griffith, M.S.
CTTP Associate Director

Roselie Conley
CTTP Research Technologist

Mary Fleck
CTTP Instructor

Austin Williams
CTTP Programmer

Talley Faulkner
CTTP Program Specialist

Katie Juniel
CTTP Administrative Specialist

CONTACT INFO

4190 Bell Engineering Center
University of Arkansas
Fayetteville, Arkansas 72701
Phone: 479.575.6021
Email: mbtc@uark.edu

UNIVERSITY OF ARKANSAS

MBTC ADVISORY BOARD

Cover photo courtesy of Thaddaeus Lim, Unsplash

Mack-Blackwell Transportation Center

October 2019 - September 2020

mackblackwell.uark.edu