LSU

Department of Civil & Environmental Engineering

CEE IN FOCUS

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FROM THE DEPARTMENT CHAIR

During these challenging times, I would like to share with you how our faculty and students in the department are coping with the COVID-19 crisis. As you all know, teaching and learning is now online. This decision has been made by LSU to protect the health of students, faculty, and staff. Our faculty and students have moved to this new educational platform successfully. It should be noted that, in 2019, the Civil and Environmental Engineering (CEE) Department initiated the online MS degree in civil engineering. Roughly half of its faculty prepared and taught courses in this new mode of instruction. This helped tremendously with the CEE faculty preparing for online courses during this period of remote learning.

I am listing some examples of headlines in this newsletter—Dr. Navid Jafari, LSU CEE Assistant Professor, Studies Disaster Reconnaissance Using Social Media, Drones; Dr. Brian Wolshon, LSU CEE Professor, Studies Effects of Coronavirus on Travel Patterns; Dr. George Z. Voyiadjis, LSU CEE Boyd Professor, Studies the Micromechanical Behavior of Additively Manufactured Inconel 718 Honeycombed Structure; The President-Elect of the American Society of Civil Engineers, Dr. Jean-Louis Briaud, Visited the LSU ASCE Student Chapter; Dr. Clinton Willson, Mike N. Dooley, P.E. Professor in Civil and Environmental Engineering, Has Been Named a Recipient of the 2019 Worley Professor of Excellence Award; Dr. Louay N. Mohammad, the Irma Louise Rush Stewart Endowed Professor, Received Emeritus Membership With the National Academies of Science, Engineering, and Medicine Transportation Research Record; and the several awards received by our students in the 30th WERC Design Competition.

As the spring semester progresses, I want to thank my colleagues for their Herculean efforts to shift everything online. Our seniors were able to graduate, even though the ceremony has been postponed. We should continue to practice social distancing. Please take care, and stay safe during these extraordinary times.

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

DEPARTMENT NEWS

MICROMECHANICAL BEHAVIOR OF ADDITIVELY MANUFACTURED INCONEL 718 HONEYCOMBED STRUCTURE

One component of the ITHACA project was the joint research between Boyd Professor and Chair of the LSU Department of Civil and Environmental Engineering (LSU CEE) George Z. Voyiadjis and Professor Paul Wood of the University of Derby (UoD) on micromechanical characterization of additively manufactured IN718 two-dimensional cellular structure using nanoindentation.

Additive manufacturing (AM) has witnessed a considerable improvement in the last decade after the development of selective laser melting technique (SLM). SLM technique develops a dense material; almost 99.9% density without sintering, post infiltration, or hot isostatic pressing (HIP) can be achieved. This novel characteristic of SLM, in addition to the inherent capability of AM to produce complex shaped elements, has opened the door to many possible applications of shaped metallic parts produced using this method. An example of these parts is metallic cellular structures that are used for applications that require energy absorption, weight reduction, fluid flow, or heat transfer.

The nickel based alloy In718 finds use in the mechanical applications at wide range in high temperature applications due to its high corrosion, fatigue, and wear resistance combined with high strength up to 650-750o C. However, In718 is a hard-to-machine alloy using conventional subtractive methods requiring expensive tools, high rates of tool wear, and low metal removal rates. Therefore, research has been done in the last decade to investigate the microstructure and mechanical properties of In718 alloy manufactured by SLM as a possible substitute to conventional manufacturing methods. Yet, most of these studies, if not all, were done on bulk elements or standard tension samples. The focus of the current joint project between LSU and UoD is to characterize the mechanical properties of In718 alloy in the form of a two-dimensional honeycomb cellular structure manufactured by SLM.

Two-dimensional honeycomb samples with different wall thicknesses were manufactured in UoD's Institute for Innovation in Sustainable Engineering and tested for elemental composition at Element laboratory in the United Kingdom. The effect of the element wall thickness on the homogeneity and isotropy of the mechanical hardness was investigated using the MTS Nanoindenter XP® available at LSU CEE.

