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Annual Report

Mack-Blackwell Rural Transportation Center

2020

Annual Report, 2019-2020

Mack-Blackwell National Rural Transportation Study Center (U.S.)

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Mack-Blackwell Transportation Center

October 2019 - September 2020



mackblackwell.uark.edu

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ARKANSAS

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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!

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Courtesy of ARDOT

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 Vanderbilt 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.

NEW MBTC BOARD MEMBERS



Cassandra Caldwell, Executive Director, Waterways Commission

Cassandra Caldwell, comes to Arkansas from the Oklahoma Department of Transportation as their Administrative Programs Officer. Cassandra 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.

CENTER FOR TRAINING TRANSPORTATION PROFESSIONALS



**Frances Griffith, Stacy Williams, Roselie Conley, Mary Fleck,
Talley Faulkner, Katie Juniell, 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, CTTTP has grown to be a training resource for the transportation workforce around the globe. In 1996, the CTTTP 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 CTTTP 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 CTTTP'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, CTTTP 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 CTTTP 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, CTTTP 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 CTTTP YouTube channel receives approximately 500 views each day from locations all over the world. The CTTTP 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.

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.

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

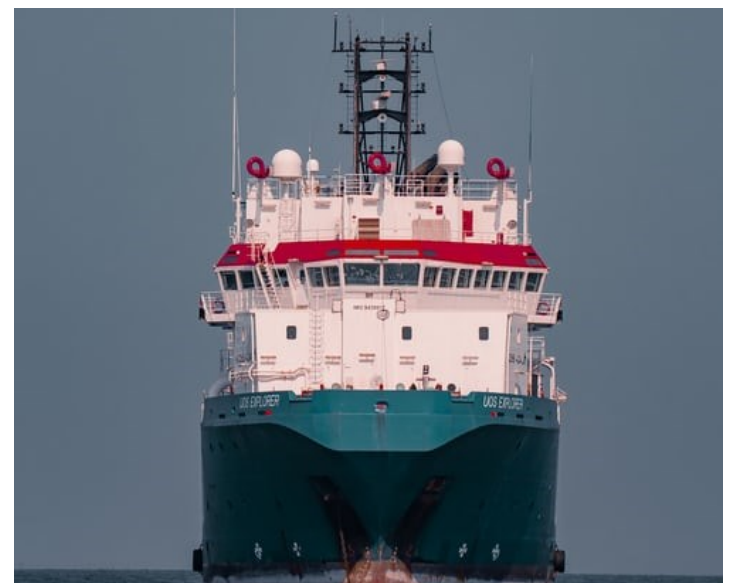
The inland waterways in the United States (U.S.) are used to transport approximately 20% of America's coal, 22% of U.S. petroleum products, and 60% of farm exports making these waterways a significant contributor to the U.S. multimodal transportation system. General freight movements via the inland waterways 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

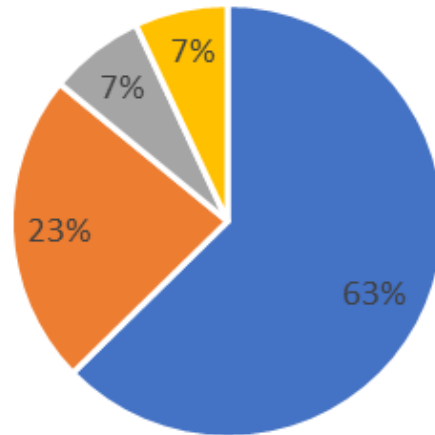
analyzed to support research and planning, and made available for real-time access for use by government agencies, industry and citizens. Intelligently using big data is critical to manage, improve, maintain, design and build our transportation infrastructure.



Courtesy of Julian Gaud, Unsplash

MBTC FINANCIALS FY2020

Fiscal Year 2020 Total Expenditures
\$2,154,035.00



■ research ■ tech transfer/cttp ■ admin ■ education

LIFE WITH COVID-19 IN 2020



Courtesy of UA resource space

WOMEN IN THE WORKFORCE



**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.”



**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>



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.