

LSU RESEARCH

Office of Research & Economic Development The Constant Pursuit of Discovery | 2020-21



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FRONTIERS

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FROM THE VICE PRESIDENT

The theme for this issue of *LSU Research* is frontiers, which we chose long before the global pandemic. This focus is more relevant than ever for the work that we do today at LSU. We are positioned at the forefront of research and discovery with an urgency to respond to and outpace the virus that has shaken the entire world. Our social scientists are studying the effects of the pandemic and helping us put it into context with their analyses, as shown in the cover story, *Coronavirus: Learning from Disaster, Reinvesting in Humanity*.

Despite the challenges the pandemic has brought, our researchers and scholars continue to push the frontiers in their respective fields. This past year, an expedition to one of the most remote parts of the Amazon rainforest was led by an LSU PhD candidate. She led an all-women expedition in honor of famed naturalist Emilie Snethlage, who was a pioneer in discovering and collecting numerous bird species in the Amazon rainforest more than a century ago. Simultaneously on the other end of the spectrum, our astrophysicists at LSU and LIGO are discovering new phenomena in the farthest reaches of the universe. These are challenging times, but they are also exhilarating times. As proven from past adversities, we will emerge from this stronger, wiser, and more resilient.

We hope you enjoy reading about the research at LSU. Visit lsu.edu/research and follow us @LSUResearch on Twitter and Facebook for more stories throughout the year.

Samuel J. Bentley

Vice President, Research & Economic Development
Billy and Ann Harrison Chair in Sedimentary Geology

ABOUT THIS ISSUE

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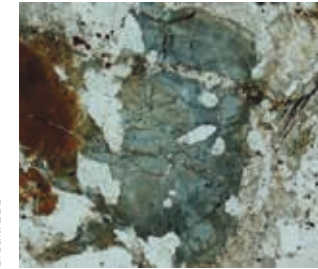
This cover alludes to the feelings one may experience when on the journey to discovering something new. It is a reminder that no one simply arrives at enlightenment. You must be willing to embrace the uncomfortable aspect of the process. The darkness and black is the unknown—doubt, anticipation, and the realization of vast possibilities. The blueish-purple is the action or the work whilst being consumed by imagination and creativity—embracing risks. The white highlight is the arrival—the awakening and the feelings of enlightenment and fulfillment. —Tyronecia Moore, LSU graphic designer and cover artist.

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NEWS

Newly Discovered Mineral Named for LSU Geologist

By Jonathan Snow



Dutrowite is the newly named mineral in the tourmaline family.

Tourmalines have been prized for their intense color and clarity, since ancient times. They are composed of silicon, aluminum, oxygen, boron, and—in this case—precise amounts of sodium, iron, and titanium. The new mineral was discovered in the rugged Apuan Alps of Tuscany, Italy, near the picturesque Grotta del Vento or “Cave of the Wind.” It formed from the compression and heating of a volcanic rock called rhyolite during the collision of the African plate with the European plate about 20 million years ago. The Italian researchers who discovered and named dutrowite cited Dutrow’s contributions to mineral sciences and crystal chemistry, particularly with respect to her work on the utility of tourmaline and the mineral staurolite, for recording chemical signatures of geologic processes.



Barb Dutrow

“I am surprised and thrilled to be honored in this way,” said Dutrow, who is the Gerald Cire & Lena Grand Williams Alumni Professor in the LSU Department of Geology & Geophysics.

“A lifelong passion of mine has been to discover and decode the geologic information embedded in tourmaline; this recognition is a highlight of our discoveries,” she said.

Tracking the Dangers of Vaping

By Sandra Sarr

When electronic cigarettes made their debut on the market about 10 years ago, the general public believed they offered a harmless alternative to cigarette smoking. However, that notion has gone up in smoke as evidence of harmful health effects builds. As of December 2019, more than 2,561 people throughout the U.S. have been hospitalized or died due to lung injuries linked to vaping or e-cigarette use, according to the Centers for Disease Control and Prevention.

“These deaths and illnesses are related to vaping, and it’s only the tip of the iceberg. Doctors are just now seeing the harmful effects,” said Alexandra Noël, assistant professor in the Department of Comparative Biomedical Sciences at the LSU School of Veterinary Medicine.

Noël is conducting a research project funded by the Food and Drug Administration and the National Institutes of Health to collect, measure, and evaluate information on vaping’s impact on the lungs. She hopes results from her studies will help people make informed decisions and keep them safe from the dangers of vaping.



Alexandra Noël

“People initially thought vaping was safer than cigarette smoking. We could see in the lab that it is not safe. Inhaling e-cigarette vapor is harmful,” she said.

To track the dangers of vaping, Noël and her research team are examining how two design characteristics of third-generation tank-style e-cigarette devices—an atomizer, or coil, resistance system and a battery voltage system—affect e-cigarette vapor composition and cellular toxicity.

According to Noël, who specializes in lung diseases, cigarette smoking is a slow killer, but the relatively recent phenomenon of vaping involves different chemicals that can have a rapid health impact. Facts about vaping, including what chemicals make up the tiny particles that enter users’ lungs when the vapor is inhaled and how they affect health over the long term, are only beginning to be scientifically documented.

“We are independently attempting to verify claims made by vaping device producers,” she said.



LSU researchers discovered the hairy-tailed shrew in Indonesia.

The Naming of the Shrew

By Alison Lee Satake

Researchers at LSU have discovered a new species of shrew, which they have named the hairy-tailed shrew, or *Crocidura caudipilosa*.

“There was no doubt that this was a new species,” said LSU Museum of Natural Science Mammal Curator Jake Esselstyn, whose work on Sulawesi Island in Indonesia led to the discovery published in the *Journal of Mammalogy*. “There isn’t another species on the island that has as much hair on its tail, in terms of shrews.”

The newly discovered shrew is slender with gray-brown fur on its back and silver-gray fur on its belly. Its tail is slightly longer than the combined length of its head and body and is covered with long bristles and hair, which make the distinctive tail very hirsute. In fact, no other shrew species in Indonesia, Malaysia, or the Philippines is known to have such thick, long hair on its tail; however, some shrew species in Africa have very hairy tails. The scientists were also surprised to discover that this shrew climbs trees, whereas most shrews live primarily on the ground, as far as anyone knows.

The hairy-tailed shrew was found on nine mountains across Sulawesi at various elevations from 1,500 feet to 4,800 feet.

“Tropical diversity is still not well documented even for mammals with a wide distribution on this island. This discovery shows how little we still know about mammal diversity,” Esselstyn said.

The real challenge was figuring out which shrew is its closest relative and how this new species fits into the shrew family tree. Shrews’ features do not change very much over time, which means closely related species tend to look very similar and are hard to distinguish from each other. This has posed a challenge for mammalogists in the past to discover new shrew species.

“Genetic data have revolutionized what we can distinguish between shrews. A lot of species are first recognized as being genetically distinct, then we look at their morphology, or physical features,” Esselstyn said.

LSU Mourns the Loss of Two World-Renowned Physicists

By Mimi LaValle and Elsa Hahne

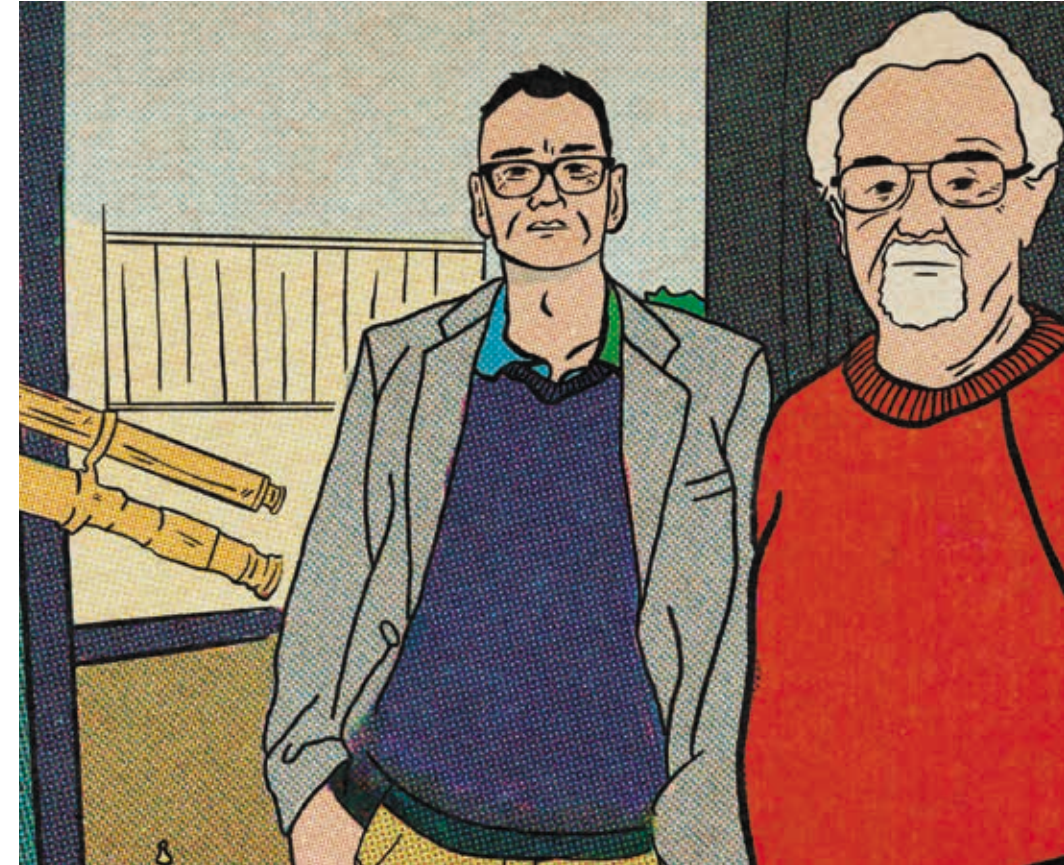
LSU Professor and Hearne Chair of Theoretical Physics Jonathan P. Dowling passed away on June 5, 2020. He was 65 years old. LSU Boyd Professor of Physics and National Academy of Sciences member E. Ward Plummer passed away on July 23, 2020. He was 79 years old. Both faculty members were internationally renowned physicists.

Dowling was an Irish-American researcher and professor of theoretical physics, known for his work on quantum technology for applications in quantum computing, quantum metrology, quantum sensing, and quantum imaging. He also was known for his playful style and witticisms in his lectures and seminars. He had an ability to light up a room with laughter, and due to this talent, he was regularly asked to deliver after-dinner talks at research conferences. He had unbounded optimism and a bright vision for the future.

“Jon was a stellar scientist, colleague, and an internationally recognized expert in his field. His work helped elevate the reputation of the Department of Physics & Astronomy at LSU as a key contributor to discoveries in quantum physics,” said Cynthia Peterson, LSU College of Science dean. “He was also an exemplary mentor, having helped guide numerous students and postdoctoral scholars as they pursued distinguished careers in academia, in the private sector, and at national research laboratories. We will miss Jon, but his contributions to our college and university will remain through his work and in the memory of his colleagues and students.”

Dowling was an illustrious scholar of the highest stature. A measure of the extensive scientific impact of his work is the high citation rate for his published articles. He published more than 200 scientific publications, amassing over 20,000 citations to date, with some papers surpassing 1,000 citations each.

His colleague, Ward Plummer, was a leading scientist in materials physics with a focus on electronic behaviors at surfaces and low dimensionality. Much of the condensed matter physics field’s current research on critical phenomena in low-dimensional systems was inspired by his discovery of charge-density waves at the metal-semiconductor interface.



Jonathan Dowling and Ward Plummer

“This is a tremendous loss for science on a global scale.”

Jeffrey C. Blackmon
Russell B. Long Professor and
LSU Department of Physics & Astronomy chair

Known for his tenacious pursuit of free and open scientific ideals, Plummer helped build collaborative research and education programs between the U.S. and international partners. In 2009, this led to the creation of a dual degree program between LSU and the Institute of Physics in Beijing, China, as well as jointly funded collaborative efforts to build state-of-the-art instrumentation to probe materials’ surface behaviors.

He was an internationally renowned researcher and educator having authored more than 400 scientific articles and mentored more than 100 graduate students and postdoctoral fellows. He accrued many awards and distinctions over his long and illustrious career including being named a fellow of the American Physical Society (1981), a recipient of a Guggenheim

Fellowship (1986), an elected member of the National Academy of Sciences (2006) and the American Academy of Arts and Sciences (2014), and a recipient of the International Science and Technology Cooperation Award, which was presented to him by China’s President Xi Jinping (2017).

“Ward was not only a visionary scientist but also a leader in fostering international collaborations and exchanges. He championed a free exchange of ideas that helped scientific discovery flourish and improved international relations. Ward recruited top talent from around the world to his research programs, and he leaves a great legacy in the careers of many outstanding young scientists that he mentored,” Blackmon said. ■



Top left to right: Dr. Philip Schauer educating high school students about obesity during a Worldwide Classroom presentation at Cleveland Clinic in 2018; at the press conference announcing his appointment as director of the new Bariatric and Metabolic Institute. Bottom left to right: Dr. Schauer with a patient from Kuwait who eventually lost more than 200 lbs. after receiving bariatric surgery at Cleveland Clinic in 2016; with trainees Dr. Charles Keith and Dr. Taher Gulamhusein; and with a patient who has maintained 100 lb.-weight loss and remission of diabetes for 10 years after receiving gastric bypass surgery performed by Dr. Schauer in 2009.

