



FROM THE DEPARTMENT CHAIR



Our department has a rich history of excellence, and I firmly believe that together we can continue to build upon our successes and shape the future of civil and environmental engineering. Our collective efforts will not only contribute to advancements in infrastructure, sustainability, and environmental stewardship but also empower our students to become the next generation of leaders in our field.

In the face of the ever-evolving challenges our society encounters, the importance of our work cannot be overstated. As civil and environmental engineers, we have the responsibility to design, construct, and maintain the critical infrastructure that supports our communities and safeguards our environment. We have the opportunity to create sustainable solutions that harmonize economic development, social progress, and environmental well-being.

In the upcoming year, we will strive to foster an environment that encourages innovation, collaboration, and continuous learning. Our department will provide ample opportunities for faculty, staff, and students to engage in cutting-edge research, participate in impactful community outreach initiatives, and develop their professional skills. By nurturing a culture of intellectual curiosity, creativity, and inclusivity, we can ensure that our department remains at the forefront of groundbreaking discoveries and advancements.

I encourage each and every one of you to actively contribute your unique expertise, perspectives, and ideas to our

departmental initiatives. Whether you are a faculty member, a dedicated staff member, a passionate student, and an alumni and a dedicated supporter your contributions play a vital role in shaping the trajectory of our department. Together, we will create a dynamic and supportive environment that inspires excellence and fosters growth.

In department news, three new professors will join the CEE department in the Fall 2023 and Spring 2024 semesters in the areas of geodesy and coastal engineering. In addition, Christopher Kees was recently named director of the LSU Coastal Ecosystem Design Studio. The American Society of Civil Engineers at LSU recently attended the 2023 Gulf Coast Student Symposium hosted by the University of South Alabama. Of the many competitions there, LSU competed in the Survey Loop, Steel Bridge, Concrete Canoe, and the new Tableau Paper Presentation.

LSU Environmental Engineering students won three tasks at this year's WERC Design Contest. Most importantly, in May 2023, I organized and hosted the Fourth Annual International Conference on Damage Mechanics, which attracted more than 100 speakers worldwide. The conference was hosted in Patrick F. Taylor Hall at LSU.

Finally, the 11th Annual Graduate Student Research Conference was successfully conducted at LSU. In addition, several of our faculty have achieved numerous awards and distinctions as listed in this newsletter.

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

DEPARTMENT NEWS

THE FOURTH INTERNATIONAL CONFERENCE ON DAMAGE MECHANICS (ICDM4)



The Fourth International Conference on Damage Mechanics, organized by Boyd Professor and Civil and Environmental Engineering Chair George Z. Voyiadjis, was held May 15-18, 2023, in LSU's Patrick F. Taylor Hall. The event brought together more than 100 leading researchers, scientists, and engineers from around the world to explore and discuss the latest advancements in the field of damage mechanics. It was chaired by Voyiadjis and co-chaired by Dr. Yaneng Zhou. The conference had previously been delayed for three years due to the COVID-19 pandemic. This three-day event provided a platform for knowledge exchange, networking, and collaboration, with a focus on understanding the fundamental aspects of material damage and its implications for various engineering

applications. The conference showcased a wide range of presentations, keynote speeches, and interactive sessions, fostering meaningful discussions and paving the way for future advancements in the field.

Conference Program: The conference program was carefully designed to encompass a comprehensive range of topics, including fracture mechanics, fatigue, impact mechanics, failure analysis, and computational methods. Renowned keynote speakers delivered thought-provoking presentations, sharing their invaluable insights and cutting-edge research. These sessions provided a holistic view of the current state of damage mechanics and set the stage for the subsequent technical sessions.

Technical Sessions: The technical sessions were a focal point of the event, featuring a diverse range of participants and presentations. With a total of 96 attendees, the high level of engagement was evident in the impressive number of abstract submissions, which totaled 83 and showcased the breadth and depth of research in the field.

The technical sessions featured 71 esteemed speakers who shared their knowledge and insights in various formats. The conference included six captivating plenary talks that provided comprehensive overviews of key topics in damage mechanics. Additionally, four keynote talks delivered by renowned experts offered unique perspectives and addressed cutting-edge advancements in the field.

To foster in-depth discussions, the conference featured 73 regular talks, covering a wide range of research areas within damage mechanics. These talks allowed researchers to present their findings, share methodologies, and engage in constructive dialogue with their peers. The wealth of regular talks highlighted the richness and diversity of research within the field.

Furthermore, the conference included 13 mini symposia, each centered on a specific theme or research area within damage mechanics. These mini symposia provided an opportunity for focused discussions and interdisciplinary exchanges, promoting collaboration among participants with shared interests and expertise.



