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Upcoming Events

**National Highway Institute (NHI)
Course No. 380032A - Roadside Safety Design**
March 14-16
TTEC 100

**National Highway Institute (NHI)
Course No. 380096 - Modern Roundabouts: Intersections Designed for Safety**
April 11
TTEC 100

To view more events, please visit
<http://www.ltrc.lsu.edu>.



Source:Wired.com

LTRC Explores Autonomous Vehicle Options for State Decision Makers

In response to a request from the Louisiana State Legislature, researchers at LTRC launched a study of autonomous vehicles to provide recommendations on legislative and regulatory action to best accommodate this emerging technology. This research, entitled "Investigation into Legislative Action Needed to Accommodate the Future Safe Operation of Autonomous Vehicles in the State of Louisiana," was led by Louisiana State University's Professor of Civil and Environmental Engineering Chester Wilmot, Ph.D., P.E., and LTRC Graduate Assistant Marlon Greensword at the Louisiana Transportation Research Center. Researchers reviewed practices in other states, observed prepared legislation, identified the role of different organizations in the development of autonomous vehicles, and observed how each state has handled the issue of preparing for autonomous vehicles on public roads.

"What was found is that there is an exponential growth in interest in the subject, both officially and among the public at large, that some unrealistic expectations concerning what autonomous vehicles will be able to accomplish is beginning to be challenged. We also discovered that two paths in the development of autonomous vehicles are being followed: one involving incremental growth toward full automation and the other an attempt to produce a fully autonomous vehicle directly," explained Dr. Wilmot.

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TRAC and RIDES in Motion in Area Classrooms

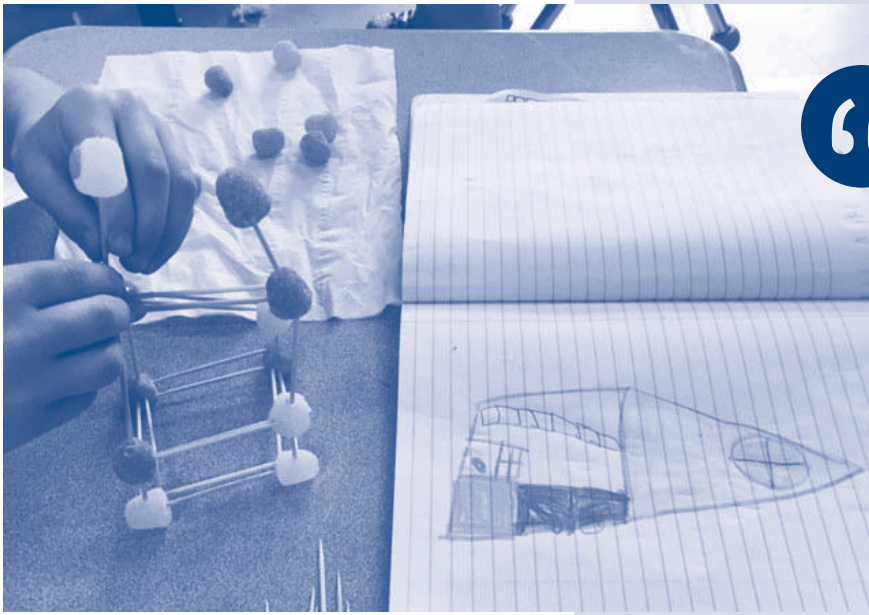
As a participating state of the TRAC™ (Transportation and Civil Engineering) and RIDES (Roadways In Developing Elementary Students) programs, Louisiana has been equipping teachers across the state for close to 5 years with resources for use in their science, math, and social science classrooms. Through these federally funded AASHTO educational outreach programs, teachers are invited to LTRC every year for a two-day, hands-on learning event conducted by National Board Certified teachers. During the two days, teachers become the students as they are challenged with interactive activities and equipped with hundreds of lesson plans, a trunk of free supplies, and hours of activities and software that will captivate their students.

“The TRAC Program has eight modules designed to engage students in solving real-world problems while connecting them to the working world of transportation. Students design bridges, build magnetic-levitation trains, plan a city, or learn about environmental issues that impact transportation,” explained Associate Director, Technology Transfer & Training Mary Leah Caillier Coco, Ph.D. “The RIDES Program is designed for K-8 students with a focus on math and science skills to help students utilize

critical thinking skills to solve real-world problems and also learn about careers in transportation.”

