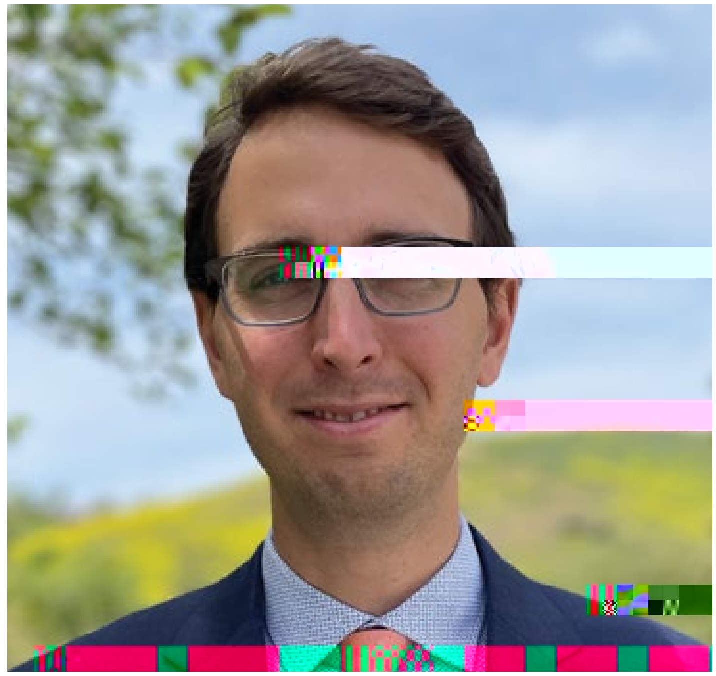
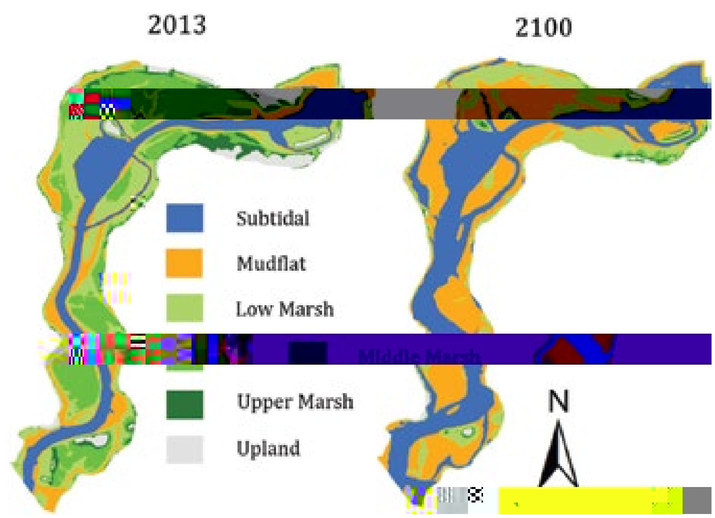
LSU


I am delighted to extend a warm welcome to each of you as we embark on another ex.5 ꞓg

Dr. Matthew Brand is joining the LSU faculty this January as an assistant professor in the Department of Civil and Environmental Engineering, with a joint appointment in the LSU Center for Computation & Technology. Dr. Brand completed his PhD in Civil and Environmental Engineering at the University of California, Irvine in 2020 and was a postdoctoral scholar at Pacific Northwest National Laboratories in the Coastal Sciences Division from 2021 until present. His research interests include developing multi-scale, process-based models of coastal systems that capture human and natural influences on dynamics, risks, and impacts. His work aims to advance understanding of coastal systems and inform adaptation in a changing climate. Areas of specific interest to him are resolving event-scale physical processes in multi-decadal projections of marsh habitat under sea-level rise, hydro-financial modeling to quantify adaptation project benefits and risks, integration of stochastic modeling techniques into decision-support tools, and in-situ and remote sensing data-model synthesis.



Dr. Brand's past research has focused on developing improved predictive tools and capabilities for understanding how marsh ecosystems evolve under the combined pressures of sea-level rise and extreme flow events (Figure 1). His work on sediment transport, morphodynamics, and marsh evolution has been featured in journals such as Advances in Water Resources and Journal of Geophysical Research: Earth's Surface. Dr. Brand is especially excited to apply the lessons learned on the importance of rare, but extreme, events' impact on marsh-surface evolution to marshes subjected to hurricanes in Louisiana.