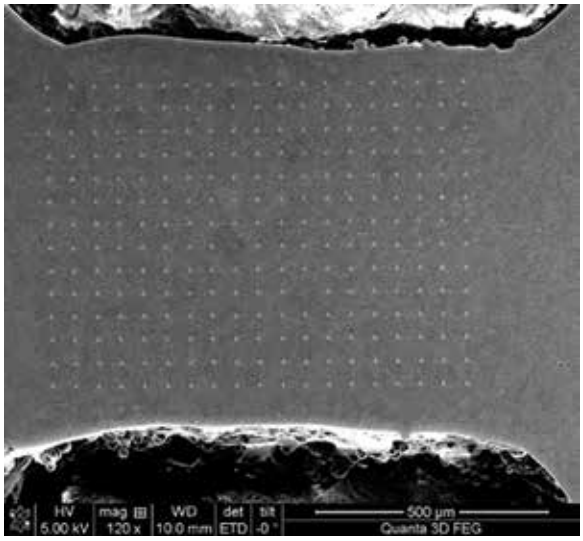
UoD's Renishaw AM250 SLM powder bed fusion machine with modulated fibre laser.

The MTS Nanoindenter XP® device with a load resolution of 50 nN and a displacement resolution of 0.01 nm is used to measure the elastic stiffness, hardness, and yield strength of metallic samples. It can also be used as a compression device for micropillars using the flat punch probe. In addition to the XP actuator with the previous load and displacement resolutions, the Nanoindenter is equipped with a Dynamic Contact Module (DCM) actuator for high-resolution displacement and force measurement, NanoVision for in-situ surface scanning (nanomechanical microscopy), and a heating stage for varying temperatures from room temperature to 350°C. Furthermore, on both XP and DCM actuators, a continuous stiffness measurement (CSM) nanoindentation can be performed to acquire the mechanical response as a continuous function of the penetration depth into the sample surface.

In718 honeycomb samples manufactured by SLM. Wall thicknesses: 0.8, 0.6, and 0.4 mm.

MTS Nanoindenter XP

The results showed that the hardness near the cell wall boundaries is generally lower compared to intermediate areas. Also, there is a minimum wall thickness, below which, the manufacturing technique will significantly affect the hardness. Anisotropy in hardness was also observed in all samples. Furthermore, hardness values obtained from experiments together with the accumulated plastic strain values obtained from the test simulation, using the commercial finite element software ABAQUS, were used to evaluate the variable material length scale of In718. The temperature and strain rate indentation size effect (TRISE) computational model of hardness developed by Voyiadjis and his coworkers was utilized to evaluate the length scale as a function of the accumulative plastic strain. This variable material length scale plays an important role in characterizing the mechanical behavior of the material at the microscale level, where the gradient plasticity theory is used to define the plastic behavior of the material accounting for the hardening as reflected by the coupling between statically stored dislocations (SSD) and geometrically stored dislocations (GNDs).



SEM image showing the nanoindentation across the cell wall thickness (the nano-indents are the light-gray triangles).

ASCE PRESIDENT-ELECTS VISITS LSU

The president-elect of the American Society of Civil Engineers, Dr. Jean-Louis Briaud, visited with the LSU ASCE Student Chapter on Wednesday, February 12. Dr. Briaud discussed his journey to presidency, the importance of being in professional societies, and his goals and initiatives for ASCE, specifically, how they relate to student chapters. He encouraged the students to be in “relentless pursuit of excellence” in their careers and in life in general. When asked how to be a good leader, Briaud suggested focusing on being firm in your decisions while staying fair, polite, and open-minded in everything you do.

LSU CEE PROFESSOR STUDIES DISASTER RECONNAISSANCE USING SOCIAL MEDIA, DRONES

LSU Civil and Environmental Engineering Assistant Professor Navid Jafari and LSU Department of Environmental Sciences Professor Nina Lam are working with Texas A&M (TAMU) faculty to find a way to quickly gather data after a disaster using the latest technology.