The technical sessions, with their dynamic mix of plenary talks, keynote talks, regular talks, and mini symposia, formed the backbone of the conference program. They facilitated the dissemination of knowledge, encouraged critical thinking, and inspired fruitful collaborations among participants.

The impressive number of participants, abstract submissions, and speakers at the conference underscored the significance of the field of damage mechanics and its growing global community. The technical sessions served as a catalyst for advancing research, exploring innovative approaches, and addressing the challenges and opportunities in this rapidly evolving discipline.

Impressive Discussions and Workshops: The conference fostered a vibrant atmosphere of discussion and collaboration, attracting participants from a diverse array of countries and regions. Abstracts and participants representing 18 nations, including Canada, China, France, Germany, India, Iran, Italy, Jordan, Korea, Netherlands, Poland, Portugal, Serbia, Singapore, Taiwan, the United Kingdom, and the United States, truly gave the event a global perspective.

The conference facilitated interactive discussions through panel sessions, workshops, and other engaging formats, allowing researchers to exchange ideas, share experiences, and explore novel approaches in the field of damage mechanics. These discussions transcended geographical boundaries and cultural differences, promoting a rich diversity of perspectives and insights.

Additionally, the workshops provided hands-on experiences, enabling attendees to delve deeper into specific methodologies, experimental techniques, or computational tools related to damage assessment and analysis. The practical nature of these workshops empowered participants to enhance their skills and gain practical insights into the latest advancements in the field.

The diverse representation of countries and regions in both abstract submissions and participants further enriched the discussions. The sharing of research findings, challenges, and approaches from different parts of the world offered a comprehensive view of the current state of damage mechanics and its applications in various contexts. These discussions sparked new ideas, fostered cross-cultural collaborations,



and highlighted the global impact of the field. By facilitating exchanges among researchers from different countries and regions, the conference laid the foundation for future international collaborations and partnerships. The insights gained from discussions and workshops will not only enhance the participants' individual research endeavors but also contribute to the collective advancement of the field.

Key Takeaways and Future Prospects: The International Conference on Damage Mechanics at LSU was a resounding success, offering a platform for researchers to share their findings, exchange ideas, and forge collaborations. The event brought together more than 100 leading experts in the field, including esteemed keynote speakers, and recognized the outstanding contributions of two individuals with prestigious awards.

During the conference, the ICDM4 Lifetime Achievement Award was presented to Professor Z. P. Bazant in recognition of his groundbreaking research and significant impact on the field of damage mechanics. Professor Bazant's pioneering

work has advanced our understanding of material behavior under extreme conditions and has provided a solid foundation for future research and applications.

In addition, the conference honored Leong Hien Poh, a promising young researcher, with the ICDM4 Young Researcher Award. This accolade acknowledges his exceptional contributions to the field, particularly in the area of computational modeling of damage mechanics. His innovative work holds great promise for future advancements in the field and serves as an inspiration for emerging researchers.

The conference not only highlighted the significant advancements in damage mechanics but also emphasized the importance of recognizing and celebrating the contributions of both established and emerging researchers. By acknowledging the achievements of Professor Bazant and Mr. Poh, the conference demonstrated its commitment to nurturing talent, fostering innovation, and promoting a culture of excellence in the field of damage mechanics. Moving forward, the takeaways from

the conference will continue to shape the future of damage mechanics. The exchange of knowledge, collaborative discussions, and interdisciplinary interactions at the conference have laid the groundwork for future research endeavors. The recognition of exceptional individuals like Professor Bazant and Mr. Poh serves as a motivation for researchers to push the boundaries of knowledge and contribute to the advancement of the field.

The conference has provided a springboard for future research, innovation, and collaboration in the field. It has highlighted the importance of recognizing the achievements of both established and emerging researchers and has set a high standard for the pursuit of excellence in damage mechanics. With the momentum generated by this conference, we can look forward to groundbreaking discoveries, transformative applications, and a thriving community of researchers dedicated to unraveling the mysteries of material damage and its impact on engineering systems.

Conclusion: Looking ahead, we are excited to announce that the fifth International Conference on Damage Mechanics will take place in Singapore in two years. This upcoming conference promises to build upon the success of previous events, providing an exceptional platform for researchers to present their work, engage in discussions, and foster international collaborations. As we conclude this conference, we extend our gratitude to all participants, organizers, and sponsors who contributed to its success. The dedication, enthusiasm, and intellectual rigor displayed throughout the event have reinforced the importance of damage mechanics in addressing the challenges of our evolving world. We anticipate that the insights gained from this conference will shape the future of damage mechanics, leading to groundbreaking research, innovative applications, and sustainable engineering practices. We look forward to the continued growth and advancement of the field, and we invite all researchers to join us in Singapore for the next International Conference on Damage Mechanics in two years' time.



