TECHNOLOGY TODAY

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RESEARCH

LTRC Researchers Analyze "Piles" of Data to Determine Best Pile-Design Methods

South Louisiana is renowned for its unique and picturesque landscape, with numerous bayous, marshes, and other waterways and wetlands. These beautiful features, however, also necessitate the widespread use of piles, deep foundations located well beneath the surface, as the state's DOTD continues to develop its transportation infrastructure. Testing and analyzing the load capacity of these piles is an extensive but essential process. As a result, researchers often utilize alternate testing methods, including cone-penetration tests (CPTs), to obtain a faster and more accurate

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TRAINING

DOTD's Co-Op Program Enables Louisiana Engineering Students to Gain Hands-On Experience

Keeping Louisiana's brightest young minds in the state is crucial to the future growth and development of its transportation engineering workforce, and DOTD's Engineering Co-Op Program represents a valuable effort in achieving that goal. The program, which is organized and executed through LTRC each semester, partners with civil engineering students at six Louisiana universities—Louisiana State University, Southern University-Baton Rouge, University of Louisiana-Lafayette, McNeese State University, University of New Orleans, and Louisiana Tech University—to provide them with hands-on experience in the department's various districts and sections.

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UPCOMING EVENTS

Foundations of Leadership Development
August 8, TTEC 179

2024-25 ArcGIS & CADD Classes
August 26-29, TTEC 179

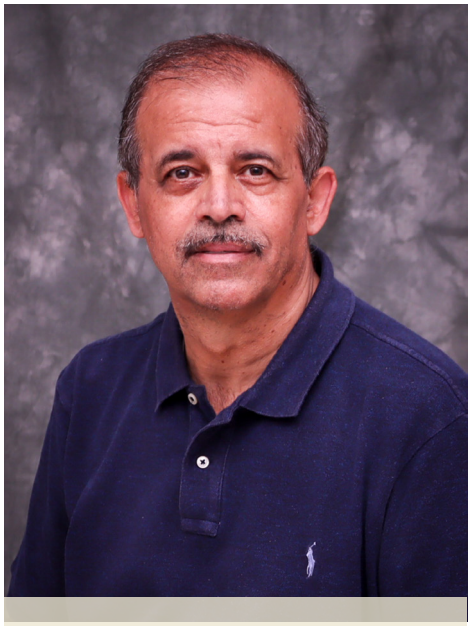
To view more events, please visit http://www.ltrc.lsu.edu.

estimate of pile capacity. LTRC researcher Murad Abu-Farsakh, Ph.D., P.E., recently completed a multi-year project evaluating 21 such pile-CPT methods to identify and integrate the best of these methods into Louisiana's ongoing pile-analysis efforts.

Dr. Abu-Farsakh and his team's extensive efforts, outlined in a sweeping report entitled "Update the Pile Design by CPT Software to Incorporate Newly Developed Pile-CPT Methods and Other Design Features," included a comparison of 21 pile-CPT methods with existing data available from 80 traditional pile load tests. The team's goal in this evaluation was to rank, identify, and select the most accurate and effective methods to implement in Louisiana's Pile-Design Cone Penetration Test (LPD-CPT) software, updating the software to reflect the latest innovations and incorporate several new testing features. Researchers utilized a combination of mathematical and statistical analyses, Multi-Dimensional Unfolding (MDU) evaluation, and reliability analysis to develop a comprehensive understanding of the best methodologies currently available to DOTD engineers.

The results of these tests were illuminating, enabling Dr. Abu-Farsakh and his team to identify the highest-performing pile-CPT methods and use them to update the LPD-CPT software accordingly. All three evaluation methods—mathematical/statistical, MDU analysis, and reliability analysis—yielded consistent results, elevating researchers' confidence in their discoveries. Further, the team experimented with several new artificial intelligence (AI) and machine learning (ML) techniques, including artificial neural networks (ANN) and gradient-boosted trees (GBT), to pave the way for even greater testing effectiveness in the future. Based on the positive results of these efforts, Dr. Abu-Farsakh recommends that DOTD compare the AI/ML techniques to direct pile-CPT methods, exploring the potential future benefits of their increased utilization.

South Louisiana's marshy soils promise to continue challenging the state's transportation officials to innovate and implement the safest, most durable solutions as they construct and update roads, bridges, and more. Because of the thorough research of Dr. Abu-Farsakh and his team, DOTD engineers are well-equipped to respond to these challenges using the latest and most effective pile-CPT methods, with even further advancement on the horizon as AI/ML technologies continue to mature.



Murad Abu-Farsakh, Ph.D., P.E., Professor, Research

Read Final Report or Tech Summary 682 online: *www.ltrc.lsu.edu/publications.html*

TRAINING

LTRC Welcomes Dynah Capone as New LTAP Director

On May 1, LTRC welcomed the new Program Director of the Louisiana Technical Assistance Program (LTAP) Center, Rudynah "Dynah" Entera Capone, MPA.