Jafari received a $180,000 National Science Foundation grant with TAMU CEE Professors Anand Puppala and Surya Congress for this project that will ultimately help Emergency Operations Centers (EOCs) in Louisiana and Texas conduct their work more efficiently using technology.

"Texas is driving technology and really advancing," Jafari said. "We want to learn how people use drones and social media to collect and interpret data to make decisions and what's stopping them from making a better, faster decision. EOCs are the heart of this proposal." EOCs collect and disseminate information to keep people safe, deciding where evacuations will take place and where to locate resources, among other things. After Hurricane Harvey hit Houston in 2017, the Beaumont EOC used drones to conduct reconnaissance, which Louisiana picked up on. "With a drone, you actually have to go to the site, set up the equipment, perform the survey, bring it back to the EOC or office, analyze it, then make a decision," Jafari said. "That process could take a very long time, even days, when a decision is needed that afternoon. Where can we improve that workflow? Currently, you can actually stream your drone video to the Internet, so maybe we need to bring that technology here. We need to figure out where the gaps are and use technology that is faster and more reliable."

To further identify where the gaps are, Jafari asked Lam to join him to look at how often residents of Beaumont and Houston Tweeted about the state's infrastructure. "Are they saying 'levee breached' or 'bridge damaged'?" Jafari said. "We want to be able to see what they're saying and what images or videos are posted and if we can extract any info that the EOCs can use. Most people have a smartphone and took photos of their neighborhoods during the 2016 flood and posted those pictures on social media saying, 'Look how high the water is on my street.' We want to be able to collect and use that information."

To attain this pertinent information, Lam and a team of students are taking a look at 45 million Tweets that went out after Hurricane Harvey, along with ones from Hurricane Barry. "We're focusing on infrastructure-related Tweets," Lam said. "What are the words relating to this—'damage,' 'no power,' etc. Once you retrieve it, we still need a person to look at the context. It's a lot of work." Jafari said Tweets are more real-time than what one would get from a stream water-level gauge that is miles away. Gathering information quickly is important because people will change the natural environment and rebuild as soon as they can. "In an emergency, the DOTD (Department of Transportation and Development), DEQ (Department of Environmental Quality), CPRA (Coastal Protection Restoration Authority), and GOHSEP (Governor's Office of Homeland Security and Emergency Preparedness) are in the midst of a firestorm," Jafari said. "We have to make decisions fast. We're the researchers who come behind and say what we can do better?"

Though hurricane season doesn't start until June, it's urgent to get the ball rolling on projects, such as the one Jafari and Lam are working on. "A disaster is no time to try new things," Jafari said, "which is why we need to figure it out ahead of the next one."

PATSY MILLER, FIRST LSU FEMALE CIVIL ENGINEER, PROUD TO SEE GRANDSON CARRY ON LEGACY

In August 1952, Patsy Miller, née Merrill, became the first female student to graduate from LSU's Civil Engineering program. Nearly 60 years later, her grandson, Trenton Miller, joined her by graduating last fall from LSU in civil engineering.

At the time, Miller recalled, her graduation wasn't looked at as a milestone. "It was not important to me at the time; I was more focused on school and the next steps in my career," Miller said. "I was just another student." After graduation, Miller spent one year at the Chance-Vought Aircraft Company in Dallas before returning to Baton Rouge and working for the Louisiana Department of Transportation and Development, where she eventually retired.

While she downplays any notion of being a trailblazer as the first female civil engineering graduate from LSU, Miller is even more humble when it comes to her legacy with the La. DOTD. "Though she would probably never admit it, my grandmother was instrumental in the development of Baton Rouge's infrastructure," Trenton said. "[She] was a geometric design engineer who did preliminary designs for interchanges, intersections and roads. "Her responsibility in this position was to ensure that all of (DOTD's) designs [met] geometric safety standards, such as minimum line of sight, minimum turning radius and maximum design speed. Through the 25 years she held this position, my grandmother devoted her life to ensuring the safety of Baton Rouge's citizens."