**F 1.**

Boyd Professor and Chair of the LSU Department of Civil and Environmental Engineering George Voyiadjis was recently awarded the 2023 Blaise Pascal Medal for Engineering by the European Academy of Sciences. The medal was established in 2003 to recognize “an outstanding and demonstrated personal contribution to science and technology and the promotion of excellence in research and education.”

“This is a great honor for me, and I am extremely proud to be recognized by my peers in such a way,” Voyiadjis said. “My experience in industry and my academic appointment in the US and overseas has allowed me to think in a more global sense and at the same time, stay relevant to engineering applications in my research endeavors. Working with my students has been the catalyst of my success in my academic career. The importance of this interaction is to challenge them but also allow them to interact with you through the evolution of the research work.”

Voyiadjis was presented with the award by Giuseppe Lasidogna, head of the Engineering Division at the European Academy of Sciences. As part of the ceremony, he delivered a presentation on his groundbreaking work, exploring the intricacies of a physics-based crystal plasticity model. The talk delved into its applications, specifically in the simulation of micropillar compression and the strengthening effect of multilayered copper-graphene nanocomposites.

Voyiadjis was elected as a member of the European Academy of Sciences in 2019. In fact, he is a member of all three European Academies—the other two being the European Academy of Sciences and Arts and the Academia Europaea of Physics & Engineering Sciences. He is also a Foreign Member of both the Polish Academy of Sciences, Division IV (Technical Sciences), and the National Academy of Engineering of Korea.

In terms of past awards, Voyiadjis 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 was also the recipient of the Damage Mechanics Medal for his significant contribution to continuum damage mechanics in 2015 and the 2022 American Society of Mechanical Engineers Nadai Medal for outstanding achievements in micro-mechanical characterization of plasticity and damage in materials and for pioneering contributions to multi-scale modeling and localization problems.

In 1980, Voyiadjis began his career at LSU as an assistant professor after working at the California Institute of

"I think something that has been under-investigated is the construction of these mounds," Jafari added.

He said that the LSU mounds are made of two different soils, one of which is siltier and the other more clay, meaning they were sourced from different areas.

"It's quite interesting to get an idea of what materials they used and how they engineered them to have higher strengths, leading to high mounds without any landslide or slope issues," Jafari said. "We're coming from an engineering perspective to look at their strengths and index properties. When doing this, you can see how resilient they'll be to sea level rise."

The team's first step is to find out which mounds are more resilient so it knows where to prioritize resources. Next, will be a discussion with the tribes on how they want to mitigate, such as doing shoreline protection to keep the mounds from eroding.

"It's up to the tribal partners on how they'd like to move forward, whether it's preservation or mitigation," Konsoer said.

Michael Rodgers, an assistant professor of anthropology at the University of Louisiana at Lafayette, is helping on the MRDAM project and has been communicating with the tribes. He will be guiding interviews and workshops to direct MRDAM's efforts and center the concerns of stakeholders.

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"I'm serving as a cultural anthropologist, and my role is to facilitate with the Louisiana tribes to see if they're interested

based on the metrics we provided for Dr. An's group to validate and calibrate the material models. We will further develop a physics-guided, machine-learning model that takes environmental conditions, material composition, and additive-manufacturing process factors into consideration."

Traditionally, building underwater structural components is complicated and requires pumping or placing concrete using a tremie pipe, a long tube that extends to the seabed and ensures accurate placement while minimizing disturbance to the surrounding water. Repairing those structures once they're built requires highly-skilled divers equipped with specialized gear and techniques to carry out the process. Neither approach is ideal for various reasons.

"These traditional methods pose numerous challenges in the hazardous conditions which impact both workers and the environment, including harsh working conditions such as low visibility, strong currents, and high pressure," Su said. "Equipment and technology limitations in underwater environments also present challenges. Although advances in remotely operated vehicles and autonomous underwater vehicles have enabled the inspection and surveying of underwater environments, they have yet to fully address the challenges of underwa-