DR. AHMED ABDALLA JOINS THE DEPARTMENT

Ahmed Abdalla is an assistant professor of research in the LSU Center for Geoinformatics (C4G). His research interest started during his bachelor's degree graduation project, which was focused on establishing horizontal control points using the Traverse method and resulted in a prize for the best project. After three years working as a construction surveyor in Sudan, he started his master's degree in geodesy and geoinformatics in Sweden. His master's thesis was on geoid determination and was recognized as higher than other master's thesis. After that, Abdalla moved to New Zealand to pursue his PhD at the University of Otago. During that time, he strengthened his problem-solving skills and developed his geoid and gravity-modeling research expertise. He was one of a few graduate students who completed their PhD and submitted their thesis within the specified timeframe (36 months) at the end of 2012. Consequently, he was awarded a six-month research bursary. In 2017, Abdalla was awarded a research grant and relocated to Leibniz University of Hanover as a visiting professor for a year to conduct his research, which was on improving the geoid and investigating mass variations in Sudan.

PREVIOUS RESEARCH WORK

Research at University of Hanover, Germany (2017–2018)

GRACE data is analyzed at three geodetic centers – The University of Texas at Austin's Center of Space Research

(CSR), the German Research Centre for Geosciences (GFZ), and NASA's Jet Propulsion Laboratory (JPL). The least-squares spectral approach assessed mass changes in Eastern Sudan and found the region's critical temporal fluctuations within Blue Nile tributaries near Dinder National Park and the Rahad seasonal river. The three GRACE solutions (CSR, GFZ, and JPL) produced comparable findings (Fig. 1).

Research Assistant Professor at C4G (2018–2023)

GNSS Data Processing and Analysis – Abdalla's work at C4G focuses on processing the daily CORS archive of the GulfNet for monitoring subsidence processes in Louisiana and its coastal part. The Global Navigation Satellite System (GNSS) data archive processing based on precise orbit estimation and point positioning (PPP) is used for land subsidence monitoring in Louisiana and the Gulf Coast using time-series analysis. The Gipsy-X software package is advanced software produced by NASA and has been used by a few GNSS experts. The crustal motion estimation by GNSS techniques requires multiple steps, such as pre-processing, processing, and post-processing. Finally, the automation scheme is completed and tested for the computation of the entire GulfNet stations. The post-processing step estimates the horizontal and vertical changes in ENU (East, North, Up) directions. Parallel computation was used for optimization and reduction of the computation time. The subsidence rates in coastal Louisiana from

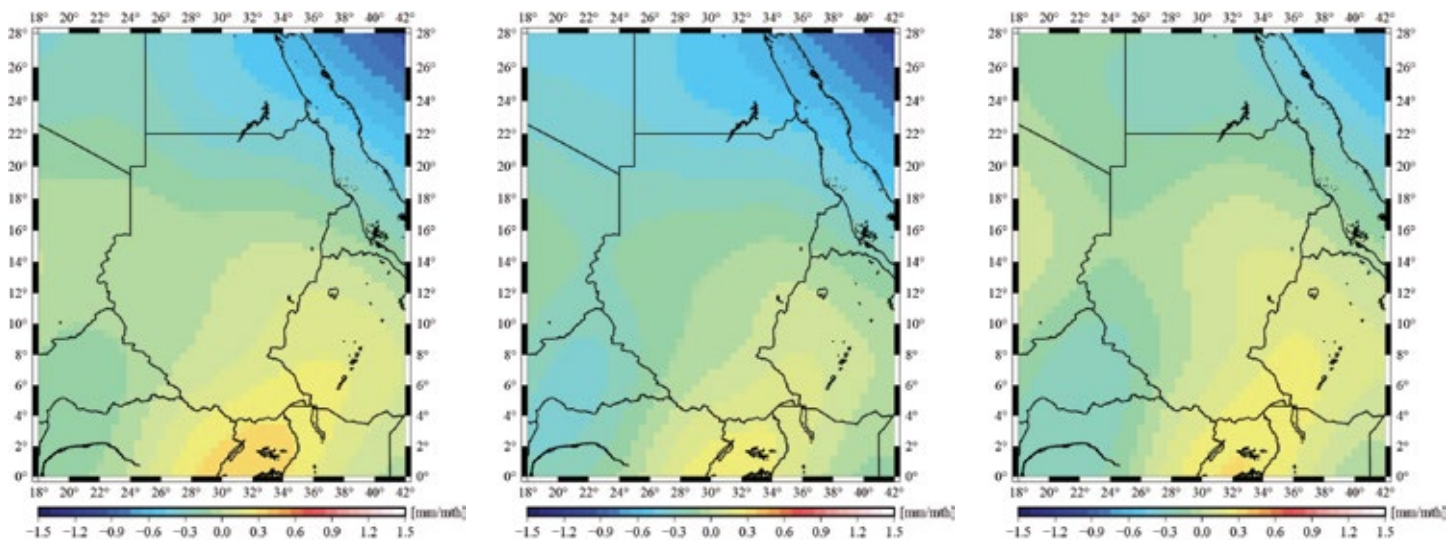


Fig. 1. Linear trend of the water mass changes in Sudan estimated for the period from April 2002 to December 2015 from CSR (left), GFZ (middle), and JPL (right) in mm per month.