Trenton graduated from LSU with a bachelor's in civil engineering and a minor in Spanish last December and now looks to start building his own legacy as a structural engineer with Quality Engineering and Surveying in Port Vincent, Louisiana. As part of his role there, he will travel to Puerto Rico to help rebuild cities destroyed by the last two major hurricanes, serving as a translator for his company and helping analyze the condition of existing water management structures to determine which areas need improvement. He will then design plans to address the subsequent issues.

But first, Trenton will have time to enjoy the fruits of his labor at LSU. "I am honored to graduate from LSU in civil engineering," Trenton said. "I am proud to have studied alongside so many determined and brilliant engineers. But most importantly, I take pride in my family name and hope to contribute just a fraction of [what] my grandmother made to the civil engineering industry. For her part, Miller takes equal pride in the achievements of her grandson. "I'm proud of him," said Miller. "He's a smart boy."

LSU PROFESSOR, RESEARCH TEAM STUDYING EFFECTS OF CORONAVIRUS ON TRAVEL PATTERNS

A number of metrics are being examined by experts to determine how successful, or unsuccessful, the nation's response to the coronavirus pandemic has been thus far.

For LSU Civil and Environmental Engineering Professor Brian Wolshon, that metric is traffic. Specifically, Wolshon and a group of fellow researchers are studying the impact of social distancing directives on human travel behavior, using highway volume data as a representation of personal activity and interaction. The research involves a comparison of roadway travel statistics throughout the state of Florida in March 2019 versus March 2020 to identify and track differences between rural and urban areas, freeways and arterial roads, etc. The goal of the project is to understand the early impacts of government restrictions on social interaction with the expectation that it will be possible to determine its effectiveness in limiting the timing and extent of infections and use the resulting data in future operational, strategic, and recovery planning efforts.

What the group has determined, so far, is that overall traffic volume decreased by 47.5% during the study period. The greatest decline occurred later in the study period, suggesting multiple factors contributed in an additive way to increase the change in travel behavior. Issuance of emergency declarations were key to reductions in travel; however, other actions, such as school closings, a shutdown of theme park operations, and the shuttering of bars and restaurants also played a part. Whether the reduction in travel demand was due to the closure of activities or a function of "increased fear arising from the lethality of the coronavirus" will require further exploration, Wolshon said.

"The most important unanswered question is did reduced level of travel reduce sickness and fatalities from the coronavirus?" Wolshon said. "Time will tell. We were focusing on the onset and spread of the virus, not the 'peak of the curve' or the drop. We hear lots of evidence that it did, especially if you look at the spread stats through Florida to this point. They were definitely below New York, Louisiana, Michigan, etc., despite having way more people. "We also still need to direct correlation between trip reduction and actual numbers of infection, transmission, and lethality for the virus. And we need to get data on people who sheltered in place and their health outcome."

Working alongside Wolshon is Scott Parr in the Department of Civil Engineering at Embry Riddle Aeronautical University; John Renne with the Florida Atlantic University School of Urban and Regional Planning's Center for Urban and Environmental Solutions; Pamela Murray-Tuite with Clemson University's Department of Civil Engineering; and Karl Kim with the University of Hawaii's Department of Urban and Regional Planning, Pacific Urban Resilience Lab, and National Disaster Preparedness Training Center. The group's initial findings are detailed in a paper titled, "Traffic Impacts of the COVID-19 Pandemic: A Statewide Analysis," which is under review in the American Society of Civil Engineers' journal, Natural Hazards Review.

"[The team works] on lots of things, collaborative research in resilient and emergency traffic, so we do lots of collaborative research and instructional projects," Wolshon said. "I was at a conference in Honolulu...we were having a call and discussing how traffic was less and where and when and why it was happening. So I literally coordinated the team through texts and wrote an initial work plan over the middle of the Pacific Ocean on the flight back [from Hawaii]." The team decided to use Florida as its testing ground, Wolshon said, because its Department of Transportation has a real-time, interconnected network of hundreds of traffic flow sensors throughout the state. Its data is logged and stored continuously and has been for years. It's also open to sharing the data, most of which is available online. "We are still working on analysis of statewide evacuation movements

during Hurricane Irma for a separate project, so we already knew how to collate, process, and organize the data from the (FDOT) files based on that project," Wolshon said. "Effectively, we were doing the same thing but in the opposite direction. We were looking at traffic going down instead of going up like it does in evacuations."