Capone has 23 years of combined experience in public and private sector leadership, transportation program management, strategic communications, and stakeholder engagement. She is no stranger to the LTRC and LTAP communities, as she previously served as LTAP's Communications, Technology Transfer, and Innovation Manager.

Dynah is enthusiastic about her new role with LTAP: "It's an honor to be given this new role of leading a team that provides the necessary capacity-building tools and resources to our local public agency partners. As one of the 58 LTAP centers networked through the National LTAP Association (NLTAPA), we will continue to uphold our mission of stimulating the progressive transfer of highway technologies through training, workforce development, and technical assistance to all of Louisiana's 64 parishes and 308 municipalities."

Outside of the workplace, Capone serves as the PR Director of the New Orleans Filipino American Lions Club, where she engages in humanitarian efforts on weekends. She is married to a high school educator and coach, Drew Capone, and they are parents to one son, Enzo.

Click here for more information on Capone's education, adventurous career path, and other credentials and achievements!

"It is an honor to be given this new role of leading a team that provides the necessary capacity-building tools and resources to our local public agency partners."

Rudynah "Dynah" Capone, New LTAP Director

Through year-round employment with the department, the Co-Op program is intended to enhance students' education by enabling them to practically explore their interest in engineering, while simultaneously adding significant value to the department's ongoing efforts to enhance the safety, efficiency, and effectiveness of Louisiana's transportation infrastructure.

On April 17-18, LTRC hosted the spring cohort of Co-Op students for two days of in-person and virtual presentations highlighting their research projects across the state. This semester's participating students were:

- **Myandra Gildon (LSU)**, presenting "Protecting Communities: The Dam Safety Program in Action"
- **Tatum Bonura (LSU)**, presenting "Evaluating the Chloride Content of Portland Cement Concrete using Titration (ASTM C1152)"
- **Kallie Broussard (McNeese)**, presenting "LA 384 @ Gauthier-Haymark Road"
- **Sam Haase (Louisiana Tech)**, presenting "LA Hwy 151 Bridge Replacements and Downtown Ruston Revitalization Projects"
- **Nicholas Vu (LSU)**, presenting "Intelligent Transportation Systems Lab at LTRC"
- **James McMath (LSU)**, presenting "3-Peak vs 4-Peak Data for SARA Grouping"
- **Claire LeBlanc (ULL)**, presenting "Evaluating Moisture-Density Relationships"
- **Taylor Rachal (Louisiana Tech)**, presenting "Ruston Progress"
- **John Cole Woods (McNeese)**, presenting "Signal Upgrade & Nelson Bridge Extension"
- **A'Kera Kelly (Southern)**, presenting "Implementing Intelligent Transportation System for Seamless Connectivity"
- **Briana Smith (Southern)**, presenting "Bridging Opportunities: Designing the Path to Success"
- **Brock Boudreaux (ULL)**, presenting "LA 321: Creek Bridges"
- **Nathan Mahoney (LSU)**, presenting "Review and Coordination of Consultant Roadway Design Projects at LADOTD HQ"

Stacey Wilton, LTRC's Education Outreach Program Manager, highlights the immense value of the Co-Op Program to both university students and the ongoing work of LTRC and DOTD: "Our cooperative education program is a great opportunity for our state's civil engineering students to take what they learn in the classroom and apply this knowledge to real-world projects across the state, in partnership with a Professional Engineer supervisor and mentor. Through this experience, they are developing not only their technical skills but their professional skills as well. This program enables LTRC to advance its mission to train the transportation workforce of the future for the benefit of everyone in Louisiana."

For more information on the LTRC Co-Op Program, please contact Education Outreach Program Manager Stacey Wilton at (225) 767-9141 or stacey.wilton@la.gov.

A'Kera Kelly of Southern University shares about her work through the DOTD Co-Op Program.

Enduring Impact: DOTD Co-Op

"My experience with the Co-Op Program gave me valuable insight into the career of a design engineer with DOTD, from participating in decision-making meetings with established engineers to implementing those decisions into project design to troubleshooting deficiencies to design the best product. Because of my experience with the program, I realized early on that a career as a design engineer would be rewarding!"
Anna Rozyskie, Co-Op Participant

"As it becomes more and more challenging to attract qualified engineering graduates to the public sector, it is imperative that we engage engineering students as early in their educational career as possible. The co-op program is one way to do that. The program has proven to return value to DOTD and to the profession and we would like to expand participation in the program as much as possible."
Chad Winchester, DOTD Chief Engineer

COMMUNITY

Bentley Systems Awards LTRC $25,000 Grant

The fulfillment of LTRC's expansive mission is made possible in part by the generous contributions of partners throughout our community and the transportation industry at large. The center recently received one such investment through a $25,000 grant from Bentley Systems, Inc., one of the nation's leading infrastructure engineering software firms. This grant, presented by Mo Harmon, Bentley's Director of Industry Strategy, is designed to enhance LTRC's outreach initiatives in both K-12 and higher education over the next two years.