As a consensus, teachers who have attended TRAC or RIDES programs agree that this training is unlike any they have ever received. D.C. Reeves 3rd Grade Math and Science Teacher Amber Perrin explained, “I have bragged to my colleagues each time I have an opportunity by letting them know that this was the best workshop I have attended in my 13 years of teaching. The training provided hands-on activities from the moment we walked in the door. It provided an opportunity to dive in and think/ explore like our classroom kiddos do.”

One of the goals of TRAC and RIDES is to introduce these interactive activities to students at an early age to foster an interest in STEM areas, in hopes that students would be inspired to consider careers in transportation and civil engineering. Dr. Coco added, “LTRC feels strongly that we have a responsibility in helping cultivate future engineers for the transportation community. We feel extremely honored that we are able to provide these programs to our education community throughout Louisiana.”



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“We had our children draw blueprints for a gingerbread house and then use the blueprints to design the house. We then wrote about how we created our structures. The language the children were using was amazing!”

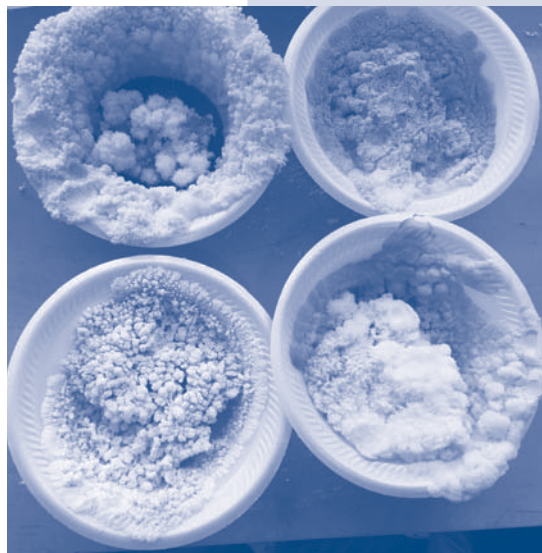
**Aundrea Reidenauer and
Misty Pignato
1st Grade teachers
Abita Springs Elementary**

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Teachers who frequently use the provided lessons and activities agree that TRAC and RIDES is accomplishing that and more inside their classrooms. “Using the program in my classroom has helped to spark an interest of STEM within my students,” said Shenandoah Elementary Kindergarten Teacher Erica Clements, M. Ed. “My students’ vocabulary has grown greatly. They are able to make meaning through their experiences and apply it to other learning.”

As a participant in TRAC and RIDES, teachers also have access to LTRC, where they can request local engineers to visit classrooms to serve as speakers, teach a hands-on activity, and/or talk to students about the importance of math and science in preparing for their future.

If you are interested in attending the next TRAC and RIDES workshop, another workshop is slated for June 5 and 6, 2017, at TTEC. Please contact LTRC Training Program Coordinator Rebecca Rizzutto at Rebecca.Rizzutto@la.gov or 225-767-9187 to sign-up or get more information.



“The lesson manual and resources given have provided hours of hands-on activities, engaging lessons that students are thrilled to participate in, and countless ways to enhance learning through creating and discovering. The students in my class have been exposed to several STEM labs where they work best collaborating with teammates and constructing and building in a hands-on learning environment. They often surprise me with their creations and final products. It is even more exciting when they have an ‘ah-ha’ moment and can make a connection to what they have been learning.”



Amber Perrin, 3rd Grade Teacher, D.C. Reeves

“This has been their favorite activity so far this year. I was really surprised at how my students were able to make connections to what we are learning and the activity that we did. They came up with all sorts of inquiry questions, which is something they tend to struggle with. We also took it a step further to talk about living and non-living things. I would highly advise everyone to consider going. This class has provided me with endless ideas that I can utilize in my room. It has definitely been one of the best decisions for me to go.”

**Lacey Ardoin, 3rd Grade Teacher
Central Park Elementary**

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LTRC Represented at 96th Annual TRB Meeting

The Transportation Research Board (TRB) 96th Annual Meeting was held January 8-12, 2017, at the Walter E. Washington Convention Center, in Washington, D.C. The meeting program covered all transportation modes, with more than 5,000 presentations in nearly 800 sessions and workshops, addressing topics of interest to policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions. A number of sessions and workshops focused on the spotlight theme for the 2017 meeting: *Transportation Innovation: Leading the Way in an Era of Rapid Change*.