Next steps for Wolshon and the group are to analyze the "positive" aspects of the data in terms of reduced congestion and delay, especially as they relate to helping move freight and supplies, reduce fuel consumption and exhaust emissions, and increase safety and travel time reliability. They will also study other modes of transportation like regional rail, airlines, etc.

30TH WERC DESIGN COMPETITION GOES VIRTUAL

LSU Environmental Engineering students have competed in the WERC Environmental Design Competition at New Mexico State University since 1996. When the 30th WERC Design Competition went "virtual" this year, LSU Environmental Engineering teams had to immediately alter their teamwork strategies, moving from face-to-face group work in a laboratory to remote work scattered across the United States. The virtual format consisted of written reports as usual, oral presentations to engineering practitioner judges via Zoom, and bench-scale presentations consisting of in-depth conversations with smaller groups of judges over a two-hour period. The LSU team had another great year, winning three Task Awards and a Judge's Choice Award.

Students won tasks submitted by Freeport-McMoran for an algae-based remediation system (phycoremediation) for acid-mine drainage and a task submitted by Los Alamos National Laboratory for a water treatment system that recovered valuable quantities of rare earth elements (lanthanum, europium, and neodymium) from produced water. Students also won the highly competitive open task for a project that designed unit operation to remove microplastics from wastewater. A second open task team won a Judges Choice award for community involvement for thae continued efforts for the blight to bioswales project in the Ninth Ward in New Orleans. Students showed excellent adaptability and focus, which bodes well for their future engineering careers. Geaux Tigers! Geaux Engineering!

Task 3: Heavy Metal Removal via Phycoremediation, First Place

Nafis Choudhury
Jacob Bougere
Natalie Nelson
Devon Dao
Johnny Crouere
Thinh Huynh
Monica Nguyen
Abdullah Baroun

Task 5: Produced Water: Rare Earth Element Recovery and Clean Water Production, First Place

Sammie Parks
Emily Thompson
Miller Warrington
Raymond Poche
Bilquis Williams
Sidd Srinath

Task 6: Design of a Microplastic Removal Process for Use in a Wastewater Treatment Plant, First Place

Emily Fertitta
Lauren Bauhs
Chelsi Parker
Stephen Chamberlain
Cougar Chichester
Garrett Melton
Jonathan Efferson

Development of a Blight to Bioswales System to Assist New Orleans, Louisiana Storm Water System, Judge's Choice for Community Involvement

Joseph Beatty
Bayllie Breaux
George Carson
Chi Phan

FACULTY AWARDS

WILLSON NAMED WORLEY PROFESSOR OF EXCELLENCE

Clinton Willson, Mike N. Dooley, P.E. Professor in Civil and Environmental Engineering, has been named a recipient of the 2019 Worley Professor of Excellence Award, which is presented by Worley and LSU's Cox Communications Academic Center for Student-Athletes. Dr. Willson was recognized during the LSU vs. Arkansas football game on Saturday, November 23.

"I am very honored to receive the 2019 Worley Professor of Excellence Award," said Dr. Willson. "I love the passion that so many of our LSU students, staff, and faculty bring to the classroom, research, and administration. What is particularly exciting and makes my job so much fun is how much our students love this state and really want to improve our communities, infrastructure, and way of life."