Q&A with Metabolic Surgery Pioneer Dr. Philip Schauer

By Ted Griggs

Dr. Philip Schauer helped pioneer laparoscopic bariatric surgery and built a major bariatric and metabolic surgery program at the Cleveland Clinic. Metabolic or bariatric surgery is a procedure to reduce weight and improve associated health conditions including diabetes, hypertension, and heart disease. Dr. Schauer is now a professor of metabolic surgery and the director of the Bariatric & Metabolic Institute at LSU's Pennington Biomedical Research Center.

You are known as one of the top bariatric surgeons in the world. How did you choose this specialty?

Totally accidentally and serendipitously. After completing my surgical training at the University of Texas at San Antonio, I received a fellowship in advanced laparoscopic surgery at Duke University. It was a brand-new area at the time, 1994-95. Complex procedures that had required an abdominal incision 10 inches long could now be done with 1- or 2-inch openings. Laparoscopy reduced the patients' blood loss, pain, and discomfort. It sped up recovery times, and the technique worked for many types of operations. It revolutionized surgery.

After the fellowship, I took a job at the University of Pittsburgh Medical Center. No one was doing much laparoscopic work in bariatric surgery at the time. Bariatric surgery, now referred to as metabolic surgery, is surgery to reduce weight and improve associated conditions like diabetes, hypertension, heart disease, sleep apnea, and many others. The conventional approach required opening up the entire abdomen. People spent a long time in the hospital recovering, and there were risks of complications like pneumonia, wound infections, and hernias. I realized if I could do these procedures laparoscopically, the benefits for patients would be huge. Instead of a week in the hospital, a person could leave in a few days.

So that's what I did. In 1997, I became one of the first to do weight-loss surgery laparoscopically. Dr. Alan Wittgrove from San Diego was the very first, and he guided me. Over time, I realized the procedures helped with more than weight loss. After bariatric surgery, a lot of the patients' health conditions went away. Two to three days after surgery, people with severe insulin resistance no longer needed a daily injection of insulin. Their Type 2 diabetes vanished.

I realized this was a career, and I would devote my career to unraveling the mechanisms of weight loss and of bariatric surgery's ability to cure Type 2 diabetes.

What drew you to Pennington Biomedical?

The Cleveland Clinic is an incredible clinical powerhouse, and we, including John Kirwan, who is now the executive director of Pennington Biomedical, had built a big clinical program for bariatric and metabolic procedures there. But Pennington

The Bariatric & Metabolic Institute

The Bariatric & Metabolic Institute, or BMI, is uniquely focused on the advanced treatment of obesity and diabetes. BMI is the first institute in the nation to offer an integrated and multidisciplinary approach to caring for individuals who suffer from these devastating diseases in a single facility at the world-renowned Pennington Biomedical Research Center in Baton Rouge, Louisiana.

Biomedical offers an incredible and, I would say, unmatched concentration of obesity, diabetes, and metabolism science. It was not difficult for Dr. Kirwan to convince me to come to Baton Rouge. The research here is at the core of understanding these issues with some of the best scientists in the world.

In addition, we are also at the epicenter of the obesity epidemic. Louisiana has the third-highest rate of obesity and diabetes in the country and the highest rate of severe obesity. We plan to make the Bariatric & Metabolic Institute (pbrcBMI.org) a clinical and research powerhouse that combines the resources of Pennington Biomedical, Our Lady of the Lake Regional Medical Center—one of the top hospitals in the state—and LSU's wealth of science expertise. This is a tremendous opportunity, and it seems right that solutions for obesity and diabetes should come from Louisiana.

You are a runner. Is that part of practicing what you preach?

I was an athlete in high school and college, but I didn't really keep up with it afterward. About five years ago, I got a wake-up call from my annual checkup. My cholesterol was high, my blood sugar levels were creeping up. I needed to make a change. Now, I run four to five miles a day, four to five days a week, and I really enjoy it. On the weekends, I try to get in a bike ride. In addition to the health benefits, exercise provides a lot of mental benefits. It relieves stress, helps you sleep better, and improves your mood. It also gives me the chance to catch up on my reading with audiobooks.

What are you listening to now?

Right now, *The Great Influenza* by John Barry. It's a fascinating account of the 1918 flu epidemic, which killed an estimated 700,000 Americans and 50 million worldwide. I'm on a bit of a nonfiction kick. I've also read the biography of Winston Churchill by Andrew Roberts. His life is better than fiction. You couldn't make this stuff up. And a biography of Ulysses S. Grant by Ron Chernow, totally underrated as a general and a president. He was a civil rights champion too. ■

Credit: Phil Schauer, LSU

CORONAVIRUS

LEARNING FROM DISASTER,
REINVESTING IN HUMANITY

By Ferris Wayne McDaniel



Artwork created by LSU graduate Thomas Wimberly is displayed on NYU Langone Hospital.

Credit: Thomas Wimberly

It's easy for anxiety and fear or, in some cases, disagreement to loom large over conversations regarding the coronavirus pandemic. Even as our lives return to a pale shade of normal, the future is a cause for worry. But the global health emergency also has presented an alternative narrative that offers hope and change.

Positive side effects have already emerged out of the necessity to survive, including a strengthened support for some form of universal basic income; a loosening of restrictions on gay and bisexual men donating blood due to shortages; and the New Orleans City Council unanimously approving a resolution in support of the federal Medicare for All Act of 2019 and the Health Care Emergency Guarantee Act.

In the smallest of ways, too, a new way of living has presented itself. Taking walks each afternoon to stay safely connected to the world outside my home during quarantine, I noticed people had become more eager to wave hello to a complete stranger from their driveways and porches as part of an unspoken understanding that humanity collectively is involved in a new challenge, and our response will set the tone for years to come.

PERSONAL

Since the COVID-19 virus emerged, nobody's life has gone untouched. Routines have been shattered, plans have been put on hold. Everyone was charged at the beginning with the personal responsibility to persevere for an undetermined amount of time. Most of us were pushed indoors away from the fixtures of life and left with an unfamiliar idleness.

Time became contentious: the uncertain stretch ahead seemed daunting while the abundance or sudden dearth of it forced a reprioritization of life and what fills it with purpose.

Social media feeds became flooded with photos and videos of people baking bread for the first time. Families, even under modified obligations of work and school, have spent more time with one another. With a fear of food supply shortages and an excess of time, people tried home gardening.

Heather Kirk-Ballard, assistant professor in the LSU School of Plant, Environmental, & Soil Sciences and the LSU AgCenter consumer horticulture specialist, witnessed the rise in home gardening anecdotally, through contacts with retail nurseries, and among colleagues at other land-grant universities across the country. Citing an earlier national gardening survey of 12 million participants, Kirk-Ballard said the main reason people don't usually garden is a lack of time. Since the pandemic, she and her cohort of county agents have received double or triple the number of phone calls from home gardeners.

From an environmental standpoint, Kirk-Ballard explained how growing food at home minimizes the chain of food distribution, which saves energy and reduces emissions via



Heather Kirk-Ballard

transportation and storage—speaking to the environmental crisis that persists as a backdrop to the current crisis.

Looking back at the Great Recession in the late 2000s, when people were laid off or furloughed and businesses were closing, Tracey E. Rizzuto, associate director for the LSU School of Leadership & Human Resource Development, studied the tendency for people to pursue education when economies fall into recession.

With the support of the Louisiana Board of Regents, Rizzuto found that more adult learners across Louisiana were enrolling in degree programs, and more than 80 percent reported self-fulfillment as their primary motivation.

“It was something they always wanted to do but never found the time to do it,” she said. “There was a sense of personal accomplishment. Maybe a degree they always wanted to pursue but life got in the way, and they didn't have time, but now they have the chance to reset and think: What do I want to do with my life?”



Tracey E. Rizzuto

When frustration about the pandemic sets in, Rizzuto tries to remember research done on transportation after Hurricane Sandy in New York and New Jersey, when a shutdown of the area's metro transit left several million people in Manhattan alone without their usual transportation to work.

People were forced to reconfigure how they would get to work, Rizzuto said. They created flexible schedules or worked from home, similar to what's happened with coronavirus. They organized carpools with neighbors whom they'd never met before, which saved on gas and created new bonds. Some of them realized they could easily bike or walk to work, which also served as exercise.

“What's interesting is when transit opened again, so many of those people didn't go back to subways. They didn't return to their previous routes. They had found new ways... As many things as I find frustrating now, I'm learning new things, and when life goes back to *normal*, we're hopefully smarter and wiser from it. Maybe there are things we will retain, that we found we can do better now than simply returning to our old way of doing things.”

Tracey E. Rizzuto
LSU School of Leadership and Human Resource Development
associate director

GLOBAL

According to data analysis done by Carbon Brief and the International Energy Agency, the standstill of activity due to the coronavirus crisis could trigger the largest-ever annual fall in CO₂ emissions, more than that of any previous economic crisis or even since World War II.

The International Energy Agency forecasted the CO₂ impact of the crisis, suggesting emissions could fall by 8 percent, surpassing the United Nations Environment Programme's estimate that global emissions must fall by 7.6 percent annually this decade in order to stop climate change and reverse the planet's warming.

Carbon Brief's analysis also showed the crisis cut CO₂ emissions in China by 25 percent, with emissions still below

normal even after the country emerged from lockdown. Not only has air quality improved in East Asia but reduced smog has contributed to an increase in temperature which can lead to atmospheric and weather changes.

LSU meteorologist Paul Miller describes it as akin to shining a flashlight through smoke coming from a campfire, which will diffuse the light. Similarly, soot, smog, and particulate matter diffuse the sun's rays. Without it, the sun's rays can hit Earth with greater intensity and result in higher temperatures near the surface. This has potential implications on virus transmission as some studies have shown that warmer temperatures can suppress the coronavirus.

COMMUNITY

The coronavirus pandemic has been as much of, if not more so, a community experience as a personal one.

For Tim Slack—a professor in the LSU Department of Sociology who studies social inequality processes and social stratification with an interest in community and environmental issues, along with space and place as axes of inequality—the pandemic has shown the importance of social capital and community connectivity.



Tim Slack

Social capital refers to the resources available to people through relationships with others: both strong ties (the people we know) and weak ties (the people connected to the people we know). These sorts of resources prove crucial during disasters, Slack said, since more social capital yields a stronger, unimpeded connection to physical and emotional resources in the event of a quarantine, when access to such resources becomes more difficult.

Social capital relies on relationships being secured by trust and reciprocity in the sense that if a person does their part in a community, the benefit spreads to everyone, even if the do-gooder doesn't see them directly. It's about investing in a relationship without expectations.

“We know that social capital is related to all kinds of social goods: economic well-being, social functioning, happiness, health—all of these things are supported by robust social capital. If this pandemic helps people refocus on that, refocus on how important connectivity to other folks in their lives is, that could have long-lasting implications,” Slack said.

But like any form of capital, social capital is unevenly distributed across the population. While some people have

been able to “cash in” on their social capital and remain connected during the pandemic, others have felt disconnected and isolated, Slack explained.

A disaster like the coronavirus pandemic exposes the structural unevenness, too, that exists within communities before, during, and possibly after coronavirus. But an elevated cognizance of such imbalance could lead to material change if society acts on this moment in history.

According to Slack, the comorbidities that make people more susceptible to COVID-19 aren't evenly distributed across the population. This is due to social inequality processes that have created higher rates of obesity, hypertension, diabetes, and asthma in typically less advantaged populations.

“The fact that socioeconomic sort people into different places through segregation processes means you're going to have unevenness across place in the way this virus plays out,” he said. “We've seen some of that in [Louisiana]. For example, look at how coronavirus has disproportionately impacted the African American population. There are places and spaces in which the African American population constitutes a greater share of the folks. That means communities and places are going to take a bigger hit.”



Dereck Rovaris

LSU Vice Provost for Diversity Dereck Rovaris and his cohorts on Gov. John Bel Edwards' new Health Equity Task Force are referring to the coronavirus as a triple pandemic of health, economics, and race.

As an example, Rovaris explained, “Let's say you're in the Latinx community in a low-income job, and you have no health insurance, and you're concerned about ICE or any other groups. You've got a

situation that puts people making tough decisions about what to do health-wise, race-wise, and socioeconomic-wise.”

Slack's research on the social and public impacts of the Deepwater Horizon oil spill in 2010 has shown that the more persistent, negative health outcomes came from the long-term socioeconomic impacts, such as job and income loss or working in particular occupations like the fishing industry, rather than the physical exposure to the oil spill toxins.

“The parallel for the current situation is we're going to have people who get the virus and get sick,” Slack said. “But the other thing is that the larger public health initiatives have really been related to a broad shutdown of the

American economy, so we can expect there will be health implications related to who got sick but also to who's taking a disproportionate economic hit relative to the shutdown initiatives. The past research on Deepwater Horizon suggests we should be thinking about those things.”