2002 to 2022 as estimated over 15 existing stations can be found in Table 1.

Table 1. Subsidence rate estimated over coastal Louisiana stations (2002 to 2022).

Station	Subsidence [mm/yr]	Location
1LSU	-4.02	LSU
AMER	-4.3	Amerada Pass
AWES	-2.26	Donaldsonville
BVHS	-5.6	Boothville
CAMR	-3.44	Cameron
COVG	-1.2	Covington
DSTR	-1.89	Destrehan
FSHS	-3.11	Franklin
GRIS	-6.82	Grand Isle
HAMM	-2.11	Hammond
HOUM	-3.24	Houma
LMCN	-6.35	Cocodrie
MCNE	-1.03	Lake Charles
SBCH	-1.3	Lake Borgne
INRI	-2.17	New Orleans

Most considerable subsidence rates were detected in Boothville (-5.6 mm/yr), Cocodrie (-6.35 mm/yr), and Grand Isle (-6.82 mm/yr). See Fig. 2a.

Geoid and Gravity Modeling

The combination of sparse gravity data sets over Louisiana, its coastal waters, and neighboring states is proposed for precise geoid modeling. The International Gravimetric Bureau (BGI) database service obtained the terrestrial gravity and ship-tracked marine data. The airborne gravity data were obtained from the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) project and the National Danish Space Center (DNSC) altimetry data. Cross-validation was used to refine the gravity data by means of the prediction error (PE), which was found to be 10 mGal for the terrestrial gravity and 5 mGal for the marine data (Fig. 2b).

Analysis of Astrogeodetic Measurements

The vertical deflection measurements obtained by the C4G new Digital Zenith Camera (DZC) were tested and analyzed to improve the geoid in Louisiana. The differences in geoid leveling were estimated using the Vening-Meinesz methodology to process 127 DoV stations across Louisiana. The comparison with the US national astrogeodetic model shows comparable quality (Fig. 2c). The collected DoVs represent the ground truth and reliable data sets that will improve the geoid in Louisiana. Therefore, additional sites will be observed, and existing sites will be regularly revisited for more reliability and accuracy.

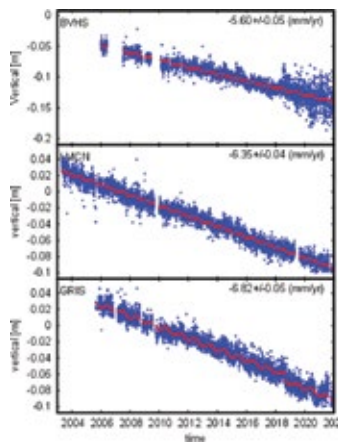


Fig. 2a. Time series of the vertical component in stations showing high subsidence rates in coastal Louisiana calculated by using GipsyX.

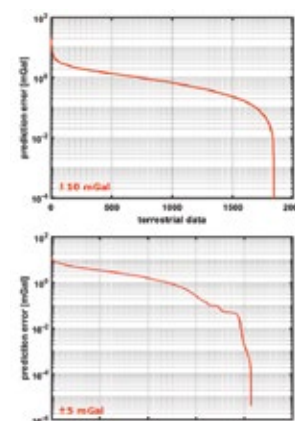


Fig. 2b. Gravity refinement by means of prediction error in terrestrial and marine gravity data using leave-one-out cross-validation.

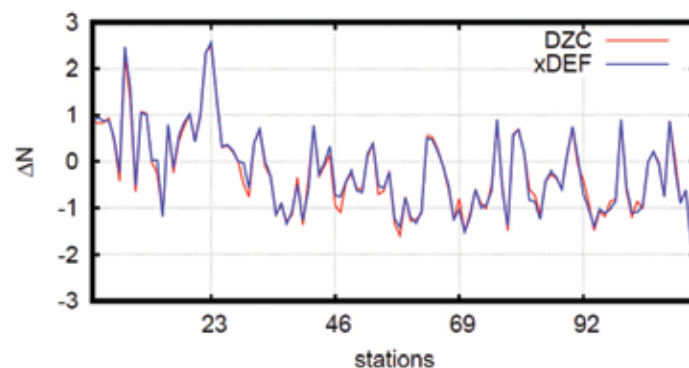


Fig. 2c. Comparison of geoid leveling using DZC field observations and xDEFLEC20 model based on NGS GEOID20.

