



FROM THE DEPARTMENT CHAIR



It is my pleasure to welcome you to the Fall 2025 edition of the LSU Department of Civil and Environmental Engineering Newsletter. Each semester, our department continues to build on its strong tradition of academic excellence, impactful research, and dedicated service to our state, nation, and global community. This issue highlights the achievements, collaborations, and innovations that reflect the outstanding work of our faculty, students, alumni, and partners.

The past year has been one of continued growth and distinction for our department. We saw remarkable faculty accomplishments—from prestigious national awards and major research contributions to global recognition in areas ranging from transportation resilience to advanced materials modeling. Our students demonstrated leadership and ingenuity through hands-on projects, conference participation, and award-winning team activities that strengthen experiential learning across our curriculum. These successes reinforce our commitment to preparing the next generation of engineers capable of addressing the most pressing infrastructure and environmental challenges of our time.

We are also grateful for the support of our industry partners and friends. Gifts such as the newly established Terracon Foundation Endowed Excellence Fund enable us to expand opportunities for our students, enhance our research capabilities, and strengthen our service to the community. Their investment in our mission is an investment in the future of engineering in Louisiana and beyond.

This issue also celebrates major events hosted by our department, including the SIAM GS25 international conference, which brought to LSU more than 250 professionals from academia, industry, and national laboratories across the world. Moments like these place our department at the forefront of global conversations in computational geosciences, climate resilience, and interdisciplinary engineering research.

As we look ahead, we remain committed to excellence in teaching, research, and outreach. The CEE department is initiating, in the Spring of 2026, a course on Artificial Intelligence with emphasis on Deep Learning and Physics-based Structural Health Monitoring. Dr. Furkan Luleci, who joined our department in the Fall of 2025, has spearheaded this effort. This course is an application of fundamental Deep Learning (DL) with physics-informed approaches to Structural Health Monitoring, including data acquisition, basic signal processing, model development, training, and damage detection. The course provides students with a fundamental understanding of neural networks and how they can be applied to monitoring and understanding the health condition of civil infrastructures.

I extend my sincere appreciation to our faculty, staff, students, alumni, and partners whose dedication continues to elevate the reputation of our department. Thank you for being part of our community and for supporting the continued success and impact of LSU Civil and Environmental Engineering.

I hope you enjoy this newsletter and share our pride in all that we have accomplished together.

Dr. George Z. Voyiadjis, D.Eng.Sc.,
Boyd Professor
Chair and Bingham C. Stewart
Distinguished Professor of Engineering

DEPARTMENT NEWS

LSU ENGINEERING PROFESSOR RECALLS INCEPTION OF CONTRAFLOW DESIGN PRIOR TO KATRINA



These days, seeing cars heading in one direction on the interstate can only mean one thing—a hurricane is approaching. Contraflow, a method of evacuation devised by LSU Civil & Environmental Engineering Professor Brian Wolshon, is now used worldwide to save lives and was an integral part of evacuating people from New Orleans before Katrina struck.

“I feel like my entire professional career is the result of Katrina,” Wolshon said. “The reason I’ve had success as a professor is from Katrina. The reason why I’m on TV across the world is Katrina. I’ve written books, and I consult, all based on Katrina.”

Wolshon, a native of Detroit, Mich., began teaching at LSU in 1997, one year before Hurricane Georges.

“I’d never seen an evacuation or a hurricane before, nothing,” he said.

Wolshon, whose background is in roadway design and safety and managing traffic, was dumbfounded when he saw the traffic jams coming out of New Orleans to miss Hurricane Georges. This Category 2 storm made landfall near Biloxi on Sept. 28, 1998. “It was the first time they used a real mass evacuation or called for the mass evacuation of New Orleans since 1969,” Wolshon said.

Wolshon knew there had to be a better way for everyone to evacuate. Still, it wasn’t until Hurricane Floyd loomed over the Atlantic in September 1999 that Wolshon saw just how desperate the South was for a hurricane evacuation plan. Floyd was initially poised to hit Florida before turning to Georgia, then South Carolina, and finally making landfall in North Carolina as a Category 2 hurricane.

“It caused an evacuation of Floridians going north to Georgia, then all the Georgians had to evacuate to South Carolina,” Wolshon said. “It was a mess. It was the biggest traffic jam anyone had ever seen. You have this storm that could kill people, and nobody can move.”

Wolshon knew the states should be working together and soon realized no one had a playbook for hurricane evacuations.