The people who were most economically vulnerable prior to the pandemic are going to take the worst economic hit during and after, Slack said. Even in times of economic stability, low-wage workers can't afford not to work, and during a pandemic involving a highly contagious disease, it's these same workers whose health is most at-risk. Their economic position forces them into a vulnerable position.

Rovaris gave the anecdote of individuals wanting to find out through testing whether they're positive for the coronavirus while simultaneously not wanting to find out because they can't afford to miss work for 14 days to quarantine after a positive test, so they forego testing completely. Then if that person becomes sick, their health is in a more dire condition than if they'd gone for earlier treatment.

“It's a bad situation when you're choosing between your health and your income...And sometimes it comes down to that.”

Dereck Rovaris

LSU Office of Diversity, Equity, & Inclusion vice provost

“People working jobs at the lowest economic levels are forced to be physically present while others in more privileged economic positions can choose to either not go in if they're worried about their health or to work from home,” Rovaris said.

This has spurred a necessary conversation about who are the essential workers. What the pandemic has underscored is some of the country's lowest paid employees with the most marginal benefits attached to their work are being deemed essential, which highlights a mismatch, Slack said.

He and others have posited the question: if people are essential to the economy, shouldn't their compensation reflect that instead of being at or below the poverty line in terms of standards of living and access to healthcare?

Slack believes the pandemic has presented an opening for change, whether it's a revived dialogue about labor or a renewed sense of solidarity and importance among workers or a broader recognition in society that people and their labor are more important than was once believed—or even a larger effort to gain a foothold in the economy through unionization.



Credit: LSU

PROTECTING THE PROTECTORS

By Ernie Ballard

Within the first few weeks of the pandemic, LSU launched large-scale production of personal protective equipment, or PPE, in the Pete Maravich Assembly Center, or PMAC, as part of its statewide response to support medical professionals on the front lines of the COVID-19 pandemic. The PMAC PPE production effort unified LSU's innovation, research, expertise, assets, and facilities into a single purpose-driven initiative: Protecting Louisiana's doctors and nurses through bold and creative efforts to fill shortages in critical equipment, specifically gowns and face shields.

Activating the PMAC in the very heart of campus as a medical emergency operation—as it was when LSU cared for victims of Hurricane Katrina 15 years ago—and developing a novel and safe production environment underscores LSU's complete commitment to its statewide mission.

“The entirety of the LSU family has responded to this health crisis and are making a difference for the people of Louisiana through their innovation and commitment,” said Louisiana Gov. John Bel Edwards.

LSU employees worked with physicians in New Orleans and Shreveport to develop and produce two types of critically necessary PPE: Heavy-duty, reusable gowns made from billboard vinyl donated by Lamar Advertising and Circle Graphics and face shields with donated materials and design feedback from Baker Hughes.

“At every pivotal moment in our history, the LSU community has come together for the good of our state and our nation,” said LSU Interim President Tom Galligan. “I am proud of the outstanding and innovative work being conducted by our faculty, staff, and students in the face of such great adversity.”

LSU's collective COVID-related efforts to date have been wide-ranging and extensive, including:

- Establishing coronavirus testing facilities at LSU Health Shreveport, the River Road Testing Laboratory at LSU's School of Veterinary Medicine, and LSU Health New Orleans.
- Coordinating PPE collection and donation from LSU Alexandria, LSU Eunice, and LSU Shreveport;
- Facilitating extension, outreach, and education through LSU's Pennington Biomedical Research Center and the LSU AgCenter; and
- Funding and managing rapid innovation in gown and shield PPE design, UV-based mobile sterilization technology, and large-scale hand sanitizer production in Baton Rouge.

“The low-wage service sector is disproportionately non-unionized, but there is an opportunity, I think, around this question of who is essential, potentially as an organizing tactic,” he said.

Healthcare infrastructure is also spatially uneven, being mostly located in larger metro areas, Slack explained. If coronavirus had accelerated in more isolated, rural places, the pandemic would’ve been very different since a robust healthcare infrastructure oftentimes does not exist in rural communities.

In terms of poor health, Slack explained, it’s more concentrated in the U.S. South than in other regions of the country, which makes the population in the South more vulnerable to a pandemic like coronavirus, where a significant amount of young people, for example, face health conditions that make outbreaks more dangerous for them.

According to a recent analysis from the Kaiser Family Foundation, the Deep South and mid-South form a grouping of states where young adults are at a much higher risk of serious illness if infected with coronavirus, due to pre-existing health conditions like heart disease, cancer, lung disease, and diabetes. In these states, young adults make up more than a quarter of the vulnerable population, compared to other hotspots in the country, like Washington, where young adults represent only about 19 percent of the vulnerable population.

Additionally, the states with the highest percentage of their population diagnosed with hypertension are in the South. In Louisiana alone, hypertension is related to 59 percent of

person in New York, according to the State Health Access Data Assistance Center.

Additionally, southern states have some of the lowest ratios of active physicians-to-patients in the country, and the poor, Black, Latino, or rural residents who make up large shares of southern populations tend to lack access to high-quality doctors and care.

In Louisiana, Black residents make up just under a third of the population but account for nearly half the deaths from COVID-19.

Rovaris often refers to a book titled *Blaming the Victim* when discussing health disparities, especially when people are tempted to blame poor health outcomes on sick individuals not visiting a doctor.

“It’s not as simple as that,” Rovaris said. “If I go to the doctor, as an African American, I don’t get the same care as someone else who goes at the same time with the same condition. The doctor is going to treat me differently because of my race—or because of my gender, my obesity, or some pre-existing health condition—and then when I don’t get well, you blame me? We have a system that treats patients differently based on ability to pay, color of skin, sexual orientation, and that’s real.”

Rovaris cited a former student of his, a leading physician in Chicago tasked with planning how ventilators would be prioritized in the case of a shortage. The student explained that their suggested policy of placing patients with

hypertension or pre-existing conditions or obesity lower on the priority list was inherently racist—with more than 40 percent of non-Hispanic African-Americans suffering from high blood pressure.

“Your relationship with a doctor is structural, relative to your place, your position in society, and the healthcare system,” Slack said. “Your health is relative to the conditions in your neighborhood.”

As an example, he cited the issue of stress, which tends to be higher among poor people because the curveballs of everyday life are more pronounced when a person lacks an economic cushion. Stress can then lead to additional negative health problems.

Proximity to environmental toxins is another structural and area-based health concern, he said. People who live in the shadows of chemical plants tend to have higher rates of asthma and respiratory problems.

UNITY

Leading up to the pandemic, the country had shifted towards a nationalistic sentiment based on hyper-individualism. According to Slack, part of what’s been happening in our country is rooted in less localized connectivity.

Maybe how we view our daily lives through a broad nationalistic lens is less reliable than we once believed. Maybe our scope must be readjusted to beyond ourselves while also maintaining localism.

Coronavirus may be a preview of what’s to come with the climate crisis, which remains the ultimate threat looming ahead on the horizon. The United Nations’ secretary general recently noted that the threat from coronavirus is temporary whereas the threat from heat waves, floods, and extreme storms resulting in the loss of human life will remain with us for years.

If the Cajun Navy—the informal ad-hoc volunteer group comprising private boat owners who have assisted in search and rescue efforts during Hurricane Katrina, the 2016 Louisiana floods, Hurricane Harvey, Hurricane Irma, and more—is any indication of localized communities’ strength (especially if and when government support fails), then now is the time for the development of a stronger collective identity. Not necessarily in the terms of any specific identifying trait, like a country or religion or political affiliation, but as an understanding that our lives and well-being are interconnected in profound ways.

I’ve personally seen evidence that this new line of thinking is already being accelerated, in people organizing efforts online, encouraging those who received a stimulus check but didn’t necessarily need the money to donate at least a portion—whether to a friend who lost their job or a non-profit organization feeding families, especially when school was out and children needed hot meals.

“Social divisiveness is about ‘us’ versus ‘them,’” Slack said. “Social unity is about ‘we.’ There is a potential for a greater sense of the ‘we’ and our connections to other people.”

Slack cited the Great Depression as a collective trauma that bolstered a sense of “we” over “me.” The massive economic collapse during that time was felt by virtually everyone and was responded to with a reinvestment in infrastructure through large public works projects, something for which there’s no lack of need in this country, he added.

All of this creates a greater sense of belonging in a country that has been so deeply divided. It creates empathy for people you may not have been aware of before, like the grocery store clerks and pharmacists and restaurant workers and immigrants who harvest our country’s produce and process our meats.

“From a public policy standpoint, it’s suggestive of the ability to target policy at certain groups and places because there’s more bang for your buck in doing that,” Slack said.

POLICY IN ACTION

When it comes to enacting change, Slack suggests that creating policy to meet the needs of specific groups and places is more effective, which is part of the Health Equity Task Force’s mission. Rovaris explained that the group will advise the government, particularly the state legislature, to inform policy that will not perpetuate health disparities.

The task force strives to create structures that allow people to prioritize and receive healthcare regardless of their socio-economic status, such as looking at a full restoration of policy put in place with Obamacare and Medicare reform that allowed many people to get quality healthcare for the first time ever, Rovaris said.

The group also plans to examine what Rovaris called “the educational piece,” which ultimately refers to providing everyone with quality education so they have opportunities to generationally advance their socioeconomic position.

“Having the ability to impact policy is huge,” Rovaris said. “This gets right to it. This is why I’m on this task force.”

Rizzuto shared a historical example of how targeted policy can affect change. After Hurricane Katrina, she worked closely with the Louisiana Society for the Prevention of Cruelty to Animals, or SPCA, in New Orleans, which recognized that during many rescues, people had refused to leave their homes, despite evacuation orders, because shelters wouldn’t accept their pets or livestock. By June 2006, which marked the beginning of a new hurricane season, Gov. Kathleen Blanco signed what was dubbed the “pet evacuation bill” into law, providing resources and protocols for the evacuation of pets.

“In the midst of disaster and crisis, [the SPCA] had been doing education, but it never occurred to them to be so targeted and strategic and to really tackle something of such importance. They were able to see the big picture, see a role where they had a strategic opportunity to make a change that in the end has gone on to have tremendous importance for our state. With the enactment of that bill, and during hurricanes since then, we have seen much more compliance with evacuations,” Rizzuto said.

“Social unity is about ‘we.’ There is a potential for a greater sense of the ‘we’ and our connections to other people.”

Tim Slack
LSU Department of Sociology professor

COVID-19 deaths and diabetes is a close second at nearly 37 percent.

Slack suggested the pandemic could potentially spur an evolution in conceptualizing health from people perceiving it as an individualistic matter—a person’s own body, their genetics, and their relationship with a doctor—to being perceived as a regional or at least community-based concern informed by social systems.

For example, the South is the poorest region in the country with a population more likely to suffer from chronic diseases than other Americans, yet the states of Mississippi, North Carolina, Texas, Florida, Georgia, and Louisiana spend only \$25 per person on public health a year compared to \$84 per

At LSU's Baton Rouge campus, the response to Hurricane Katrina catalyzed the establishment of the Emergency Operations Center under the leadership of former Chancellor Sean O'Keefe. He recognized the capacity for LSU to serve as a medical special needs shelter, much like how LSU converted its facilities during the coronavirus pandemic to produce personal protective equipment, or PPE, and analyze thousands of coronavirus tests.

Days before the storm's landfall, facilities around LSU were reconfigured. At first, it was estimated that about 200 people would use the medical special needs shelter. However, 10 days later, more than 15,000 people had come through campus, and within a month and a half, more than 30,000 had relied on LSU's shelter. In all, 6,000 patients were treated for acute-care trauma and dehydration at LSU's Pete Maravich Assembly Center and the Carl Maddox Fieldhouse, which made LSU the site of the largest acute-care field hospital in U.S. history.

Furthermore, the Stephenson Disaster Management Institute was also established after the storm, in 2007, by a \$25 million gift from Toni and Emmet Stephenson, business school alumni who believed much of Katrina's devastation resulted from management issues that could have been prevented if basic business principles had been applied.

Slack considers the coronavirus pandemic a technological disaster in certain regards, from a breakdown of testing capabilities to a shortage of PPE and ventilators, despite the U.S. being the wealthiest country in the world with the greatest scientific capacity and logistical through private industry and the military.

He explained that in such a technological disaster, people sometimes lose faith in the institutional actors charged with mitigating risks and protecting public well-being. Deepwater Horizon, for example, resulted in more distrust amongst local, state, and federal agencies of the oil and gas industries.

The same could happen in relation to coronavirus, Slack said, but there's also a possibility that people will recognize elements in the pandemic that have fostered trust.

He continues to say, "Trust in expertise can be positive since even before the pandemic, we were experiencing a rise, to a

certain degree, of anti-science, anti-intellectualism, and anti-expertise populism. Coronavirus could put into perspective a counterweight to that view to say, maybe if we're part of a hyper-interconnected globalized world, just shooting from the hip is maybe not what we want to do—and we don't have to."