Future Work

Modeling of geoid and its variations will be investigated in Louisiana for better accuracy. The ongoing observations of the deflection of vertical (DoV) will be combined with geopotential models and GNSSonBenchmark to improve the geoid precision in Louisiana. Continuously Operating Reference Stations (CORS) and absolute and relative gravity measurements will also be employed to study the dynamic orthometric height in Louisiana. Furthermore, artificial intelligence using a convolutional neural network (CNN) will predict the geoid surface by identifying features such as topography, reduced gravity, and other factors affecting the geoid. Moreover, the subsidence study and analysis from GNSS will continue. They will be combined with InSAR data, providing more details about surface displacement.

FACULTY NEWS

DR. CHRIS KEES NAMED DIRECTOR OF THE LSU COASTAL ECOSYSTEM DESIGN STUDIO



Dr. Christopher Kees, CSRS Distinguished Professor in Coastal Engineering, was named director of the newly formed LSU Coastal Ecosystem Design Studio (CEDS), a multidisciplinary research center located on the Mississippi River at the Water Campus in Baton Rouge. Taking a collaborative approach with faculty from engineering, science, design, social sciences, and planning, CEDS aims to expand the horizon of quantitative, science-based design for dynamic, multi-objective coastal systems involving environment, settlement, infrastructure, and economic issues. The studio's work focuses on challenges people face living and working in the Gulf Coast, Mississippi River basin, and coastal and deltaic regions around the world. CEDS was formed through a merger of the former LSU Coastal Sustainability Studio; recently led by Dr. Robert Twilley until his appointment as vice president for research and economic development; and the Center for Coastal Resiliency, led by the late Dr. Scott Hagen. The new studio is authorized by the Louisiana Board of Regents and functions under the LSU Office of Research and Economic Development.

The newly restructured CEDS carries on educational and mentorship programming, in addition to its highly regarded research. For example, June 5-July 28, CEDS will host the 2023 Summer Institute, where 19 students representing eight universities from around the world will be assigned to

an interdisciplinary team that will study one of four selected coastal design challenges. In addition to studio-based research, students will participate in several field trips, experiencing a variety of coastal landscape typologies associated with natural, social, and built environment systems. Research is funded by the US Army Corps of Engineers.

This fall, CEDS will host the fifth Louisiana Community Resilience Institute Workshop for Elected Officials, which begins with a kickoff reception at the Louisiana Governor's Mansion. At the workshop, selected mayors and police jurors work with planners and subject matter experts in closed door sessions to develop site-specific projects that will improve their community's resilience. Many of these sites will become subjects of future engineering courses and design studios at LSU.

CEDS serves as a model for promoting resilience and adaptation in coastal and deltaic regions by designing processes, systems, and solutions that reduce vulnerability to increased storm damage, coastal hazards, habitat degradation, and global environmental change. Innovative designs are supported with advanced systems-based models for assessing the dynamic, interrelated processes of natural and human systems and the ability to analyze design performance.

FACULTY AWARDS

Dr. Mohammad Awarded Prestigious

AAPT Honorary Membership

An Association of Asphalt Paving Technologist (AAPT) Honorary Membership Award was conferred on Dr. Louay Mohammad at the association's annual meeting on September 12-15, 2022, in San Antonio, Texas. Honorary members in AAPT are those people recognized by vote of membership as having outstanding eminence and life-long experience in the practice of asphalt science and paving technology. AAPT is a global community of researchers and practitioners that serves as a central forum for communication, networking, and exchange of ideas to advance the body of knowledge and state of the practice in asphalt science. With more than 800 members from every continent in the world, AAPT is renowned for advancements in asphalt science and paving technology. Dr. Mohammad is the first recipient of this award from LSU and the state of Louisiana.

Dr. Sun Awarded Early Career Research Fellowship

Dr. Chao Sun received the 2023 Early Career Research Fellowship from the Gulf Research Program (GRP) of the National Academies of Science, Engineering, and Medicine. The Gulf Research Program's Early-Career Research Fellowship supports emerging scientific leaders as they take risks on research ideas not yet tested, pursue unique collaborations, and build a network of colleagues who share their interest in improving offshore energy system safety and the well-being of coastal communities and ecosystems. Under the support of this fellowship, Dr. Sun and his students will develop high-fidelity computational models to simulate the complex structural performance of offshore wind turbines and farms exposed to high winds and strong waves during the passage of extreme tropical clones. Also, AI- and computer-vision-based monitoring methods and effective damping devices will be developed to enhance the structural resilience and prolong the service life of offshore energy infrastructure systems (offshore oil and gas pipelines and wind turbines). The research outcomes can be used to develop hurricane-proof offshore wind and will be shared with the offshore energy community via the GRP database. Dr. Clint Willson is the mentor of Dr. Sun during the completion of this program.