The following is a list of presentations made by LTRC staff members and contract researchers:

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Reducing Consolidation Settlements Beneath Embankments Using Lightweight Aggregate
Gavin Gautreau

Evaluation of Pile Setup from Osterberg Cell Load Tests and Its Cost-Benefit Analysis
Murad Abu-Farsakh, Md. Nafiul Haque, Ed Tavera, and Zhongjie Zhang

Calibration of Resistance Factors for LRFD of Drilled Shafts Using 2010 FHWA Design Method
Murad Abu-Farsakh, Alicia Fortier, Md. Nafiul Haque, Qiming Chen, and Xinbao Yu

New Approach for Estimating Pile Setup Using the Combination of Power Function and Log-linear Setup Models
Md. Nafiul Haque, Murad Abu-Farsakh, Ching-Nien, Tsai, Jesse Rauser, Zhongjie Zhang, and Chris Nickel

Instrumentation of Granular Materials for Applications to Pavement Base and Subbase Layers and Backfill for GRS-IBS
Murad Abu-Farsakh

Full-Scale Testing of Geosynthetic-Reinforced Soil Integrated Bridge System
Milad Saghebfar, Murad Abu-Farsakh, Allam Ardah, Qiming Chen, and Benjamin Fernandez

Performance Evaluation of Geosynthetic-Reinforced Flexible Pavement Using Full-Scale Accelerated Loading Test
Murad Abu-Farsakh, Shadi Hanandeh, Qiming Chen, and Louay Mohammad

A Model for Educating CE Students in Field Monitoring and Measurement
Ayman Okeil and Vijaya (VJ) Gopu

Accounting for Driver Distraction and Socioeconomic Characteristics in a Crash Risk Index: A Naturalistic Driving Study
Mengqiu Ye, Osama A. Osman, and Sherif Ishak

An ANN Model for Detecting Secondary Tasks from Driving Behavior Attributes: A Naturalistic Driving Study
Mengqiu Ye, Osama A. Osman, Sherif Ishak, and Bitu Hasheminezhad

Effect of Secondary Tasks and Driver Behavior on Crash and Near-Crash Risk: Naturalistic Driving Study
Grace Ashley, Osama Osman, Sherif Ishak, and Julius Codjoe

Impact of Connected-Vehicle Market Penetration on the Effectiveness of Blind Spot Warning Applications: A Driving Simulation Study
Matthew Theriot, Osama A. Osman, Sherif Ishak, Ciprian Alecsandru, Saleh Mousa, and Peter Bakhit

Detecting Imminent Lane Change Maneuvers in Connected Vehicle Environments
Peter Bakhit, Osama A. Osman, and Sherif Ishak

Extreme Gradient Boosting Algorithm for Freeway Short-Term Travel Time Prediction Using Basic Safety Messages of Connected Vehicles

Saleh Mousa and Sherif Ishak

Modeling Emergency Manager Evacuation Decisions

Ravindra Gudishala and Chester Wilmot

Modeling Household-Level Joint Evacuation Mode and Destination Type Choice Using Hurricane Irene Data

Ruijie Bian, Ravindra Gudishala, and Chester Wilmot

Twitter in Circulating Transportation Information: A Case Study on Two Cities

Xiaoduan Sun

Comparison of Volumetric Properties Between Laboratory and Field

Louay Mohammad

The Effect of Tack Coats on Asphalt Pavement Performance

Louay Mohammad

Effects of Tack Coat Application on Interface Bond Strength and Short-Term Pavement Performance

Louay Mohammad

Asphalt Pavement Fatigue Performance Prediction Based on Semi-Circular Bend Test at Intermediate Temperature

Wei Cao, Louay Mohammad, Mostafa Elseifi, and Samuel Cooper, III

Deployment of Performance Tests During Asphalt Mixture Design: Louisiana's Approach

Samuel Cooper, III

Mini-Workshop Assists Louisiana Faculty Gain an Understanding of DOTD Research Needs



In order to assist the university faculty in developing and submitting problem statements that address DOTD needs, LTRC held four mini-workshops on January 19-20, 2017, at TTEC. The three-and-a-half-hour workshops were devoted to four specific research areas: geotechnical engineering/pavements, transportation planning/ITS/intermodal/safety, and environmental engineering. Workshop participants included university faculty and DOTD engineers and staff related to the specific research area addressed in the workshop.

Associate Director of External Programs Vijaya (VJ) Gopu, Ph.D., P.E., spearheaded the workshops. "LTRC has announced its biennial 'Request for Problem Statements,' and the problem statements received enable LTRC's research project identification/selection committees to identify the high priority projects that address DOTD needs and deserve serious consideration for funding," said Dr. Gopu. "These biennial workshops provide the faculty working in the aforementioned research areas at our state's universities an opportunity to meet with the DOTD engineers and staff dealing with these areas, present a brief overview of their research interests and activities, and learn about DOTD's current interests and areas of concern directly from the DOTD participants."