“Not Florida, not Louisiana, no one,” he said.

In 2000, Wolshon and three of his LSU CEE students began researching traffic-related evacuations. One student began reaching out to each hurricane-prone state in the South to gather information. Another student used a traffic simulation program to research evacuation routes.

“Contraflow sounded crazy to my students at first,” Wolshon said. “They thought people would get killed doing lane reversals. I said, ‘Let’s just simulate it and see what it looks like. If you think about it, turning all the lanes of the freeway into one direction is going to make a ton of traffic move.’”

Soon after he began his research, Wolshon received a phone call from the United States Department of Transportation, inviting him to discuss contraflow. Before calling Wolshon, the office had reached out to officials in 14 states who all recommended speaking to Wolshon.

“The craziest thing is that everyone remembered me and my students and knew we had been collecting all this information,” he said.

Wolshon’s student, who was writing her thesis on contraflow, was told it was now a matter of vital national

significance. The Department of Transportation requested that she condense her thesis into a 10-page report, print 10,000 copies, and ship them to Washington, D.C. The DOT then sent copies to police departments, emergency management, the Department of Transportation and Development, the Department of Public Works, the Federal Emergency Management Agency, and anyone involved in evacuations, according to Wolshon.

Fast forward to Hurricane Ivan in 2004, Governor Kathleen Blanco's office reached out to Wolshon, asking him to come to the Governor's Mansion and share what he knew about evacuations. Ivan was the

"City officials and residents knew New Orleans was below sea level," Wolshon said. "No one thought, realistically, that the levees would breach and flood the city."

Today, Wolshon travels the globe talking about contraflow for emergency situations and spent time at a conference in China this past summer to discuss the topic. He has also given TV interviews on CNN and Fox News, and has written four books.

"What I tell people at all these conferences around the world is that this is going to happen again and again and again. The problem is that no one plans in

"Louisiana's evacuation plan is hands down the best plan I've ever seen anywhere on Earth. When I roll into meetings with important people, and I have my LSU tie on and my slides that say LSU on them, people know who we are."

first time contraflow was implemented in Louisiana for a hurricane evacuation.

Then came August 29, 2005. Hurricane Katrina, a Category 3 storm that was initially predicted to be a Category 5 with a direct hit on New Orleans, veered right and swiped the Crescent City, causing its levees to break, which left most of the city flooded. Gov. Blanco's office called Wolshon once again.

"We have a problem, they said," Wolshon said. "We have a flooded city. You're the transportation guy. If we give you some data, can you tell us where the traffic left the city, how fast, and how many people might still be trapped in the city, and where they might be? So, we start off with 1.3 million residents, then count 800,000 cars, and you figure 1.6 people per car. That means you might have 10,000–30,000 people in the city."

This estimate gave city and state officials an idea of just how catastrophic the storm was and how many lives needed to be saved.

advance. Everyone thinks it won't be that bad where they are. If there's a legacy of Katrina, it's that what we learned in Katrina never stopped with Katrina. We began looking at not just moving cars, but also people who couldn't move because they didn't have a car. It branched off into even more research. Now we're talking about mass movements like war refugees and wildfires."

Wolshon says another thing he learned in Katrina is that sometimes you don't need to be the smartest; you just need to be the first to get there.

"I've studied these scenarios all over the world, and I can say that, today, Louisiana's evacuation plan is hands down the best plan I've ever seen anywhere on Earth," Wolshon said. "People need to know that because we don't get enough credit. When I roll into meetings with important people, and I have my LSU tie on and my slides that say LSU on them, people know who we are."

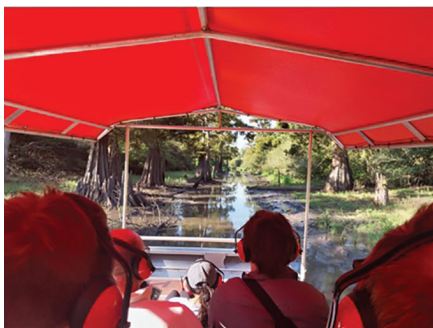
LSU HOSTS SIAM GS25 AND 250+ GLOBAL CONFERENCE-GOERS

LAISSEZ LES BON TEMPS ROULER

On October 14th at the LSU Union, Dr. Robert Twilley, LSU Vice President for Research and Economic Development (ORED), and Dr. Chris Kees, Associate Professor in CEE & CCT and Director of the LSU Coastal Ecosystem Design Studio (LSU CEDS), welcomed 250+ professionals from around the world for the Society for Industrial and Applied Mathematics (SIAM) Conference on Mathematical and Computational Issues in the Geosciences (GS25). Twenty-five percent of the conference attendees came from outside the United States, representing 14 countries from around the globe.