Dr. Wolshon Named Innovators and Influencers Luminary

Dr. Brian Wolshon, Edward A. and Karen Wax Schmitt Distinguished Professor in the Department of Civil and Environmental Engineering and director of the Gulf Coast Center for Evacuation and Transportation Resiliency, was chosen by the Resilient Roads Roundtable as one of its Innovators and Influencers Luminaries. The roundtable is an organization of highly regarded transportation infrastructure leaders from across the industry who are allied to improve the resilience of America's roadways. With deep expertise in highway design and traffic engineering, particularly related to the management of transportation systems during mass evacuations, Dr. Wolshon has been a prolific resilience thought leader. His recent publications include co-authoring the book *Creating Resilient Transportation Systems*, co-authoring *Resilience Primer for Transportation Executives*, and a study on transportation system disaster preparedness for coastal and river valley communities.

Dr. Pardue Receives Brookshire Award

Dr. John Pardue received the Brookshire Award for Teaching Excellence in the College of Engineering for the 2022-2023 academic year. He was recognized for his teaching in the environmental engineering undergraduate program, particularly for the capstone experience that takes students to the WERC Environmental Design Competition annually. The honor also comes with a one-time award of \$25,000.



DEPARTMENTAL AWARDS

Dr. Christopher Kees was awarded the CEE Departmental Service Award. He is currently the director of the Coastal Ecosystem Design Studio—a Louisiana Board of Regents Center of Excellence under the LSU Office of Research and Economic Development—which supports multiple disciplines across LSU. Dr. Kees also serves on LSU’s Internal Evaluation Panel for the Department of Environmental Science within the College of Coast and Environment, is the coordinator of the Graduate Students’ Seminar series in the CEE department, served as chair of the faculty search committee for the vacant coastal engineering faculty position in CEE and helped bring in several top prospects, and serves as the secretary of the SIAM Activity Group on Geosciences, which planned the 2023 Conference on Mathematical & Computational Issues in the Geosciences in Bergen, Norway.

The 2023 CEE Educational Achievement award goes to **Dr. Suresh Moorthy**. Dr. Moorthy serves as the CEE undergraduate program director; advises more than 500 CEE undergraduate students, including advising and conducting exit interviews with graduating seniors; his teaching evaluations are very good to excellent; and these teaching scores have been achieved in classes totaling more than 200 students per semester.

The CEE department would also like to recognize **Dr. Aaron Bivins** as the 2023 CEE Research Achievement Award recipient. Dr. Bivins has authored, or co-authored, 11 peer-reviewed manuscripts in 2022 and already has two that have appeared in 2023. His work in Google Scholar was cited 1,958 times in 2022; he was successful in securing a major grant for nearly \$500,000 from the US Environmental Protection Agency with other investigators; and he has built a Biosafety Level 2 (BSL-2) laboratory, the first in the department.

STUDENT NEWS

ASCE

The American Society of Civil Engineers at LSU recently attended the 2023 Gulf Coast Student Symposium hosted by the University of South Alabama. Of the many competitions there, LSU competed in the Survey Loop, Steel Bridge, Concrete Canoe, and the new Tableau Paper Presentation.

The surveying team gave an outstanding performance this year, placing third overall among the 12 teams that participated. Under the leadership of team captain Alexander Stapp, they placed first in three of the four field competitions. This exceptional group has several highly experienced members. We look forward to seeing their performance in the coming years. The concrete canoe team had some setbacks on its journey but gave a proud performance at the competition this year. The team's canoe had been critically damaged on the drive to the competition, but this hardly stopped them. The team, co-captained at the symposium by Catherine Ladner and Matthew Derouen, made the necessary repairs to have the boat eligible to race. The team's canoe was unable to complete the race due to the damages, but they were awarded first place in the technical presentation and second place in the technical report.



Members of the 2023 surveying team were Alex Stapp, Luke Ory, Brandon Bergeron, Brennan Smith, and Madison Cruz.

The steel bridge team, under the leadership of Eli Barbin, put on an amazing performance, having the fastest build time of all the teams present and the best overall cost efficiency in their design. Unfortunately, a minor construction error resulted in the team being ineligible for awards.



Members of the 2023 Steel Bridge Team were Eli Barbin, Jake Wismans, Blake Guidry, Shaohan Zeng, Johnathan Gallagher, Sarah Christopher, John Peak, and Faith Robertson.