The pandemic might also prompt people to reevaluate the importance of local and state governments, which were arguably more suited for disaster response than the federal government. The pandemic has elevated the profiles of governors and state legislators, Slack said. These were the decision-makers who had the authority to shut down and reopen, as well as provide the public with updates and information through daily press conferences, such as those held by Gov. Edwards.

All of this seems to speak to an idea that disasters engender special circumstances that allow individuals the opportunity to step outside their regular assumptions and reassess operations or priorities. Much of the discussion about coronavirus seems to center on how the illusions of societal order or the assumptions we held before the pandemic have since been shaken.

Perhaps the most obvious assumption was that we, as a technologically advanced civilization, had for the most part mastered survival over illness, that we had come further than we thought since the days of the Spanish Flu 102 years ago. But there are individual assumptions, too, that the pandemic has dissolved, like those of access to healthcare or food and sanitary products or even the internet.

The coronavirus has devastated lives around the world and will continue to do so for an uncertain amount of time, but maybe the broken parts of our system will be repaired or rejected completely as a result. Maybe instead of hurrying backward into our old normal—which no longer exists no matter how much we wish for it—we have an opportunity to re-imagine and reinvent.

This may be the moment in our modern history when we prove we are still capable of creating something better, stronger, and more equitable together, so that the next time we're faced with such a challenge—and there will always be another challenge—we confront it with unwavering grace. ■

"We have to trust in expertise because none of us have the capacity to understand the complexity of the modern world."

Tim Slack
LSU Department of Sociology professor



Credit: Thomas Wimberly

GLOBAL FOREFRONT

By Rachel Holland

LSU College of Art & Design graduate Thomas Wimberly's art work is displayed on the side of a New York City hospital. The piece, called *Global Forefront*, gives thanks to the world's essential workers during the COVID-19 pandemic.

"I'm so excited to see my work resonating at such a scale, and to be able to bring it directly to those working tirelessly was a truly humbling experience for me," Wimberly said. "I wanted to bring attention to the incredible service they are performing for the rest of us. I thought that, of course, the mask was a good place to start."

His first version, *USA Forefront*, features a woman wearing a face mask displaying the American flag. Wimberly said he used his wife as a reference for the eyes and mask.

"More than anything I used the flag simply because I could personally attest to the sacrifice and hard work people like doctors, nurses, grocery store workers, and even sanitation workers, to name a few, had been doing here," Wimberly said. "My work has had a common thread of being critical and confrontational about the country and world around me. In this case, I thought a more positive, unifying message would better serve for the respect I had for my fellow working-class Americans during this time."

When an art and design lab called Amplifier, which focuses on using art to highlight grassroots movements, contacted him, the piece changed. Wimberly has worked with this group in the past, and this time they used his *Global Forefront* art to advertise for their campaign to collect art relevant to the pandemic.

"I wanted to make something that would resonate with the world as a whole. I realized that modifying my design to be more global would serve the better good. So in the mask, I switched out the American flag for a world map. I also switched out the star in the background for a globe," Wimberly said.

That updated design was then enlarged on NYU's Langone Hospital in New York City, one of the country's hotspots for coronavirus cases.

"Amplifier teamed up with The Illuminator, a New York City group of art activists, and they projected my image, as well as other artists' work onto various hospitals and places where those working the frontlines could see it," Wimberly said.

His work typically focuses on topical and socio-political issues.

"More than anything, I just hope I can move forward and use my interest to better our society, in whatever small ways I can," Wimberly said.

After receiving his degree from LSU in 2014, he has worked at multiple Louisiana design agencies, freelanced, and more recently moved to Los Angeles to build a career as a fine artist.

Wimberly currently works as an art director for Studio Number One in Los Angeles.

"I look back [on my time] at LSU as the connecting source to some pretty pivotal moments in the foundation that would become my career and my life," Wimberly said.

Now his work is making connections to people around the world.

"Whether it be the medical staff treating those physically affected; the grocery store worker stocking shelves amidst the chaos; or even the sanitation specialists, postal service workers, and countless other professions making sure the rest of the world spins, this pandemic has shown us which societal roles are truly 'essential.' I really hope people are able to use this image as a way of spreading thanks to those individuals, while at the same time reminding us that we are unified as a planet in these chaotic and uncertain times," he said.

ALL-WOMEN VOYAGE BREAKS GENDER BARRIERS, SETS SIGHTS ON THE AMAZON RAINFOREST

By Jessica Manafi

More than a century ago, German naturalist Emilie Snethlage left her homeland to travel alone to the loosely studied terrain of Brazil's seemingly boundless Amazon rainforest.

For the first time in LSU's history, an all-female expedition team took a page from Snethlage's notes and spent several weeks surveying an unexplored area of the country's dense junglescape.



Boat the expedition team traveled on

Credit: Emilie Snethlage expedition team



Green bird flying in the Amazon Rainforest

Sneathlage's discoveries not only led to the identification of more than 60 species of birds, but her own physical pursuit of specimen samples eventually changed how museums managed their approaches to research in general. Her achievements are still impacting scientific fields today. She also was one of the first women to lead a scientific institution in Latin America as director of the Museu Paraense Emílio Goeldi in Belém, Brazil.

"In her time, she was one of the only naturalists to say, 'I want to study the specimen, but I'm also going to be the one to go out and collect them,'" said Glaucia Del-Rio, a Brazilian-born LSU ornithology PhD student who organized the trip.

The ornithologist's impenitent approach to research and unapologetic mannerisms to her male counterparts have steadily encouraged women scientists through the years to take a similar path.

"This was a time that was really difficult and really oppressive for women in general, and she broke so many barriers," said Anna Hiller, an ornithology PhD student with LSU's Museum of Natural Sciences, who also participated in the expedition. "So this trip was a particularly cool way to pay tribute to her life's work."

But even 100 years later, ornithology is a field still predominantly led by men, which is why Del-Rio said it's vital now more than ever to expel the myths that surround females in potentially treacherous expedition opportunities. The expedition team also included LSU's Jessie Salter, an ornithology doctoral student with the museum, and Marquette Mutchler, a biology undergraduate student.

"Trips like this are huge and costly endeavors, and I've always worried that my relative inexperience in the field means it's not worth taking me," Salter said. "I don't want to be the

weakest link—a feeling I think most women can relate to. But it's a catch-22 because everyone was inexperienced at one point, and you can only learn these skills by going. I hope that by participating in this trip, I can show other women and girls, like me, that they can do it, too."

The group began their journey in Carauari, a small town located in the Brazilian state of Amazonas, and departed by boat, which also served as their camp, to follow the Juruá River. They then made scheduled stops along the river bank to collect samples and identify potentially unknown species.

Of all the Amazon's major tributaries, Juruá was the only one Sneathlage never sampled. But the head of that river is home to more than 700 bird species. Even more specific to the group's research, the drainage area encompasses multiple well-documented "contact zones" where different bird species meet.

The research group documented the bird fauna from the region and collected data to understand the extent of hybridization, or the interbreeding of species, responsible for the contact zones.

Hybridization provides favorable conditions for major and rapid evolutionary stages to occur. Approximately one in 10 species is known to hybridize.

But not all birds interbreed, and the group wants to know why.

Hybrid zones are natural laboratories that help to understand how certain species are formed and maintained because if one species doesn't overcome another, that means there might be a reproductive mechanism separating them.

However, there are many bird species, especially in the tropics, that will not cross certain areas along rivers. Some have lost their ability to fly long distances, with wings shortening over time. Their biology corresponds to the biology of other small mammals, which generates a lot of genetic structure. But Del-Rio said that as the waters become narrower, bird communities will come together.

This simple act can have big impacts on current evolutionary uncertainties.

"It's a new frontier of speciation," Del-Rio said. "What are the incompatibilities in their DNA that prevent them from coming together? Do the females only choose males that look like their relatives rather than males who look similar but have different colors?"

By looking at the genomes, or the genetic material of the birds, the researchers will better understand what separates these bird species within the same family, which could ultimately show if they discovered new species, or if the Juruá River is important in generating new species or keeping them apart.



Group photo of the Emilie Sneathlage all-female expedition team



Red bird found in the Amazon Rainforest

"Representation matters...Seeing women I admire doing the kind of research I want to do and achieving the success I hope for keeps me motivated and pushing forward in my own career. My female peers and mentors at LSU have taught me how to be a better researcher, leader, and member of a supportive scientific community."

Jessie Salter
LSU Ornithology PhD candidate

After returning, the group has been processing the samples in the lab, extracting DNA, and writing a scientific article about the results of their expedition. However, due to COVID-19 restrictions, their work has been temporarily put on hold and will resume once the lab reopens.

In addition to the research, the scientists have also employed an all-female filmmaking crew to document their voyage. The documentary will showcase the difficult and remote trek through the Amazon, as well as the science behind the trip.

Beyond this attributed journey to conduct research and to raise awareness in gender equality in STEM, these women scientists have one other goal in mind: de-mystifying the uncertainties of the Amazon.

The loss of the rainforest accelerates a worldwide climate crisis by removing a large carbon sink that absorbs carbon dioxide from the atmosphere. Additionally, the rapidly occurring deforestation destroys the livelihoods of the indigenous communities.

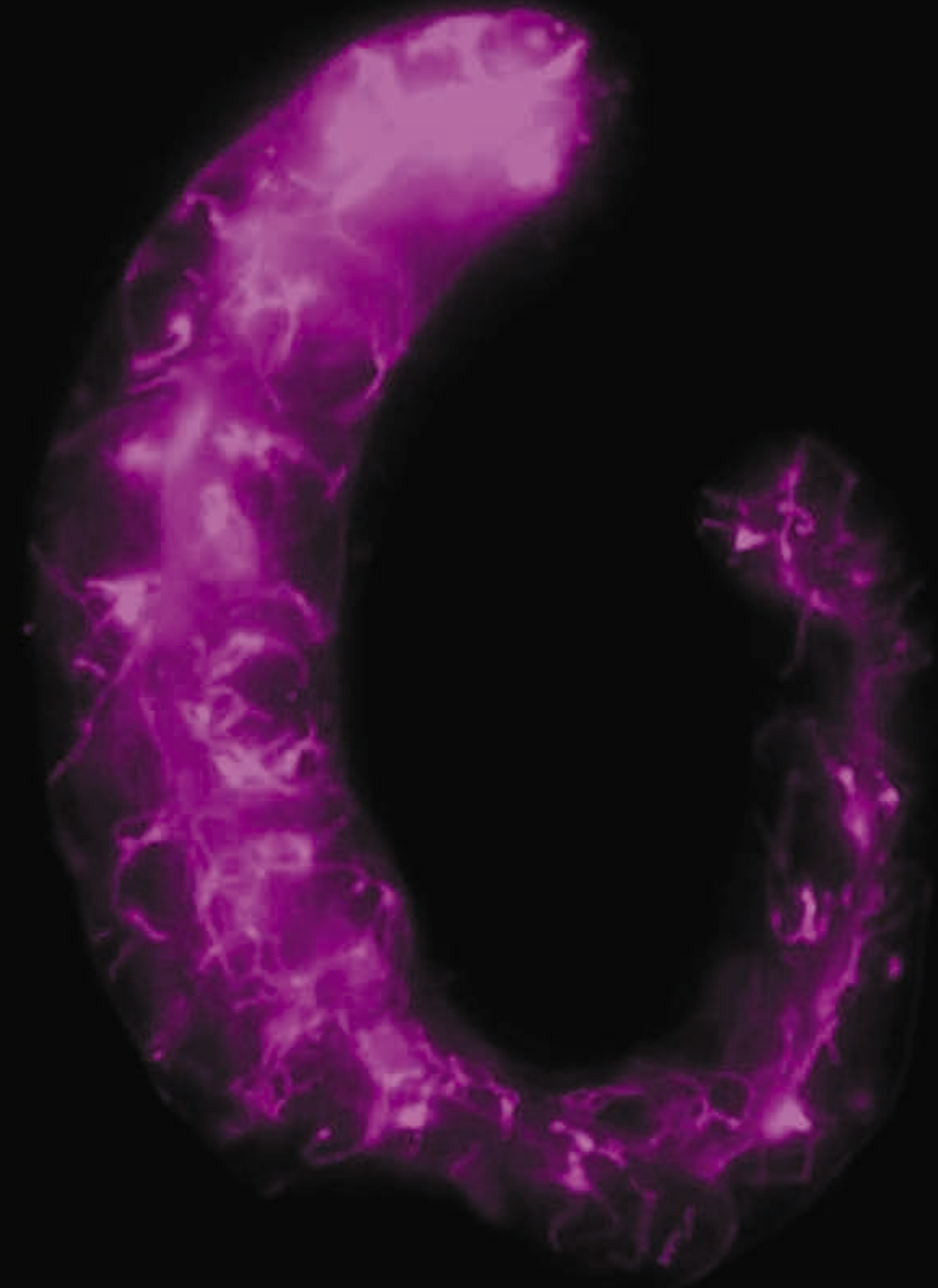
The damage to the biodiversity and degradation of one area could result in environmental insecurity for our planet's future.