GS25 focused on stimulating the exchange of ideas among geoscientific modelers, applied mathematicians, engineers, and other scientists with special interests in the range of geophysical domains, from the deep subsurface to the atmosphere. Conference attendees come from academia, public service, including several national laboratories, and the private sector. They are all dedicated to careers and research in sophisticated mathematical modeling, efficient computational methods, and pervasive complex data integration. LSU was honored to host this SIAM conference and have more than 30 LSU faculty and graduate students selected to lead discussions and/or give presentations during this impressive global gathering.

SOUTHERN HOSPITALITY

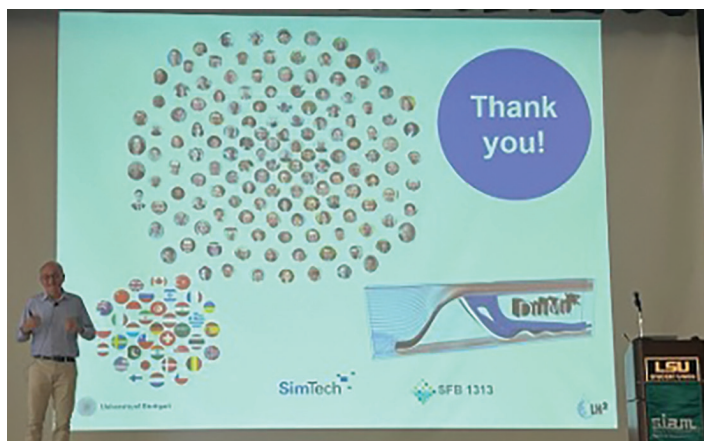


Multiple regional site visits throughout the conference provided participants with firsthand experiences in the physical, historic, social, and cultural aspects of South Louisiana. SIAM GS25 kicked off with optional

pre-conference trips on Monday to a variety of nearby sites: the ExxonMobil Refinery (with 100+ years in operation!), the LSU Petroleum Engineering Research, Training, & Testing Lab (PERTT), and an airboat tour of the Atchafalaya River Basin.

At the end of the GS25 programming on Friday, October 17th, conference attendees had the opportunity to tour the US Army Corps of Engineers' Old River Control Complex, in addition to PERTT and the Atchafalaya River Basin, for those who had not made the trips on Monday.

CONFERENCE PROGRAMMING



Chris Kees, LSU, USA, and Luca Formaggia, Politecnico di Milano, Italy, served as conference co-chairs for GS25 with support from two 10-person organizational committees, one through the global SIAM organization and the other a local group made up of:

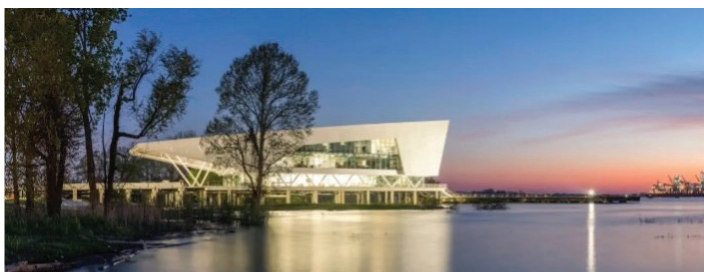
- Sue Brenner
LSU Mathematics and
Center for Computation & Technology
- Karsten Thompson
LSU Cain Department of Chemical Engineering and
Craft & Hawkins Department of Petroleum Engineering
- Frank Tsai
LSU Department of Civil Engineering and
Louisiana Water Resources Research Institute
- Kory Konsoer
LSU Department of Geography & Anthropology and
Center for River Studies
- Myank Tyagi
LSU Department of Petroleum Engineering and
Center for Computation & Technology
- Muriel Brückner
LSU Department of Civil & Environmental Engineering
and Center for Computation & Technology
- Jaggannathan Ramanujam
LSU Division of Electrical & Computer Engineering and
Center for Computation & Technology

- Jun-Hong Liang
LSU Department of Oceanography & Coastal Sciences
and Center for Computation & Technology)
- Matt Brand
LSU Department of Civil & Environmental Engineering
and Center for Computation & Technology
- Carol Friedland
LaHouse Research & Education Center and
Department of Biological & Agricultural Engineering