The concrete canoe team had some setbacks on its journey but gave a proud performance at the competition this year. The team's canoe had been critically damaged on the drive to the competition, but this hardly stopped them. The team, co-captained at the symposium by Catherine Ladner and Matthew Derouen, made the necessary repairs to have the boat eligible to race. The team's canoe was unable to complete the race due to the damages, but they were awarded first place in the technical presentation and second place in the technical report



Members of the 2023 Concrete Canoe team were Matthew DeRouen, Catherine Ladner, Madalyn Mouton, Luke Ory, Joseph Lamendola, Colin Martin, Haley Stevens, and Nicholas Vu.

The tableau paper was introduced this year and made participation mandatory for schools to compete in any of the competitions. Maya McGrath volunteered to write this paper about the ethics involved in practicing civil engineering. We are very thankful for her efforts, as nobody would have been allowed to compete without her.

The students of LSU had no intention of coming back from a Mardi Gras-themed competition empty-handed and were very successful in doing so. Regardless of how the competitions went, the student symposium was a great experience for everyone there. It was a great opportunity to meet students and professionals from other universities, and it was all around a very fun time. All of LSU's ASCE competition teams are looking forward to our next performance, which will be March 2024 at the University of New Orleans.



LSU ENVIRONMENTAL ENGINEERING STUDENTS WIN THREE TASKS AT THE 2023 WERC DESIGN CONTEST

LSU Environmental Engineering students competed at the 33rd WERC Design Competition in Las Cruces, New Mexico, from April 10-13, 2023. The event was part of the students' capstone design experience and saw them take on teams from Arizona State University, Cal Poly-San Luis Obispo, Arizona State, Michigan Tech, New Mexico State University, Washington University-St Louis, Oklahoma State University, Tennessee State University and Ohio University. Five LSU teams competed in four tasks.

Task 4 (Microplastics Sampling in Water Reservoirs)



LSU Team 17 wins Task 4: Microplastics Sampling in Water Reservoirs.

LSU entered two teams in the Task 4 competition, which challenged students to design a method for sampling microplastics in water reservoirs, such as Lake Mead, the drinking water supply for Las Vegas, Nevada. LSU Team 17 designed a novel recirculating system that employed a hydrophobic plate to trap plastics. The team successfully tested the device at Port Fourchon in March 2023. Team 17 won, defeating teams from Michigan Tech, Oklahoma State, and New Mexico State University! The team finished in second place in the Bench-Scale competition and was a finalist for the Flash Talk competition. It was also invited to publish its results in IEEE Xplore. Team members were Tirzah Brown, Nacey Goodson, Alexis Stafford, Emma Stiening, and Jesse Sibley.



LSU Team 16 wins the Bench-Scale award for Task 4.

LSU Team 16 also tackled the microplastics task and designed a sampling approach that utilized nanobubbles to concentrate the microplastics in water. Nanobubbles are of a similar size to typical microplastics and are neutrally buoyant. The microplastics partition to the nanobubbles and aeration (using macrobubbles) collects those plastics in the upper layer of the tank. The team also travelled to Port Fourchon to successfully test the device. It won the Bench-Scale award in Task 4 for the most effective demonstration of its design. The team was also invited to publish their results in IEEE Xplore. Team members were Julia Henderson, Seanelle Higgins, Daniel Labove, and Hannah Mistric. In addition to the Bench-Scale award, Higgins won the Terry McManus award given to outstanding students at the competition. She was nominated by her peers for her collaborative work on the task, as well as her resilience and spirit in overcoming obstacles.

Task 5 (Ammonium Recovery From Produced Water)

LSU also competed in Task 5, which was designed to recover ammonium for use as a fertilizer from produced water. The team designed a multi-step treatment train that used waste concrete to raise the pH of the produced water and then air-stripping to recover the ammonium. Finally, the stripped water was sent through a sand filter for polishing. The LSU team won first place in the task and were honored with a peer award, which was based on voting by teams from other universities. LSU also won the best bench scale and was invited to publish their results in IEEE Xplore!. The team faced tough competition from Washington University-St Louis and

Ohio University, among others. Team members were Madelin Anglin, Brandon Huggett, Annie Lobitz, Alex McDonald, Steven Tran, and Josie Walters.



LSU Team wins Task 5: Ammonia Recovery From Produced Water.

Task 6 (Storage of Water on the Moon Without Chemical Addition)

This LSU team designed a method to prevent microbial ingrowth in tanks storing water on the moon for the Artemis mission. The key constraint was that no chemical addition could be used. The students utilized a multiple-lines-of-defense approach to prevent microbial growth in the tank between the mission time on the moon (11 months). A copper-lined tank combined with a novel LED ultraviolet-light-dosing system was selected and tested successfully by the team. The students finished first in Task Award for Tasks 2, 3, and 6. The team was also one of six finalists for the Flash Talk competition held on the opening night. Students competing in Task 6 were Ann Madison Jones, Mason Bailey, Trey Naquin, and Clayton Rives.