"[People] fear the Amazon rather than feel a connection to it because of what they see in documentaries and movies," Del-Rio said. "It's depicted in a scary way, so we want to show that the Amazon forest is not this terrifying space. We want to show that we are trying to protect it because it deserves our protection." ■

Biology's Potential Fountain of Youth

Alyssa Johnson and Adam Bohnert, assistant professors in the LSU Department of Biological Sciences and experts in cell and molecular biology, have discovered a new class of lysosomes that they refer to as “tubular lysosomes.” This breakthrough could lead to medical therapies and treatments to slow—or even reverse—aging and disease in humans and animals. The researchers received a \$1 million grant from the W. M. Keck Foundation to advance their work.

By Elsa Hahne



Tubular lysosomes in a live worm

Credit: Alyssa Johnson and Adam Bohnert, LSU

Lysosomes are generally known as cellular “garbage dumps” or recycling stations for obsolete and undesirable materials, including bacteria and viruses. Originally discovered in 1949, lysosomes have always been drawn as homogenous, spherical vesicles, not unlike Spaghettios. Johnson and Bohnert, meanwhile, have found that lysosomes can form complex, lattice-like networks, which can greatly affect the outcome of aging, disease, and other stressors.

While Johnson mostly studies fruit flies, or *Drosophila*, and Bohnert’s focus is on worms, or *C. elegans*, they have also looked at mammalian cells. Their findings translate well between organisms. Not every tissue in every organism contains tubular lysosomes, however. Some never have them, while tubular lysosomes can be stimulated and made to grow in others. A starved worm, for example, will grow tubular lysosomes in certain cells. Not only does this help the worm survive the temporary starvation, it may also help the worm be healthier and live longer after it returns to a normal diet. And surprisingly, the worm’s progeny appears to benefit, too.

The researchers are testing whether tubular lysosomes can be passed from a parent to a child and then onto grandchildren and so on.

In the short term, the researchers’ discovery could help explain the benefits of intermittent fasting. In the long term, their work could find ways to induce tubular lysosome activity in human and animal tissues to extend health and longevity for not just one individual but multiple generations.

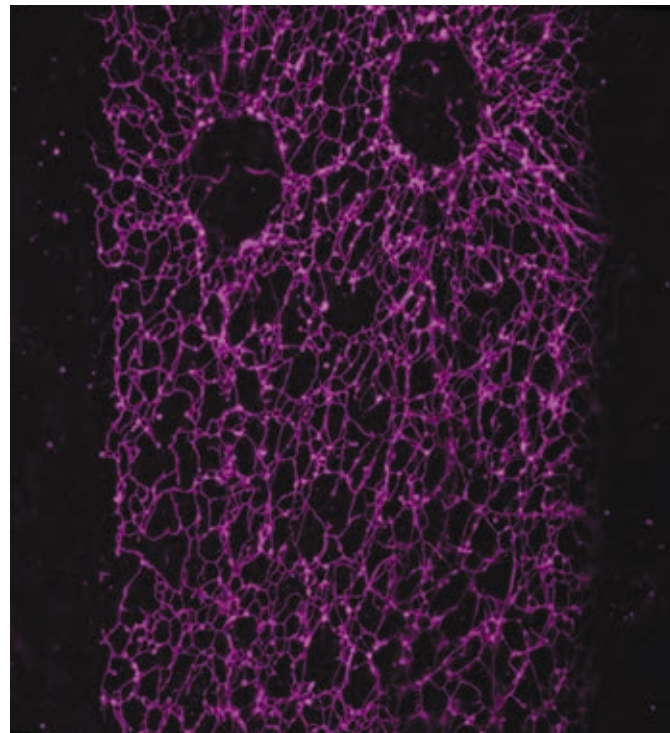
“This is a major black box in biology where we don’t have a lot of knowledge yet,” Bohnert said. “From a very basic level, we’re now redefining the landscape of what it means to be a cell. Tubular lysosomes could hint at ways to slow down the aging process, or even reverse it. This sounds like science fiction, but it could be possible.”

Johnson was the first to observe tubular lysosomes in muscle tissue in a fruit fly.

“My first thought was, ‘This is beautiful!...I had never before seen lysosomes that look like this in any cell type. At that moment, I knew in my heart that I had to study them further.’”

Alyssa Johnson

LSU Department of Biological Sciences assistant professor



Tubular lysosomes in fruit fly muscle cells

Credit: Alyssa Johnson and Adam Bohnert, LSU

“Alyssa and I complement each other because we have expertise in different model organisms: she, in flies, and I, in worms,” Bohnert said. “We’ve now developed a toolkit to go in and assess on a broad level any tubular lysosome. How does it act? How does it function? How is it built? How is it stimulated?”

So far, the researchers have identified a couple of genes that appear to control tubular lysosomes.

“One of the genes, if you over-express it, can make networks in places where there normally are no networks, and this seems to correlate with animal health,” Johnson said. “Our question is, can we introduce it in animals and tissues that don’t normally have them, to promote their health? We’re trying to understand the differences between tissues and if we can learn from one tissue to provide beneficial output for a different tissue, or the whole organism in general.”

Worms have turned out to be a near-ideal animal for the study of tubular lysosomes. Since *C. elegans* are transparent, it is easy for the researchers to watch the lattice of tubular lysosomes either grow and connect or shrink and disconnect as they look at whole, living animals under fluorescence microscopes.

The fact that the worms can be kept alive during imaging is an integral part of the discovery process. Perhaps the main reason tubular lysosomes were unknown until now is that they only can be observed in live tissue.



Credit: Alyssa Johnson and Adam Bohnert, LSU

LSU Department of Biological Sciences Assistant Professors Adam Bohnert and Alyssa Johnson have discovered a new class of cell organelles called tubular lysosomes, which could lead to medical therapies and treatments to slow aging and disease in humans and animals.

“From a very basic level, we’re now redefining the landscape of what it means to be a cell. Tubular lysosomes could hint at ways to slow down the aging process, or even reverse it. This sounds like science fiction, but it could be possible.”

Adam Bohnert

LSU Department of Biological Sciences assistant professor

“We’re really the only ones studying tubular lysosomes in the world, which puts us in a unique position to break open this field,” Johnson said. “There’s the basic, fundamental science part of our work and then the biomedically relevant part, where we use our new knowledge of lysosome biology to see how it could be used for therapeutic purposes. That’s what made it possible for us to get support from the Keck Foundation. We’ll do genome-wide screens, biochemical screens, and broad analysis of tissues. We’ll find new genetic players that regulate and control these tubular lysosomes.”

Johnson and Bohnert don’t just work together; they are married with two kids. Recently, their son was gifted a coloring



Credit: Nicolette Ross, LSU

Johnson and Bohnert share their research with students at the LSU Early Childhood Education Laboratory Preschool as part of their science outreach work.

book where he could color cells. Inside, the lysosome looked like a Spaghettio, just like in Johnson and Bohnert’s biology textbooks from college. Their ongoing research will now likely lead to revisions in both coloring books and textbooks, as it redefines our perception of life at its most basic unit—the cell.

“The differences we’ve seen in different tissues will be really important for future studies,” Johnson said. “Often, people study organelles or some function of organelles in one system or cell type and make assumptions about that organelle universally. But based on what we’ve seen, that’s really not true for the lysosome. In every tissue, lysosomes look and behave quite differently.” ■

More than 17 billion years ago, two massive black holes spiraled together and came crashing into each other to form a black hole about 142 times larger than the mass of the sun. This cataclysmic astronomical event released so much energy that reverberations from it traveled in ripples and waves throughout the universe over billions of years until on May 21, 2019, scientists at the Laser Interferometer Gravitational-Wave Observatory, or LIGO, in Livingston, Louisiana, detected it with one of the three most sensitive instruments in the world.

Discovering a Massive Black Hole Merger

LSU and LIGO Scientists Detect Another First

By Alison Lee Satake

An artist's impression of binary black holes about to collide. It is not known if there were any electromagnetic emissions associated with the gravitational wave detected on May 21, 2019.

Credit: Mark Myers, ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav)

This was the first time humans observed the formation of an intermediate mass black hole, which can range from 100 to 10,000 solar masses. Scientists have observed smaller black holes merge, which garnered the founders of the 1,000-member LIGO Scientific Collaboration the Nobel Prize in Physics in 2017. Scientists also know about supermassive black holes from observations of stars orbiting these heavy objects extremely fast at the centers of galaxies. However, this was the first confirmation that intermediate mass black holes “can form through the merger of two less massive black holes,” write the authors whose detection was published in *The Astrophysical Journal Letters*.

“In this specific event, the masses of the black holes involved were interesting. These black holes had the highest masses ever detected by our instruments,” said LSU Postdoctoral Researcher Guillermo Valdes, who works at LIGO Livingston as part of the team led by LSU Boyd Professor Gabriela González, that is constantly working to improve the sensitivity of the instrument.

While smaller black holes form from collapsing stars, scientists know larger black holes do not come directly from stars. This detection offers more information on how these large black holes form.

“With each detection, we know more about the universe,” Valdes said.

At LIGO Livingston and its identical twin observatory in Hanford, Washington, the detector has more than 10,000 channels and sensors collecting data 24/7. Some channels collect 16 samples every second while others are collecting 16,000 samples per second. The LIGO scientists have developed algorithms and other tools to analyze the massive amounts of data. For this observation of the intermediate-mass black hole formation, as in other observations, the LIGO Detector Characterization group analyzed the data from May 21 to eliminate the possibility that the detected signal had come from the instrument or an event on Earth, such as an earthquake.

“Then, the data is processed before the estimation of parameters. This process includes removing narrow spectral features that were intentionally injected to calibrate the LIGO detectors,” said Valdes, who is a member of the LIGO Detector Characterization group.



Guillermo Valdes is part of the team at LIGO Livingston that helped confirm the signal came from the merger of two massive black holes.



LSU and LIGO Postdoctoral Researcher Guillermo Valdes with the Nobel Prize in Physics.

GUILLERMO VALDES

Valdes is from Mexico and came to the U.S. to pursue his PhD. Before that, he worked as an electrical engineer at Ericsson Telecom in Mexico City and installed telecommunication networks in business and residential areas in Cabo San Lucas, Mexico.

Valdes is passionate about mentoring students, especially under-represented minorities in science, technology, engineering, and math.

“The main advice I give students is to not be scared—forget about fear—and that this is difficult. My other suggestion is to take advantage of opportunities that come to your door. And if they don’t come, go look for them,” he said.



Guillermo Valdes inside LIGO Livingston

First Detections

On September 14, 2015, LIGO detected the first-ever gravitational-wave signal coming from the coalescence of two black holes.

“It was an amazing experience. I was mainly doing detector characterization analyses, which roughly speaking means to describe the observatory’s behavior. For that particular event, I was asked to check if noise from radiofrequency modulations coincided with this gravitational-wave event. So, I learned a lot,” said Valdes, who was a physics PhD candidate working at LIGO Livingston at that momentous time.

On August 17, 2017, LIGO and the gravitational wave observatory in Italy, Virgo, observed a binary neutron star merger. Neutron stars are the smallest, densest stars known to exist and are formed when massive stars explode in supernovas. The aftermath of this merger was also seen by 70 other observatories including radio and gamma-ray telescopes. This was one of the most observed astronomical events in history.

“There was definitely a buzz in the whole building that day,” said LSU Department of Physics & Astronomy PhD candidate Corey Austin, who works at LIGO Livingston with his advisor and Observatory Head Joseph Giaime.

All in a Day’s Work

LIGO alternates between observing runs when the detectors are looking for signals from black holes and upgrade periods when the detectors are made more sensitive to gravitational waves. A typical day at LIGO Livingston during one of the upgrade periods may include Austin donning special clothes that he describes as “a big bunny suit” plus gloves and special shoes. He works inside the 4-kilometer-long L-shaped interferometers that comprise LIGO’s gravitational wave detectors. He and his colleagues fix and install equipment inside the vacuum chambers that contain the laser, mirrors, sensors, and other incredibly delicate instruments.

“It’s physically and mentally demanding,” said Austin about working on the gravitational wave detector.

Giaime chose him for this work because he needed someone with technical experience who could work with their hands. Austin had worked for eight years as an engineer in the oil and gas industry prior to pursuing a career in astrophysical instrumentation and gravitational wave science.

“As an instrument scientist, your focus is on making the instrument better all the time. So even when the instrument is observing, we’re looking at the data coming out of it to see if there is noise somewhere we don’t expect there to be,” Austin said.

On May 21, he was working on finding the source of some noise that appeared sporadically in the gravitational wave channel.

“We eventually narrowed down the source, and during a break in November 2019, we installed some parts to limit the noise. It just goes to show that even when the world’s most sensitive scientific instrument is making unique discoveries, there’s a group of people thinking about how they can make it better,” he said.

He is driven by the challenge and process of continually improving the instrument.



Credit: Corey Austin, LSU

COREY AUSTIN

Austin received his bachelor’s degree in general studies from LSU in 2005. He worked in the oil and gas industry for about eight years before returning to LSU for a graduate degree. Initially, he intended to study petroleum engineering, but he stopped by the LSU Department of Physics & Astronomy to get a form signed and was convinced to pursue a PhD in physics.