Dr. Willson serves as the director of the LSU Center for River Studies, which is a collaborative partnership with the Louisiana Coastal Protection and Restoration Authority. The center houses a large, physical model of the lower 190 miles of the Mississippi River and an extensive education and outreach exhibit hall. Dr. Willson also serves as the LSU East Campus faculty-in-residence. In this role, he and his family regularly host programs and events to help LSU on-campus students make connections, navigate their way through LSU, and develop a sense of belonging to a community. Dr. Willson has also served as the advisor or co-advisor for 39 MS or PhD graduates and currently has 14 graduate students working in his research group.

"On behalf of Worley, I would like to congratulate Dr. Willson as the Worley Professor of Excellence at LSU," said Michael Authement, Worley Sr. Vice President of Operations–US Gulf Coast. "At Worley, we support higher education must continue to foster the next generation of problem solvers. Dr. Willson's commitment to the engineering field and connecting the student community are important to developing the leaders of tomorrow."

"It was an honor to spend time with Dr. Willson and recognize him as a difference maker and steward of excellence," said Walt Holliday, director of academic affairs at the Cox Communications Academic Center for Student-Athletes. "Dr. Willson's fusion of teaching, research, and service continues to help LSU meet the challenges of today and tomorrow."

MOHAMMAD AWARDED EMERITUS MEMBERSHIP

Professor Louay Mohammad, PE, F ASCE, was presented with National Academies of Science, Engineering, and Medicine Transportation Research Record emeritus membership at the 2020 TRB annual meeting for his long-term standing, leadership, and being an effective ambassador in the subjects of highway construction materials, pavement design and analysis, and infrastructure sustainability. Dr. Mohammad has been in TRB's asphalt materials section for more than 18 years, which includes being the chair of committee AFK40 "Surface Requirements of Asphalt Mixtures" from 2007 to 2013. This honor is the second designation for LSU faculty and first for an active faculty in the CEE department and LTRC. This category of committee membership recognizes outstanding individuals who have participated as members of the TRB Technical Activities Divisions' committee structure, volunteered and shown their dedication to the TRB standing committees, and made significant leadership contributions to these committees over a sustained period of time.

LSU AND LTRC RESEARCHERS LED BY DR. MOHAMMAD WIN BEST PAPER FOR SUSTAINABILITY WORK

A group of researchers from LSU CEE, Chemistry, and LTRC were recently honored at the 2019 meeting of Association of Asphalt Paving Technologists (AAPT). This is LSU's first AAPT Walter J. Emmons Award for A Paper of Outstanding Merit.

Authors Sreelatha Balamurugan, Ph.D.; Louay Mohammad, PhD, PE, F ASCE; William Daly, PhD; Ioan Negulescu, PhD; Samuel Cooper III, PhD, PE; Samuel Cooper, Jr, PhD, PE; and Gaylon Baumgardner were awarded the Walter J. Emmons Award for best paper. Their study entitled Impact of Various Crumb Rubber Modifications on Asphalt Binder and Mixture Properties explored the performance benefits of using sustainable materials in flexible pavement construction, specifically the use of waste tires (also known as crumb rubber) as an asphalt binder modifier used in asphalt mixtures.

"The project was in response to DOTD's search for sustainable options to reduce the rising costs of asphalt pavement materials without compromising performance," explained Mohammad, professor of civil engineering at LSU. "One such alternative is the use of crumb rubber (or waste tires) in asphalt binders of asphalt mixtures."

Funded by LTRC, this project combined the unique capabilities and collaboration among LSU Chemistry, Civil Engineering, and LTRC researchers.

"Utilizing each department's specialties and technology, researchers studied the impact various crumb rubber modifications had on rutting and cracking of asphalt mixtures, as compared to control mixtures," Mohammad said. "The most common crumb rubber modifier packages were evaluated because those are what local contractors are using in this state."

The findings of this research have resulted in updates to the department's 2016 specifications. The new rubber specification for DOTD places a limit on the maximum allowable rubber modification rate at 10%. The new specification also allows the use of cryogenically ground crumb rubber.

"Through incorporating crumb rubber from waste tires into Louisiana asphalt mixtures, researchers are not only improving the durability and sustainability of local infrastructure but are also furthering sustainability efforts that have been in motion for years across the nation," Mohammad said.