LSU Team wins NASA Task Award.

Task 1 (Water Reuse from Rural Wastewater Treatment Plant)

The fifth LSU team developed a water-reuse strategy for rural communities that rarely get the benefits of complex reuse treatment trains concentrated in major urban centers. The objective of this task was to treat partially-treated lagoon wastewater to one of two accepted reuse standards. This LSU team used an ultrafiltration membrane to produce a high-quality effluent that met reuse standards after testing with actual lagoon wastewater in Louisiana. The team's design performed especially well at the competition and resulted in a first-place award in the bench scale. Team members were Johndaniel Hebert, Christian Hoppmeyer, Jordan Radford, Mason Sheely, and Grady Shupe.



LSU Team wins Bench-Scale award in Task 1: Water Reuse of Rural Wastewater.

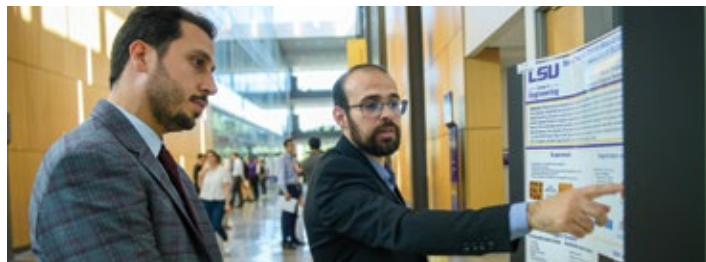
The teams would like to thank the contest sponsors, New Mexico Space Grant Consortium, El Paso Electric Company, Dell Technologies, Freeport McMoran, Chevron, ConocoPhillips, EPA Office of Research, CDM Smith, Arrowhead Center, and NGL Water Solutions. The teams would also like to thank the New Mexico State University staff who have put on the competition for 33 years. LSU Civil and Environmental Engineering would also like to thank local sponsors who have helped bring everyone to the competition over the past decade, regardless of the ability to pay. The three Task Awards in the 2023 cycle are the most ever won by LSU teams in a single year. Congratulations to all of the environmental engineering seniors who competed in 2023, and best of luck in your future endeavors.



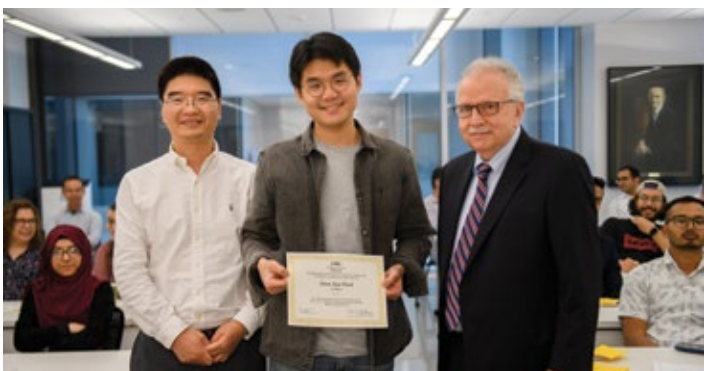
Seanelle Higgins wins Terry McManus Award

11TH ANNUAL GRADUATE STUDENT RESEARCH CONFERENCE

The Department of Civil and Environmental Engineering had a successful Graduate Student Research Conference (GSRC) on Friday, April 14, in Patrick F. Taylor Hall. Thirty-nine students submitted abstracts, and 35 of those presented their research work to fellow students, faculty, visitors, and local experts. This year's participation almost doubled from last year's participation.



FIRST PLACE



Joon Soo Park (Advisor – Dr. Thomas Lin)
“Mechanical and Thermal Properties of Mud Dauber Nests Under Atmospheric Drying”

THIRD PLACE



Reem Abo Znemah (Advisor – Dr. George Voyiadjis)
“Coupled Microstructure-Reem Geometry Effects on the Compressive Behavior of LPBF-Manufactured Inconel 718 Honeycomb Structures”

SECOND PLACE



Taniya Sultana (Advisor – Dr. Hany Hassan)
“Drivers' Preferences, Challenges, and Attitudes While Driving in the Presence of Connected and Autonomous Vehicles (CAVs)”

HONORABLE MENTION

Julia Mudd (Water Resources)
Elizabeth Bogan (Coastal)
Azmair Akash (Environmental)
Yanlin Chen (Structures)

**Department of Civil &
Environmental Engineering**

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Baton Rouge, LA 70803

ADDRESS SERVICE
REQUESTED

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 young2@lsu.edu or, if you prefer, you can “snail mail” them to:

Department of Civil and Environmental Engineering
Louisiana State University
Attn: Tori Young
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!

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