His PhD advisor is LIGO Livingston Observatory Head Joseph Giaime, who recognized Austin’s unique technical ability to work on the instrument both with his hands and computationally. Upon completion of his PhD, Austin plans to work for NASA on the space-based gravitational wave observatory, LISA.

“We are just in the beginning.”

Guillermo Valdes
Postdoctoral researcher

“Getting rid of that one little source of noise may have taken you six months to do but it’s that whole process of finding a source of noise, finding correlations with sensors, figuring out what’s causing it, coming up with something to mitigate it, installing or making a change, and then seeing that noise go away. These little victories just keep you coming back,” he said.

He recalls LIGO pioneering leader and Nobel Laureate in Physics Rai Weiss talk about what sustained his motivation over the decades of developing gravitational wave science. Weiss’ sentiment resonates with him.

“You have the pride in knowing that this is the most sensitive scientific instrument ever built by man. And anything I can do to make it better is making it better than anyone has ever done before. That’s a pretty strong motivation,” Austin said.

The Future

LIGO’s discoveries are far from over.

“We are just in the beginning,” Valdes said.

There are many astrophysical phenomena yet to be observed, such as neutron star-black hole mergers. Scientists are also working on the next generation of gravitational wave detectors like NASA’s space-based detector, LISA.

“We still need to know more about the universe. Just think of how we discovered new elements, which are now common knowledge. Those discoveries started out as projects like this,” Valdes said.

There is room for more people in the field of gravitational wave science. ■

◀ Visualization of the gravitational wave detected on May 21, 2019, or GW190521

Credit: N. Fischer, H. Pfeiffer, A. Buonanno (Max Planck Institute for Gravitational Physics), Simulating eXtreme Spacetimes (SXS) Collaboration

The Delta Breathes: Mapping Carbon Along the Muddy Mississippi Delta

By Christine Wendling



Mississippi River by New Orleans

Credit: LSU

Rivers and deltas can release significant amounts of carbon dioxide into the atmosphere, which contributes to global warming. But until recently, climate modelers have had limited information on this process. A team of LSU scientists, in collaboration with Southern University, has accepted the challenge of analyzing this complex carbon export in the largest delta in the United States—the Mississippi River Delta.

Carbon is the fourth most abundant element in the universe and the foundation for all life on our planet. It is cycled and recycled through land, sea, and atmosphere in a process scientists call carbon cycling. To many, this process might look as though the Earth is breathing. And if the Earth breathes, then surely river deltas, with their bronchial-like river branches, channels, and flow-through lakes and estuaries, are like lungs that inhale the carbon into their waters, rocks, plants, soil, and fossil fuels, and sometimes exhale it into the atmosphere—in the form of carbon dioxide, or CO₂, a greenhouse gas that contributes to global warming.

The LSU team is led by Associate Professor Zuo “George” Xue and comprises three additional faculty members from the College of the Coast & Environment: Professor Eurico D’Sa, Associate Professor Kanchan Maiti, and Associate Professor Victor Rivera-Monroy, along with several graduate students. They are tracking the carbon as it moves through the Mississippi River Delta and the Gulf of Mexico coast to see how it affects coastal water quality. In conjunction, the Southern University team—led by Zhu Hua Ning, a professor of forest ecophysiology and tree anatomy—is studying the terrestrial carbon export.

Together, the teams are exploring two contrasting sites in the Mississippi River Delta plain: Barataria Bay, whose coastline is experiencing significant subsidence and land loss, and Wax Lake Delta, a fast-growing and expanding delta. When soil from a delta submerges into the coastal ocean—due to land loss, for example—carbon is released from the soil’s organic matter. This greenhouse gas may become trapped when the aquatic environment acts as a carbon sink or is released into the air. While the Gulf of Mexico generally acts as a carbon sink, as do mid-to-high latitude oceans worldwide, the coastal zone of Louisiana can become oversaturated with CO₂, releasing carbon into the atmosphere and exacerbating climate change.

To explore how carbon is exported from delta-dominated systems to the coastal ocean, LSU and Southern, in partnership with the Louisiana Space Grant Consortium, were awarded a \$1.5 million Established Program to Stimulate Competitive Research, or EPSCoR, grant from NASA and the Louisiana Board of Regents in 2018. Now, in year two of the three-year project, they have collected hundreds of water and soil samples and completed six offshore cruises, led by Maiti, and seven wetland surveys, led by Rivera-Monroy, covering 3,200 square miles along the coastal zone of the northern Gulf of Mexico.

“This EPSCoR project is providing Louisiana with a lot of research infrastructure. For example, over the past two years, we purchased state-of-the-art carbon dioxide measuring equipment for Louisiana research, and now we have created our own cutting-edge carbon model that is specific to our own delta. With it, we will be able to answer so many questions in the future.”

Zuo “George” Xue
LSU Department of Oceanography & Coastal Sciences associate professor

“We are excited to collaborate with Southern University and promote diversity in STEM. Southern is the largest university among the Historically Black Colleges and Universities in Louisiana, and five of our six graduate students are minorities, and five are women,” Xue said. “My co-PI, Victor Rivera-Monroy, is working closely with Southern faculty and students in the field, often for their first time. He is also teaching the students how to analyze soil samples here in the College of the Coast & Environment’s wetland lab.”

This new circulation model was built to encompass the Gulf of Mexico, Barataria Bay, and Wax Lake Delta. With the data collected, they have already performed an accurate hindcast for the Gulf of Mexico covering the past three decades. Now, Xue says the next step is to incorporate climate change scenarios into the model to provide a projection of future conditions.

Soon they will have collected enough data to produce a carbon “budget” for the Mississippi River Delta by comparing sites losing land with sites building it and assessing the net



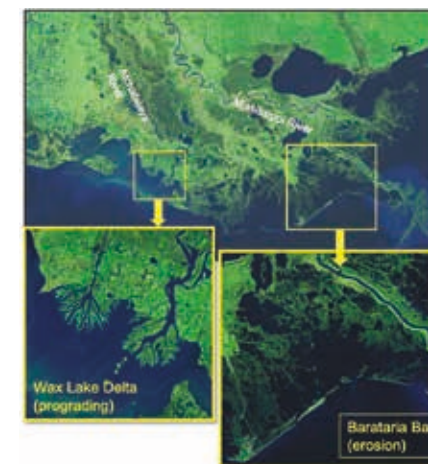
From left to right: LSU graduate student Ivan A Vargas Lopez, LSU Professor Victor Rivera-Monroy, Southern University graduate student Hande Kilic, LSU graduate student Le Zhang, and LSU Professor Zuo “George” Xue conduct wetland field work at the Wax Lake Delta.

Credit: George Xue, LSU

carbon being exported into the ocean and atmosphere. This information is especially valuable because carbon budgets apply a dollar amount to emissions that enter the atmosphere and can be used to generate tax credits for businesses, incentivizing them to reduce their carbon emissions. For example, California has an economy-wide cap-and-trade system, and the northeastern U.S. uses a carbon pricing program known as the Regional Greenhouse Gas Initiative. These incentives may one day expand into Louisiana as well. Furthermore, this

modeling platform will become part of a toolbox that can be shared freely with any scientist and adapted for use in modelling deltas and estuaries around the globe.

“I am fortunate to be leading and managing this project as it’s been a very good learning curve for me,” Xue said. “We have issues that need to be addressed—land loss and possible ocean acidification, but we don’t know about the fate of the carbon. So, that’s something that we need to know for Louisiana.” ■



“With this newly constructed model, combined with global climate model data from the United Nations’ Intergovernmental Panel on Climate Change, we can have an assessment of the carbon export for both current and future conditions. We aren’t quite there yet. But we are heading there.”

Zuo “George” Xue
LSU Department of Oceanography & Coastal Sciences associate professor

◀ Mississippi River Delta Plain showing regional study sites. Left: prograding Wax Lake Delta; Right: Barataria Bay (acute erosional process, land loss). Satellite data source: USGS Landsat.

Credit: George Xue, LSU

NEW RESEARCH HIGHLIGHTS PERSONAL STORIES, DISPARATE IMPACT OF COVID-19 ON BLACK BATON ROUGE RESIDENTS

By E Pluribus Unum staff



LSU Manship School of Mass Communication Assistant Professor David Stamps leads a study on the lived experiences of Black Americans during the COVID-19 pandemic.

Existing data demonstrates that COVID-19 impacts Black Americans at higher rates than other racial groups, but the narratives and lived experiences of Black individuals navigating society, particularly as essential workers amid COVID-19, are often absent from conversations. LSU Reilly Center for Media & Public Affairs has teamed up with former New Orleans Mayor Mitch Landrieu's E Pluribus Unum organization on new research that studies the lived experience of Black residents and essential workers throughout the Baton Rouge metro area.

Lead investigator David Stamps, an assistant professor in strategic communication and mass media at the Manship School of Mass Communication and a Reilly Center research affiliate, took a deeper look at the personal stories surrounding Baton Rouge's Black community during the coronavirus pandemic.

"The data is clear—Black Louisianans are seeing a disparate impact from the coronavirus pandemic," Stamps said. "But we hope this research will allow policymakers to better understand and engage with how communities, particularly Black essential workers, are navigating COVID-19 and tailor resources to address their needs."

Black Baton Rouge residents, similar to many other Black populations across the United States, have been hit the hardest—compared to their racial counterparts—by the pandemic. Based on this study's findings, it becomes clear that access to resources, including use of new media technologies, are crucial in supporting the community. These findings suggest that increasing digital literacy and accessibility, such as the use of debit cards, SNAP, and EBT online, and mitigating the digital divide would help support communities

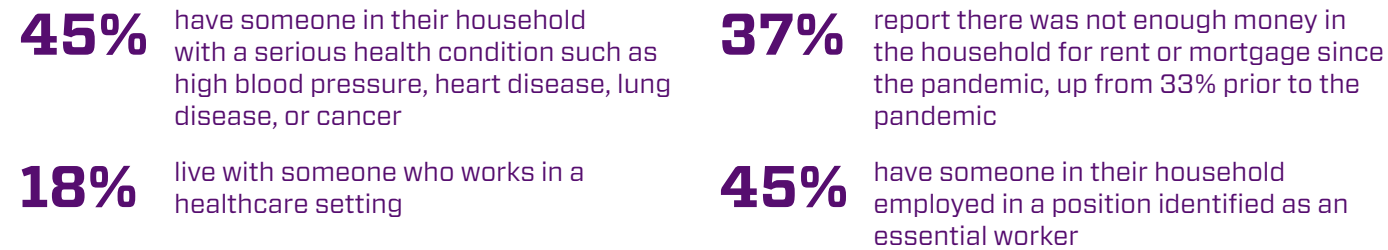
as they seek to utilize digital spaces—from shopping online and accessing telemedicine services to ordering supplies and medications. The findings also show that financial support for individuals, local small businesses, and nonprofits from family, community members, and local organizations, such as churches, has been crucial.

"We are pleased to present this narrative-forward study with LSU. It is clear we are divided by design, and these findings underscore how this COVID-19 crisis has impacted Black communities, particularly in Louisiana. Part of our work includes changing narratives so we can create a more just, inclusive, and equitable South. Lifting up the stories of these residents, many of them essential workers, is a critical part of that work," said E Pluribus Unum founder and president Mitch Landrieu.

The researchers collected data on 322 Black Baton Rouge residents ranging from 18 to 76 years of age with an average age of 35. Forty-eight percent of the study participants identified as male, 49 percent identified as female, and 3 percent did not identify a gender preference. The key findings of the study are:

BLACK BATON ROUGE RESIDENTS AT A GLANCE

HOUSEHOLD COMPOSITION



Participants noted that during the pandemic, there is increased reliance on familial and community support, primarily using technology to call, text, FaceTime, or use Zoom. This level of communication was aimed toward checking on the emotional well-being of family and community members and helping others seek vital information on navigating the pandemic, including locating resources such as masks.

FAMILY DYNAMICS AND SUPPORT



EXPRESSED COMMUNITY NEEDS



“My elderly neighbor is an EBT recipient. I try to do most of her shopping for her. But [the government] should put in the work to allow EBT recipients to use their benefits online.”

25-year-old female study respondent

Q & A WITH DAVID STAMPS

By Rachel Holland

In Baton Rouge, Manship School of Mass Communication Assistant Professor and Reilly Center Research Affiliate David Stamps is taking a closer look at how the COVID-19 pandemic is impacting Black communities.

Why did you feel called to help?

Learning of the startling disparities of COVID-19’s impact on people of color, and the primarily ignored underlying systemic issues including health and economic inequalities that those same communities face, I needed to use my resources to do something. This project, Black and Essential, was one action I could undertake to engage at this moment.

How did you use your expertise and knowledge to respond to the COVID-19 crisis?

I am conducting research and pursuing grants and partnerships that explore the impact of COVID-19 on Black communities. This work is multi-layered, but thanks to the Reilly Center for Media & Public Affairs at the Manship School, the E Pluribus Unum Fund, Blue Cross Blue Shield Baton Rouge, and Gov. John Bel Edwards’ Health Equity Task Force, I can continue these endeavors. Specifically, I can collect data that explores how Black communities are thriving amid the crisis and examine some of the complications Black individuals faced before the pandemic, which have been heightened during this crisis.