STUDENT NEWS

LSU CE HYDROLOGIC DESIGN CLASS ENGAGES WITH LOCAL PARTNERS

The LSU Department of Civil and Environmental Engineering senior project class recently completed work on four projects in the greater Baton Rouge area—the Baton Rouge Plank Road Corridor, City of Baker, City of Denham Springs, and I-110 and Acadian Thruway. The students worked with faculty and staff from the LSU Robert Reich School of Landscape Architecture, LSU Coastal Sustainability Studio, and local stakeholders, engineers, and planners. Each project team made multiple site visits, met with collaborators, "clients," and stakeholders to identify constraints and learn more about the specific problems and needs. Final presentations, which summarized the conditions, constraints, performance of various alternatives, costs, permitting, constructability, operation, maintenance, and recommendations were delivered to each client, as well as a number of local engineers, planners, and stakeholders.

Four of the project teams worked on stormwater designs for specific sites along the Plank Road corridor as part of the Plank Road Master Plan developed by Build Baton Rouge. Site development and stormwater management concepts were developed by Nick Serrano's LSU landscape architecture urban design studio with input from Traci Birch's architecture community design studio. The concepts were turned into designs, developed with assistance from HNTB and LADOTD, and included bioswales, rain gardens, reduction in pervious cover, detention ponds, and Bus Rapid Transit stops.

"[It's] great work that adds to our knowledge base," said Build Baton Rouge President and CEO Christopher Tyson. "As various projects move forward, including the Bus Rapid Transit and associated environmental reviews, it's good to have these ideas at the forefront so that we can advocate for them early." Two of the project teams worked on stormwater mitigation projects for the City of Baker. After meetings with the LSU Coastal Sustainability Studio (CSS) and Baker officials, the teams selected two projects to work on–improving drainage in the Baker Estates subdivision and implementing green infrastructure along Groom Road. Alternatives for these projects included rain gardens, channel improvements, bioswales, and detention ponds. The teams made site visits and worked with HNTB and the CSS to develop strategies for these sites.

"Thank you for the presentations; they were very informative, professional, and well-crafted. We appreciate the time and effort your teams put into them and I look forward to receiving copies of them," said Becky Bond, economic development director for the City of Baker.

The City of Denham Springs provided the sites for two of the class projects. Building on multiple reports developed after the March 2016 flood, the students visited the sites, met with city planning officials, and obtained valuable data from Quality Engineering to identify drainage problems and prioritize projects. The projects were focused along the Long Slash Branch River and involved culvert and drainage ditch improvements, along with integration of detention ponds with proposed community plans for home buyouts and hike and bike trails.

Denham Springs Mayor Gerald Landry sent a note to the teams, which read, "Thank you for letting us be a part of this. Wonderful to see the enthusiasm and energy these young students bring to the table. Their suggestions will be a part of our continued recovery."

The final project was directed at investigating two road flooding issues here in Baton Rouge–one along I-110 at the curve by the Governor's Mansion and the other under the railroad overpass on Acadian Thruway, between Perkins Road and I-10. The students met with engineers from the Louisiana Department of Transportation and Development (LADOTD) and HNTB, and, based on the data and information, focused on identifying several alternatives to reduce flooding, avoid or minimize road closures, and provide advanced flood warning systems. Following the presentations, Josh Stutes, LADOTD District 61 engineer said, "Both presentations were great and well thought out and everyone contributed well! I also appreciated the costs of various alternatives."

All of the final project presentations were done remotely and attended by all collaborators, stakeholders, and clients, as well as a number of local engineers and planners. Special thanks to Chris Tyson and Geno McLaughlin (Build BatonRouge), Mayor Gerald Landry and Rick Foster (City of Denham Springs), Becky Bond and Glenda Bryant (City of Baker), Todd Donmyer and Josh Stutes (LADOTD District 61), Melissa Kennedy and Mario Durbic (HNTB), Traci Birch, Brendan Harmon and Nick Serrano (LSU Robert Reich School of Landscape Architecture), Kim Mosby and Rachelle Trahan (LSU Coastal Sustainability Studio), Ron Rodi, Jonathan Hird (Moffat & Nichol), Jeanette Clark (LADOTD), and Jeannette Dubinin (CPEX).