Conference programming included several plenary talks, SIAM Prize lectures, minisymposia, tutorials, and a poster session, with more than 30 LSU faculty and graduate students making high-profile contributions during the week-long gathering. In addition to busy simultaneous presentations throughout the four-day conference, the following invited plenary speakers shared their insights at larger convenings:

- Clint Dawson, University of Texas at Austin, U.S., delivered “Towards a Digital Twin for Coastal Ocean Modeling.”
- Nat Trask, University of Pennsylvania, U.S., delivered “Structure Preservation in Data-driven Coarse Graining: Emergent Dynamics in Machine Learning Particle Models.”
- Sarah Gasda, NORCE Norwegian Research Centre, Norway, delivered “Simulating Our Way to CO₂ Storage at Climate-relevant Scales.”
- Simon Levin, Princeton University, U.S., delivered “The Mathematics of Sustainability.”
- Carmen Rodrigo, Universidad de Zaragoza, Spain, delivered “Numerical Simulation of Biot’s Model by an Iterative Coupling Solution Method Based on an Oscillation-free Numerical Scheme.”

AFTER HOURS EVENTS



Tuesday evening, the first day of GS25, SIAM hosted a Welcome Reception at the LSU Center for River Studies (CRS) and the LSU Coastal Ecosystem Design Studio (CEDS), both located at the Water Campus. Attendees were shuttled between CRS

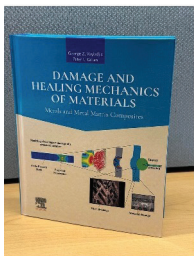


and CEDS, where they had the opportunity to see and learn about a large-scale model of the Lower Mississippi River and experience a spectacular sunset from the old municipal dock, respectively. Guests enjoyed delicacies at both venues, representing a “taste of Louisiana.” LSU ORED and the team from Visit Baton Rouge (the Baton Rouge tourist commission) helped co-host this event with SIAM, with CRS and CEDS providing impressive venues.

On Thursday night, SIAM international conference attendees were treated to an immersive experience of South Louisiana history and culture, both inside and out, at the LSU Rural Life Museum. In addition to Cajun dance lessons and participation in a “second line”, guests got to learn about living in South Louisiana in the 1800s and early 20th century, see a wide variety of Southern rural architecture, and taste good ‘ol fashioned country cooking, including homemade fried chicken (battered and cooked onsite!), red beans and rice, corn maque choux, cornbread muffins, homemade rolls, and white chocolate bread pudding. Special thanks to the LSU Rural Life Museum for their fabulous hospitality and to Visit Baton Rouge for supplying the live Cajun band. “Mais oui,” of course everybody “passed a good time”! And, if you don’t believe it, check out the photo below!



LSU BOYD PROFESSOR VOYIADJIS HAS BOOK PUBLISHED ON DAMAGE AND HEALING MECHANICS



LSU Civil and Environmental Engineering Chair and Boyd Professor George Z. Voyiadjis recently co-authored a book with LSU CEE alumnus, scholar, and educator Peter Kattan that Elsevier published. This is Voyiadjis' 24th book.

His 2025 publication is a 900-page book titled "Damage and Healing Mechanics of Materials: Metals and Metal Matrix Composites" that covers the fundamentals of damage mechanics with various damage models presented, coupled with elastic and elast-to-plastic behavior. Experimental investigations and related data on damage in composite materials are included, along with computational modeling and simulation methods for investigating damage and healing in various materials and structures.

"Healing mechanics using both scalars and more general theory based on scalars and tensor notations are discussed, as are applications of damage mechanics," Voyiadjis said. "Undamageable materials, healing mechanics, the generalized method of cells, phase field modeling, fatigue damage, cyclic plasticity concepts, and more are also covered."

Other key features in the book include an introduction to computational methods and numerical techniques such as finite element analysis and molecular dynamics to model and simulate damage and healing in various materials and structures; discussion on the ways cracks and voids are subjected to healing mechanisms and new composites that are designed to be more resilient and resistant to damage; and coverage of uniaxial tension in metal matrix composites,

damage and plasticity in metals, experimental damage investigation techniques, anisotropic healing, and more.