How has the pandemic affected you personally and professionally?

Honestly, the pandemic has not affected me in any extreme sense. Like many individuals, I was home with my family for months adhering to public health officials’ guidance; my children, partner, and I continued teaching and learning virtually until recently. We felt the impact of social distancing and limited connection with family and friends. However, these minor inconveniences are small compared to the 200,000+ lives lost, the small businesses that will never reopen, the joblessness resulting from the pandemic, and the disregard for individual well-being by the federal government. This project is the least I can do in knowing that private and public sector leaders and policymakers may need data to help inform choices that will aid vulnerable communities moving forward.

What are the lessons learned that you think we will take from this experience?

I am still collecting and analyzing data, as well as writing up findings for varied outlets. However, I have learned that digital media literacies are central to closing the value, economic, and knowledge gap. I firmly believe that post-COVID-19, society will hold on to practices that have become our “new normal,” including using telemedicine, shopping online, and communicating via digital platforms such as Zoom and Microsoft Teams. Everyone needs access and the skill set to navigate these platforms. My continued exploration will hopefully help contextualize the need for these tools and help identify where to target these efforts in the state of Louisiana.

About LSU’s Reilly Center for Media & Public Affairs

The LSU Manship School of Mass Communication’s Reilly Center for Media & Public Affairs is partnership-driven, action-oriented, and dedicated to exploring contemporary issues at the intersection of mass communication and public life. Its interdisciplinary approach draws together experts from diverse fields to advance research and dialogue. The intent is to inspire our communities to think deeply, take action, develop solutions, and broaden knowledge. To learn more, visit lsu.edu/reillycenter.

About E Pluribus Unum

Founded by former New Orleans Mayor Mitch Landrieu in 2018, E Pluribus Unum, or EPU, is a nonprofit, nonpartisan organization whose mission is to build a more just, equitable, and inclusive South, uprooting the barriers that have long divided the region by race and class. Incubated at Emerson Collective, EPU is focused on changing the divisive narratives that perpetuate systemic and interpersonal racism, cultivating and empowering courageous leaders who are advancing racial equity, and championing transformative policy change.

A Long Time Coming

LSU Alumna Shines New Light on Incarceration and a 20-Year-Old LSU Social Work Case

By Elsa Hahne

LSU alumna Monique Morrison has optioned both the book rights and the story rights related to a death penalty mitigation case researched by LSU Professor of Research and Director Emerita of the LSU Social Research & Evaluation Center Cecile Guin in the late 1990s. Morrison now has plans for a TV series called *The Farm* to be centered around Angola Prison, the former slave plantation turned Louisiana State Penitentiary, where Feltus Taylor spent the last nine years of his life before his execution by lethal injection.

There are two versions of this story.

In the first, a Black man named Feltus Taylor is born to a drug-addicted mother who goes to prison. He is put into foster care, suffers severe developmental delays, gets bullied and taken advantage of, commits an inexcusable and horrific act of violence, and is sentenced to death. While on death row, he writes a children's book and a manuscript about his own life to help other young men, inspires fellow inmates, and gains the support of two local churches—one Baptist, one Episcopalian—as well as lifelong friends around the world.

In the second, a Black man named Feltus Taylor is a murderer. He shot and killed the cook, Donna Ponsano, at the Cajun's Fabulous Fried Chicken restaurant on Florida Boulevard in Baton Rouge, from which he'd been recently fired. He also shot and permanently injured the manager, Keith Clark, before driving off with a few hundred dollars in cash from the register.



Feltus Taylor held by his adopted mother, Willie Mae Rowan.

► **RIGHT PAGE:** Feltus Taylor wrote prolifically while on death row and often signed his correspondence "Mr. Smile." The letter is to Mrs. Kathryn Daggett for whom Taylor's grandmother worked for many years and who knew him throughout his life.

LSU Professor of Research Cecile Guin knows that both of these versions are true. As director of the LSU Office of Social Service Research & Development (now the LSU Social Research & Evaluation Center) from 1996 to 2018, she worked on 115 death penalty mitigation cases. Guin was hired, through contracts, by the public defender's office as an independent expert to research the life histories of the accused to help explain to the juries why they did what they did, including committing murder.

"Doing forensic social work histories means developing a life story, but it's done in a manner that's objective, completely factual, and honest," Guin said. "It's not like you can take some good things and leave the bad things out. You have to pull all of the stuff into it and tell the story of how that person got to that place in their life."

For Taylor's case alone, Guin and her team tracked down and investigated hundreds of records—from schools and juvenile institutions, medical records, birth records, and court records.

LIFE & OTHER JOURNEYS

Life isn't a destination — it's a journey. We all come upon unexpected curves and turning points, mountain tops and valleys. Everything that happens to us shapes who we are becoming. And in the adventure of each day, we discover the best in ourselves.

"Death is nothing at all. I have only slipped away into the next room. I am I, and you are you. Whatever we were to each other, that we still are. Call me by my old familiar name, speak to me in the easy way which you always used. Put no difference in your tone, wear no forced air of solemnity or sorrow. Laugh as we always laughed at the little jokes we enjoyed together. Let my name be ever the household word that it always was, let it be spoken without effect, without the trace of a shadow on it. Life means all that it ever meant. It is the same as it ever was; there is unbroken continuity. Why should I be out of mind because I am out of sight? I am waiting for you, for an interval, somewhere very near, just round the corner.

All is well."


Mr. Smile

Written By,
Feltus Taylor Jr.

Dear Mrs. Daggett:

Well, this is my last letter to you. And I wanted you to hear from me, because by the time that you get this letter I will be dead. But please don't worry or feel sorry for me. Because now I am at rest & peace. My spirit will be able to fly away from this hell hole that I have put myself in. I know that you care for me, and have always cared for me even if I was into something or not. And I really love you for that, my friend. You have known me all of my life, and you have always cared for Mama Heavetta as long as I can remember.

She and Jane Smith, an LSU colleague with whom she'd graduated in 1978—both with Master of Social Work degrees from LSU—interviewed family members and spent hundreds of hours with Feltus Taylor while he was on death row at Louisiana State Penitentiary, the only maximum-security prison in the state, also known as Angola. On a weekly basis and for years, Taylor would mail handwritten letters to Guin's office where student workers would type them up and add the hard copies to an increasingly thick binder. Eventually, Guin and Taylor's legal team helped create a foundation just to safeguard his intellectual property.

Then, at 39 years old in the summer of 2000, Taylor was executed by lethal injection. His lawyer and spiritual advisor were in the room with him, while Guin stayed outside.

"I didn't want to go to Feltus's execution," Guin remembered. "I didn't want to see him die. And it worked out in a way, because when you witness an execution, you have to go into the room early, well ahead of time, while I was able to sit outside with him until the moment he walked in."

Guin can recount many "strange stories," as she calls them, about Taylor's faith and impact on others while on death row. Guin's own sister corresponded with Taylor and adopted his younger next-cell neighbor, Jimmy Williams, who'd been 16 or 17 when he was convicted and never went to high school. Today, Williams is no longer on death row and plans to pursue a master's degree in divinity. Taylor also, after his death, willed his personal, "beautiful" Bible—originally a gift from his second spiritual advisor, Charles deGravelles—to Guin's sister. And one of Taylor's first defense lawyers, Bonnie Jackson, who is a District Court Judge in East Baton Rouge Parish, gave the eulogy for his funeral.

Taylor's first spiritual advisor on death row was Sister Helen Prejean from Baton Rouge, who wrote the book *Dead Man Walking* in 1993 (leading to the 1995 film starring Sean Penn and Susan Sarandon). She is a leading American advocate for the abolition of the death penalty. Faith was a big part of Taylor's life as well as writing in prison. Guin eventually hired an LSU graduate student, now author, Ronlyn Domingue to help shape his manuscript and ensure he shared all aspects of his story.



Credit: Cecile Guin, LSU

LSU Professor of Research Cecile Guin (center) coordinated with a team to support Feltus Taylor (second from right) while he was on death row. The team also included his lawyer Jean Faria (left), his spiritual advisor Charles deGravelles (second from left), and medical social worker Jane Smith (right).

"Feltus wrote prolifically, but when he talked about the murder, it was brief," Guin recalled. "So, Ronlyn had to push him a little...she had to have a lot of difficult conversations with him, about the things that really changed his life."

Over time, Guin built a complex theoretical framework around the different pathways that can affect how not just Taylor but anyone might go through life—physical factors, mental factors, environment, substance abuse, family background, social connections, money, education, and so on.

"Working on these death penalty cases was great training for the social workers at LSU," Guin said. "You can learn an awful lot about humanity and grace—and about racism, for sure, discrimination [and] poverty. I don't think anyone who worked on Feltus's case wasn't a changed person from the experience."

"But it's a difficult field," she continued. "Because in about 80 percent of the cases, you find out that these are good people who did bad things—people who could have been saved somewhere along the way—and the crime came down to circumstances."

Guin wrote her doctoral dissertation on pathways to crime, following 832 young men who left the Louisiana juvenile justice system to see where they ended up 12 years later. About 85 percent of them were Black, although Black people in Louisiana comprise about one-third of Louisiana's population. She could only locate about 750 of the young men, who by that time were adults, but among them, at least 90 percent were in the adult justice system, either on probation or in prison. For someone looking to find ways to keep people out of the "school-to-prison pipeline" and pinpoint factors that could help predict who would go on to adult jail and who wouldn't, Guin's findings were less than encouraging. Later on, she was asked by the Louisiana legislature to research why kids end up in the juvenile justice system in the first place and if there was one thing they could do to help.

"I thought, 'One thing...,'" Guin recalls. "But what all the records we had pointed to, since a big part of my work at LSU dealt with pathways to crime and delinquency, was making sure kids stay in school. Keeping kids in school and away from truancy

was the number-one action we recommended, and our Truancy Assessment and Service Center, or TASC, project at LSU grew from that. If you could only do one thing and there's not a lot of money, that was it. We started with programs in Caddo Parish and Jefferson Parish that showed that the minute a child missed school, if you had a truancy program in place that did not wait six weeks to intervene, children could avoid the trajectory into crime. Something like 90 percent of the children went back to school and stayed in school."

The TASC program would later expand to roughly two-thirds of the public schools in the state over a period of 13 years—involving about 80,000 elementary school children—before the state ended funding for the program in 2014.

On the flip side, Guin also did assessments of how much it cost the state over time to put kids into foster care and group homes, the juvenile justice system, then the adult prison system, and—for some—on death penalty trial. While it made sense for those things to cost a whole lot, it was difficult for Guin to not compare those figures with the much lower amount needed to run the state-wide TASC program, especially since her research had shown that an effective truancy program could disrupt the school-to-prison pipeline altogether.

To this day, Taylor was the only person whose death penalty mitigation case Guin worked on, who was executed. After his death, Guin continued to collect his records, receiving previous correspondence from many of his pen pals around the world.

"You just can't believe the letters," she said.

Once Taylor's manuscript was finalized, with a preface by Sister Prejean, Guin expected a sense of relief that never came. Instead, the book project "drove us crazy."

"For years, I'd wake up in the middle of the night, thinking, 'I've got to get something done with this book,'" Guin said. "It's a big responsibility, making a commitment to someone to get their story told and then constantly holding it on the back burner. The book market was saturated after *Dead Man Walking*. We didn't know what to do. Also, it took years before I had anything close to a healthy psychological response to Feltus's death."



LSU alumna Monique Morrison lives in California and works in the film and television industry. She never met Feltus Taylor before he was executed, but has been trying to tell his story for nearly 20 years.

Credit: Monique Morrison

In 2001, a bright-eyed student named Monique Morrison, who was working toward her bachelor's degree in mass communication—broadcast journalism—while minoring in theater and business administration, walked into Guin's office at LSU. She'd never heard of Feltus Taylor. Like other student workers, she mostly answered the phones, made copies, and filed documents, but also ended up working with Guin on several complex research presentations, impressing Guin with her energy and creative knack for visual communication and storytelling. Just weeks before Morrison was about to graduate from LSU in 2003, Guin handed her a thick binder and said, "I know you are moving to Los Angeles to pursue a career in the

entertainment industry. This is the story of a very dear client of mine. Whatever you can do to tell his story, it's yours."

Morrison was surprised. She understood Guin was handing her something important but didn't know what to do with it at the time—she was moving to California to become an actress.

"I didn't have much experience in the world of developing a story into a film or TV project at that time," Morrison recalls. "My main focus was on my acting career."

Over the next couple of years, Guin would receive short clips of Morrison being chased by monsters, Morrison running down dark alleys, or Morrison screaming in fear.

"To tell you the truth, I didn't even really look at it right away," Morrison said. "I took the binder with me to California and kept it under my bed in my tiny, little studio apartment. Then one day, and I remember this so well, I felt a sort of nudge to pull it out. When I started reading it, I got chills all over my body and thought to myself, 'What is this?!'"

Then, when the film and television writers' strike happened in 2007, Morrison saw it as an opportunity to take a break from acting and focus full-time on Taylor's story.