The funds will be utilized in the following ways:

- $15,000 will be distributed as $500 awards to Louisiana STEM teachers who have previously participated in LTRC's AASHTO STEM Outreach Solutions program. These funds can be used to replenish the consumable supplies used in the hands-on classroom activities.

- The remaining $10,000 will be allotted to Louisiana civil engineering graduate students who are invited to present their research at academic conferences across the nation. Selected students will be awarded up to $1,000 scholarships to defray the travel costs associated with these presentations.

LTRC's Sam Cooper, Ph.D., P.E., Tyson Rupnow, Ph.D., P.E., and Stacey Wilton (*pictured above*) were on hand to receive the award from Harmon. Dr. Rupnow is thrilled about the potential impacts of these funds on LTRC's education outreach programs: "The influence of the Bentley Grant will be felt across the entire state of Louisiana, from our K-12 STEM educators to graduate students and researchers at our Louisiana universities. The LTRC Research Foundation is grateful to the Bentley Foundation for their support and looks forward to furthering research and STEM activities across the state!"

SPECIAL EVENTS

Top Ten Reasons to Register for LTC 2025!

Registration for the 2025 Louisiana Transportation Conference (March 16-19 in Baton Rouge) opens on August 1! This year's theme is **"Pathways to Progress: Shaping the Future of Transportation."**

In the words of LTRC staff and previous conference attendees, here are the top ten reasons you should register to participate today…

1. "Gain new skills and knowledge directly relevant to all areas of the transportation industry"
2. "Explore new perspectives, fresh approaches, and emerging trends in transportation"
3. "Hear the latest transportation research from a wide variety of subject matter experts"
4. "Catch up on the progress of several significant design projects around the state"
5. "Experience hands-on learning about new and innovative transportation technologies"
6. "Network with other transportation professionals from across the state and nation"
7. "Invest in your ongoing personal and professional development"
8. "Receive many of your necessary PDHs for the year in one time and place"
9. "Easy-to-use conference app to help plan ahead for sessions"
10. "Convenient, easily accessible location in Downtown Baton Rouge"

To claim your spot at LTC 2025, visit the registration page at www.ltrc.lsu.edu/ltc_25 or follow the QR code to the right!

PUBLICATIONS

Recently Published

Project Capsule 24-1SA

Ground-in Edge and Centerline Rumble Strip/Rumble Stripe Evaluation and Best Practices
Hany Hassan, Ph.D., P.E.

Project Capsule 24-1ST

Ultra High Performance Concrete (UHPC) Application in Link Slabs for Crack Mitigation
Ayman M. Okeil, Ph.D., P.E. (FL)

Project Capsule 24-2P

Develop a Methodology for Pavement Drainage System Rating
Qiming Chen, Ph.D., P.E.

Final Report and Technical Summary 695 (Project 22-SA)

Development of Statewide Guidelines for Improving Pedestrian Safety on High-Speed Arterials in Louisiana
Hany Hassan, Ph.D, P.E.; Priscilla Tobias, P.E.; Timothy Swzedo, P.E.; Anish KC

VIEW ONLINE

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

Updates and Accomplishments

Ruijie "Rebeccca" Bian, Ph.D., P.E., was recently appointed by the Transportation Research Board (TRB) to serve on two standing committees and one coordinating council:

- Standing Committee on Disaster Response, Emergency Evacuations, and Business Continuity—AMR20 (Secretary, Main Member Slot)
- Standing Committee on Transportation Demand Forecasting—AEP50 (Member, Main Member Slot)
- International Coordinating Council—A0020C (Member Slot)

Tyson Rupnow, Ph.D., P.E., served as a consultant for the rebuilding of First Baptist Church of Zachary's north parking lot. The project won a Beautification Award from the City of Zachary, as reported by the Zachary Post.

Gavin P. Gautreau, P.E., LTRC's Senior Geotechnical Research Engineer, presented at the 2024 Southwest Geotechnical Engineering Conference (SEGEC) with Xin Peng (Geosyntec) on LTRC research project 24-2GT, "Web-Based Tool to Advance Geotechnical Data Interchange and Reliability- Based Site Characterization."

Gautreau was also elected to the position of First Vice President (President-Elect) of the State Board of the Louisiana Engineering Society for 2024-25. Additionally, he was appointed as the Co-Chair of the Geotechnical Asset Management (GAM) Section Subcommittee of the Transportation Research Board (TRB) Geology and Geotechnical Engineering Section- AKG00 (May 30, 2024-April 14, 2027).

Todd Blount, LTRC's Manager of Technical Publications, graduated in May 2024 with his Doctor of Ministry degree in Strategic Leadership from New Orleans Baptist Theological Seminary.

Six **Section 33** employees (*pictured at right*) had the opportunity to attend the ATD International Conference and Expo in New Orleans in May 2024. They hosted a Pre-Lunch and Learn on June 17 to share the highlights of their experience with the full LTRC Staff. Sessions highlighted included micro learning, a broad array of exciting AI tools, overcoming distraction in the workplace, the value of mindfulness at work and beyond, and building a healthy and positive workplace culture.

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LTRC Administration and Publications Staff

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