Voyiadjis' primary research interest is in the plasticity and damage mechanics of metals, metal matrix composites, polymers, and ceramics, with an emphasis on theoretical modeling, numerical solution of material behavior, and experimental correlation. He recently received the American Society of Civil Engineers' Engineering Mechanics Institute 2024 Theodore von Kármán Medal and received the 2023 Blaise Pascal Medal for Engineering from the European Academy of Sciences. He was also the recipient of the 2022 American Society of Mechanical Engineers Nadai Medal of the Materials Division.

He was the recipient of the 2008 Nathan M. Newmark Medal of the American Society of Civil Engineers and the 2012 Khan International Medal for outstanding lifelong Contribution to the field of Plasticity. He received the ICDM2 Lifetime Achievement Medal for his significant contribution to Continuum Damage Mechanics, presented to him during the Second International Conference on Damage Mechanics (ICDM2) in Troyes, France, in 2015. He is a Foreign Member of the Academia Europaea, the European Academy of Sciences, and the European Academy of Sciences and Arts.

Kattan is an independent researcher based in Amman, Jordan, and a visiting professor at LSU. He obtained his PhD in 1989 from LSU under the direction of Dr. Voyiadjis. His research focuses on damage mechanics with fabric tensors and the physical characterization of micro-crack distributions and their evolution. He has published extensively on the refined theory of plates and shells, constitutive modelling of inelastic materials, and damage mechanics.

TERRACON FOUNDATION ESTABLISHES ENDOWED EXCELLENCE FUND FOR LSU CIVIL & ENVIRONMENTAL ENGINEERING



The LSU Department of Civil and Environmental Engineering is proud to announce a generous \$50,000 Endowed Excellence Fund established by the Terracon Foundation. Representatives Ricky Simon, Lynne Roussel McMillen, and John Voelker visited campus to present the check and celebrate this new partnership, which will directly support strategic initiatives for our students and faculty.

This endowed fund enhances our ability to expand hands-on learning, improve undergraduate and graduate research opportunities, and support high-impact student programs, such as the Concrete Canoe and Steel Bridge teams. These experiences are crucial in preparing our students for leadership roles in both the built and natural environments.

We were honored to have Dean Vicki Colvin and Dr. George Voyiadjis join Terracon's Baton Rouge leadership team for this special moment. Terracon's commitment to education, innovation, and workforce readiness aligns closely with LSU's mission to develop the next generation of engineering talent.

The LSU Civil and Environmental Engineering community extends its sincere appreciation to the Terracon Foundation for its investment in our students, programs, and the future of our profession.

FACULTY NEWS

CEE FACULTY RECEIVE MAJOR AWARDS



The Louisiana Section of the American Society of Civil Engineers (ASCE) proudly announced that Dr. Louay N. Mohammad, Ph.D., P.E. (WY), F. ASCE, has been selected as the recipient of the 2025 ASCE Louisiana Section Lifetime Achievement Award.

This prestigious award is the highest honor bestowed by the Louisiana Section. It recognizes Dr. Mohammad's distinguished career of excellence in civil engineering, dedicated service to ASCE, and steadfast commitment to integrity, leadership, and technical advancement.

The award was formally presented at the ASCE Louisiana Section Fall Awards Banquet on Friday, September 19, 2025, in Lafayette, Louisiana, where Dr. Mohammad was honored as a special guest of the Louisiana Section.



Additionally, Dr. Suresh Moorthy, the undergraduate advisor and instructor in the Civil and Environmental Engineering department at LSU, has won the 2025 Outstanding Civil Engineering Educator Award. The award was presented by the American Society of Civil Engineers, Baton Rouge Chapter, which includes membership from students, faculty, and professional civil engineers in the region.

**Department of Civil &
Environmental Engineering**

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ADDRESS SERVICE
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ALUMNI REGISTRATION & UPDATES

The Department of Civil and Environmental Engineering is always interested in how our alumni are doing. We hope you will take the time to send your updates to jpasqua@lsu.edu or, if you prefer, you can “snail mail” them to:

**Department of Civil and Environmental Engineering
Louisiana State University
Attn: Jason Pasqua
3255 Patrick F. Taylor Hall
Baton Rouge, LA 70803-6405**

Please include basic information, such as your full name, year of graduation, degree, mailing address, email address, telephone number, company, and your title/position. For your update, please include information on your recent professional and personal developments, along with a high-resolution photo, if available.

Thanks for staying in touch!

To connect with the LSU College of Engineering, please visit lsu.edu/eng and find us on Facebook at facebook.com/LSUCEE and Twitter at twitter.com/LSU_CEE.

Visit the LSU ASCE website at lsu.edu/eng/CEE