For more information about future mini-workshops, contact Dr. Gopu at (225) 767-9102 or v.gopu@la.gov.



Autonomous Vehicles

cont. from pg. 1

While existing conditions (i.e., technical components, processing capabilities, public interest, and commitment from both the private and public sector) make autonomous vehicles a reality in the foreseeable future, many obstacles still currently exist.

“There are still factors to consider before they are implemented at a large scale, such as the approximately 250 million vehicles already in the U.S., the enormous cost of autonomous vehicles, the need to maintain the safety and reliability of the vehicle, and the necessity of the public to develop in autonomous vehicles,” said Dr. Wilmot. “To what extent will parents trust their children to drive or ride in an autonomous vehicle? What other potential dangers exist and how long will it take to develop trust?”

The biggest difficulties in moving forward with autonomous vehicles are the need to interpret the data from sensors on the technical side, trust in the new technology on the human side, and the assignment of liability on the legal side. There are also the questions of accessibility and ownership of the data as well as how to maintain cyber security against malicious interlopers. Many potential drawbacks must be considered as this technology moves forward and others will likely continue to manifest afterward.

Based on other agencies and states that utilize autonomous vehicles, researchers found the general consensus is to place as little restriction and regulation on the development of autonomous vehicles as possible at the moment so innovation is not inhibited. At the

same time, the potential benefits of uniformity or standardization among states is recognized, but any proposals in this regard are limited to suggestions at the moment.

Nevertheless, researchers remain confident that autonomous vehicles are able to exist in our near future. In fact, DOTD has created an Autonomous Vehicle Technology Team that is going to achieve the following: a working knowledge of advancements in autonomous vehicles; monitor and share industry activity; determine state and local transportation agency roles; formulate DOTD policy; advise local governments of their roles and responsibilities; and identify applications for use within DOTD. The team is divided into four distinct groups: Highway Technology and Infrastructure, Multimodal Transportation Technology and Infrastructure, Agency Role Definition and Policy Formulation, and Departmental Applications. LTRC’s Special Studies group is part of DOTD’s team and will continue to provide technical assistance to this team in the future.

Among other duties, the Agency Role Definition and Policy Formation Working Group will continue to monitor autonomous vehicle legislation in Louisiana and across the country and make policy/legislative recommendations.

For more information about this project or to read the report in its entirety, please visit <http://www.ltrc.lsu.edu/publications.html> and select Final Report and Technical Summary 571 under Special Studies.

Staff Updates and Accomplishments



Traffic Research Associate **Julius Codjoe**, Ph.D. and LCTS Safety Initiatives Manager **Rudynah Capone** participated in the impaired driving prevention campaign, “Buzzed Driving Is Drunk Driving” during the Christmas Parade in downtown Baton Rouge. This effort was led by the Capital Region Transportation Safety Coalition in partnership with the Louisiana State Police, Louisiana Center for Transportation Safety, and the Destination Zero Deaths initiative.

LTRC’s Louisiana Center for Transportation Safety (LCTS) recently welcomed **Kristy Miller** back to serve as its Workforce Development Manager.

Renee Cosse was promoted to the Engineer Technician DCL within the Geotechnical Research Laboratory.

LTRC hosted the Advisory Panel Meeting for the NSF project titled “Field Monitoring and Measurement Education – A Model for Civil and Environmental Engineering” on November 16, 2016. **Vijaya Gopu**, Ph.D., Associate Director – External Programs and principal investigator for the project, stated that the advisory panel was very impressed with the tasks completed by the project team and provided valuable suggestions for enhancing the impact of the project at a national level. **Dr. Gopu** also presented a talk titled “Autonomous and Connected Vehicles – Issues, Challenges and Opportunities,” at the 2016 ASCE/ACI Louisiana Civil Engineering Conference this past fall.

Recently Published

Final Report and Technical Summary 575

Lime Utilization in the Laboratory, Field, and Design of Pavement Layers

Mostafa Elseifi, Ph.D., P.E., and Nirmal Dhakal

Final Report and Technical Summary 567

Development of Guidelines for Transportation of Long Prestressed Concrete Girders

Jonathan C. McGormley, P.E., S.E., and Richard E. Lindenberg, P.E., S.E.

Final Report and Technical Summary 530

Distracted Driving and Associated Crash Risks

Sherif Ishak, P.E., Ph.D., Julius A. Codjoe, Ph.D., Raju Thapa, and Kevin McCarter, Ph.D.



FIND OUT MORE

To view a complete list of LTRC publications, visit the website at www.ltrc.lsu.edu.



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