Finally, in spite of a busy and abnormal structure, several engineers were able to talk with the class about their career path, current work, and lessons learned. Special thanks to Sam Crampton (Dewberry), Stokka Brown (CSRS), Bob Jacobsen, Adam Smith (East Baton Rouge City-Parish Department of Public Works), and Jonathan Hird and Chris Turnipseed (Moffat & Nichol).

FAMILY HISTORY: FOUR GENERATIONS OF LSU TIGERS

Incoming freshman Jane Hamilton is a fourth generation LSU Tiger. Hamilton, of Spring Lake, New Jersey, is the daughter and granddaughter of passionate LSU alumni. Their dedication and love of LSU began with Jane's maternal great-grandfather.

"I have been visiting the campus my whole life. I've always known I would be going to LSU. I feel like I've been waiting my four high school years to go," Hamilton said.

The family's LSU history starts with Jane's great-grandfather, Boyce Miller, and his sisters, who attended LSU in the 1920s and 1930s. In 1934, Miller and his father loaded their prize-winning pig into their truck, and drove to the Baton Rouge campus from their home in Livingston Parish.

"This was during the Great Depression. The story is that my dad had raised a champion hog for the parish fair and he won a ribbon. He and his dad took the hog to the LSU campus because they didn't have any money and they offered LSU the hog as a down payment on his tuition," said Clare Miller, Boyce's daughter. "LSU took the hog, he [Boyce] became a student, and they gave him a job of caring for the hog, along with other barnyard animals."

After graduating from LSU in 1938, Miller was a teacher in Louisiana for 33 years, specializing in agriculture and horticulture. He taught an additional 11 years in Florida before retiring. He also received his master's degree from LSU in 1952 in agriculture.

"But he taught until he was 70 years old" Miller said.

Clare Miller attended LSU from 1958 to 1962. She studied home economics, specializing in dietetics and food systems management. She also returned to LSU to receive her master's in human ecology in 1979, specializing in nutrition. Her career has focused on child nutrition, working for the Louisiana Department of Education as well as the United States Department of Agriculture, or USDA, in the federal school meal programs.

"I was 60 when I went to Washington. I worked as a senior nutritionist with the child nutrition division for the USDA," Miller said.

Her daughter, Laurie, also attended LSU, studying journalism and graduated in 1987. Laurie met her husband, Patrick, an engineering student from New Jersey, at a university dining hall. Patrick graduated in 1984. After working as the head of construction for Walmart, Patrick now leads construction for Hudson's Bay Company, which owns Saks Fifth Avenue. Throughout his career, the family has moved around the world, finding other LSU graduates in places like Brazil.

The Hamilton's LSU legacy dates back to the Great Depression. Photo Credit: Laurie Hamilton

"We were members of an LSU Brazil alumni association," Laurie said. "We always wanted our kids to go to LSU."

Jane's older sister, Clare, is a current LSU student, studying engineering. Jane will study biology as an Ogden Honors College student. Even as the Hamilton family lives in New Jersey, they share their LSU pride.

"We fly the LSU flag proudly here," Hamilton said.

Jane's grandmother is proud the family has continued to attend the university her father loved.

"My dad would be really pleased. He left a legacy for my family that we all have gone to LSU. That was a man whose blood flowed purple and gold," Miller said.

Story courtesy of Rachel Holland, LSU Strategic Communications

LSU | College of Engineering

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ALUMNI REGISTRATION & UPDATES

The Department of Civil & Environmental Engineering is always interested in how our alumni are doing. We hope you will take the time to send your updates to **mlane10@lsu.edu** or, if you prefer, you can "snail mail" them to:

Department of Civil and Environmental Engineering
Louisiana State University
Attn: Madison Lane
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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