Like Guin, Morrison had no idea at first what to do with Taylor's life story. But she felt responsible for telling it, to "carry the torch," which led her toward screenwriting and producing. It took her more than a decade to secure both the book rights, which are co-owned by LSU and the Feltus Taylor Foundation, and the story rights, which are owned by the Feltus Taylor Foundation, since it wasn't clear if any of Taylor's adopted or biological relatives could claim ownership.

“I had to track down his birth mother, who was in prison,” Morrison said. “I had to hire a PI. I had to go through all of the details of who might be entitled to these rights. Finally, with the help of LSU, we did it. My alma mater helped me get the rights secured.”

Over the years, Morrison changed and so did the world around her. Her perspective on Taylor’s story changed, too.

“There have been so many times where I’ve hit a wall and didn’t know how I was going to keep this project going, but somehow and some way, a door would open,” she said.

Thank you for your friendship to me over the years. And thanks for always showing me God's love that is in your heart for people.

Today, with the momentum of the Black Lives Matter movement, Morrison sees how a project that’s been “a long time coming” might finally be ready to reach new and wider audiences. Struggling to tell Taylor’s story in under two hours, she abandoned the idea of making a movie. Instead, she’s working on a TV series about Angola Prison called *The Farm*, where Taylor’s saga will be the first season.

“In the current context, Feltus’s story has become so much bigger,” Morrison said. “Now more than ever, I want to tell this story, which is unique to Louisiana but so much also the story of America. The tagline for *The Farm* is ‘the last place you’ll ever live,’ because once you’re sentenced to Angola, you’re there as a lifer or on death row. You’re serving out a life sentence. Entering those gates, you know—this is your life now.”

Morrison also has a unique “inside” perspective on the prison. She went to college with former warden Burl Cain’s son, Marshall Arbuthnot Cain, who works for the Farm Bureau in Baton Rouge. He invited her out on a few occasions to spend time on “the farm” and witness the famous annual prison rodeo.

Before Angola was a prison, it was a slave plantation—thus the show’s name. Over the years, the story passed down was that the slaves were from Angola in southern Africa, although most of the slaves that came to Louisiana early on actually came from West Africa.

“The history is insane,” Morrison said. “It’s a farming community that’s a prison. It’s its own self-sustaining place—it has its own zip code, its own radio station, its own newspaper. It’s a world inside our world.”

“Some definitely would look at it and think, ‘This very much still looks like a slave plantation,’” she continued. “It rolls into the history. The majority of the inmates are Black, and the prison tells the story of Black American history and racial oppression in the United States. Here it is. You can’t make it up. Just look.”

Sometimes people wonder why Morrison has spent almost 20 years developing a project about a killer.

“Nobody’s arguing Feltus’s crime—he committed the crime,” Morrison said. “The moment he pulled that trigger, he became

a murderer. He never denied that. But good people do bad things. As human beings, we have the opportunity to change and make wrongs a right, but not all of us, not in this system that we currently have in play. One of the questions I keep coming back to is, does the worst thing you’ve ever done define who you are? That’s something we should really ponder and think about before we’re so quick to point the finger. Nothing’s really black and white. There’s lots of gray, and the more you know about a person, the harder it becomes to judge. Only once you walk the path someone else has traveled and lived their sorrows, doubts, fear, and pain can you start to understand. I have such strong feelings about Feltus and what happened to him, and I never even met the man.”

When Morrison was back in Baton Rouge to see her family recently, she also visited Guin. They keep in touch. For Guin, it’s a relief that Taylor’s story is finally getting the attention it deserves.

“Feltus gave me hope, and it’s good to be reminded of that,” Guin said. “To think that someone with Feltus’s background could be restored is just amazing. He was a remarkable human being. A person can turn around and be the best they can be—maybe the best anybody can be—what we all aspire to. Feltus helped me mature, he pushed me to continue my doctoral research on pathways into crime, and that also gave me respite. I needed proper boundaries, and Feltus helped me deal with some of the problems I’d had separating the sadness I felt with some clients through the years with the need to empower them. He made my work more bearable. After Feltus, I felt there was nothing else in life that could go wrong that I wouldn’t be able to handle.” ■

A Library of 11,000 Microbes

By Elisa Hahne



LSU has licensed access to a vast library of bioremediation microbes to the national environmental services firm Cameron-Cole LLC. LSU Environmental Sciences Professor Emeritus Ralph Portier developed the library at LSU over the nearly 40 years in which he has helped private companies as well as local, state, and federal government organizations mitigate a wide range of environmental hazards in the U.S. and across the globe.

Cameron-Cole LLC has previously been working with LSU scientists on specific projects for multiple clients in the manufacturing, petrochemical, construction, waste management, and military industries for over a decade. Much of that work has been sourced from Portier's 11,000-organism-strong bioremediation library. Now, Cameron-Cole will have a valuable resource at its fingertips to help its own clients.

Microbes can be used to break down dangerous chemicals and pollutants, including fuels, plastics, herbicides, and pesticides. For most of his career, Portier—an expert on ecotoxicology and bioremediation—designed custom bioreactors to do just that, ranging in size from something close to an ink pen to tanks as tall as four-story buildings. Bioreactors, or microbial habitats, are filled with bio-beads covered with specific microorganisms, and the round shape of the bio-beads allows for some empty space in between them. Next, polluted water is pumped in and the microbes get to work degrading and breaking down the contaminants. Only certain microorganisms can break down certain chemical compounds. Over the years, Portier and his LSU team identified new microbes and figured out which would be the best match to also keep each bioreactor more or less self-sustaining over time. In some cases, Portier and his team would chain different bioreactors together to perform complex remediation tasks more efficiently.

“Microbes are lazy,” Portier said. “They chew up the easy stuff first. The reason you don’t find sucrose or glucose loose on the planet is because microbes have eaten it. When you design a bioreactor, you have to make sure the system doesn’t lose its genetic signature because you gave them something too easy to eat. If there are complicated compounds to break down, you might have to chain bioreactors together so the microbes in the last one don’t have the choice to derive energy from simpler sources. If you can figure that out, the only question that remains is how long and how fast you can pump the water through.”

The best possible outcome from each system would be polluted water going in and clean water going out, along with carbon dioxide and some harmless biomass. The better the match, the cleaner the water. But Portier did not only work on wastewater and ground water, he worked on soil and sediments, too, helping companies in Louisiana and throughout the world conduct business more sustainably and avoid potentially bad reputations and costly fines.

“As companies want to be green and pro-environmental, you have to remember there’s another green involved here too, and that’s money,” Portier said. “There is a huge business incentive to this as well, because a good environmental policy is a good economic policy. It costs a lot of money to be in violation of the federal guidelines, and companies can’t afford to lose their permits.”

“Also, a lot of these large industrial and chemical plants that we have down here in Louisiana bring great value to our state,” Portier said. “Jobs are important, and if we can help some of these companies solve possible environmental problems so they can stay here and expand, that’s great for Louisiana. Plus, they hire my students!”



Researchers in this lab at LSU have developed custom microbial habitats, or bioreactors, that are used to break down dangerous pollutants in the environment.

In his work at LSU, Portier helped shape policies and processes for the Environmental Protection Agency, or EPA. To date, some 265 sites across the country and 12 international sites have been successfully remediated using LSU biotechnology patents and intellectual property developed by Portier. Some of the projects he’s been involved in include the cleanup of an oil refinery in Ascension Parish; a creosote wood treatment factory in Baldwin, Florida; an army ammunition plant in Karnack, Texas; and a wool scouring mill in Yorkshire, England.

With the licensing of Portier’s technology to Cameron-Cole and potentially other industry partners, LSU is able to share knowledge that was primarily developed in university labs to have a greater impact everywhere.

“This agreement will enable us to work even more closely with LSU’s core resources to expand our bioremediation capabilities,” said Tim Hobbs, Cameron-Cole’s COO and principal hydrogeologist. “These microorganisms have proven to be effective on hydrocarbon fuels, chlorinated hydrocarbons, and pesticides or herbicides, transforming them into harmless compounds.”

Cameron-Cole President Jerome Edwards remarked on the value of his company’s long-term collaboration with LSU and continued access to university research expertise in microbiology.



Pseudomonas aeruginosa and *Enterococcus faecalis* on tryptic soy agar are some of the microorganisms in LSU’s microbial library.

“It has been inspiring to work with Professor Portier,” Edwards said. “His creative problem-solving is contagious and has led our consulting professionals to identify opportunities for LSU’s team to develop new approaches to previously unsolvable situations. We knew we had done our job well when he would say, ‘Why don’t you bring me an easy contaminant sometime and not all of these difficult ones?’”

“It’s a good legacy to have...To have gone places and left them in a better shape than how you found them.”

Ralph Portier
LSU Department of Environmental Sciences professor emeritus

One can think of Portier’s library as a collection of microorganisms and preferred recipes Cameron-Cole can use to design unique microbial communities to help their clients manage industrial and petrochemical waste before it becomes “pollution.”

“For implementation, university researchers, like me, need companies like Cameron-Cole,” Portier said. “[In] our work at LSU, we would make an initial evaluation, develop a work plan, conduct a lab feasibility study, then a field pilot, and finally do a field implementation. Most of our work was in coming up with the know-how and figuring out solutions, doing pilot studies showing how bioremediation can be done. For wide-scale implementation, however, universities must partner with industry and government. We can show them how to do it and that it can be done, but they have to take the lead with the technology.”

The licensing of Portier’s library fits well into LSU’s overall mission to share knowledge and resources developed at the university with private industry as well as the general public.

“Portier has made foundational contributions to bioremediation research at LSU, in Louisiana, and across the nation for nearly four decades,” said Vice President of Research & Economic Development Samuel Bentley. “We are grateful for his leadership in this field and proud of the worldwide impact of his work.”

Portier emphasized that bioremediation is good business and an easy “sell” for most private companies.

“Bioremediation is an attractive approach because you’re using a decomposer and the natural carbon cycle to clean something up,” Portier said. “Hazardous waste is just carbon in the wrong form and in the wrong place. Some things that are problems in one place can be solutions in another.”

During his career, Portier helped remediate several so-called Superfund sites as well as Resource Conservation and Recovery Act sites, which are designated by the EPA as toxic and in need of cleanup. In Devil’s Swamp, miles north of Baton Rouge, Portier found a microbe in the soil that turned

out to be so useful for breaking down chlorinated phenolics and chlorinated benzenes, which are common in herbicides and pesticides and ubiquitously found in ground water, that he named it LSU-101. He later used it in the design of several bioreactors and other remediation projects.

“Based on field samples, we’ve been able to create custom solutions in the lab, including for the same contaminant in different areas,” Portier said. “If we had pesticides running off a sugarcane field in St. James Parish and the chemicals made it all the way to Grand Isle, we could simulate both scenarios in the lab with different groups of organisms and figure out how to help in both places.”

“It’s a good legacy to have,” he said. “To have gone places and left them in a better shape than how you found them.” ■



LSU Department of Sociology Associate Professor and Rainmaker Matthew Valasik led a study that shows a statistical connection between homicide, blighted buildings, and convenience stores in Baton Rouge.

Credit: LSU

RAINMAKERS

As a top-tier research institution, LSU’s research faculty are proven leaders in their fields, performing at truly outstanding levels each day. LSU’s Office of Research & Economic Development, with the support of Campus Federal Credit Union, takes the opportunity each year to acknowledge some of our many outstanding faculty with the Rainmaker Awards, recognizing sustained excellence in research, scholarship, and creative activity.

Faculty members chosen as Rainmakers are those who balance their responsibilities in the classroom with securing external funding for their research and broadly disseminating their findings to not only the scholarly community but to society as a whole. They are exemplary representatives of LSU, who garner both national and international recognition for their innovative research and creative scholarship, while also competing for external funding at the highest levels and attracting and mentoring exceptional graduate students.

Each of the following award-winning faculty members has met one or more of the criteria for high-quality research or creative activities and scholarship, which include but are not

limited, to publication in a high-impact journal(s); highly cited work; external awards; invited presentations at national and international meetings; high journal publication productivity; critically acclaimed book publication(s), performance(s), exhibit(s), or theatrical production(s); high grant productivity; and, for more senior candidates, outstanding citation records and high-impact invited presentations at national and international meetings. Two awards are granted at each career level including the Emerging Scholar, Mid-Career Scholar, and Senior Scholar levels.

All Rainmaker recipients receive a one-time stipend of \$1,000 and a plaque in recognition of their achievements.

Emerging Scholar

Arts, Humanities, Social & Behavioral Science

Matthew Valasik, Department of Sociology, College of Humanities & Social Sciences

Assistant Professor Matthew Valasik joined the LSU Department of Sociology in 2014 after completing his PhD in criminology, law, and society from the University of California, Irvine. His interdisciplinary training has informed his interest in applied research at the intersection of geography, place, and theory to better understand the community context of crime, focusing particularly on gangs and problem-oriented policing strategies. His research is primarily quantitative in nature, routinely using social network analysis and spatial methods to analyze either primary or secondary data.

His research also includes investigating the impact an abatement of a Los Angeles Police Department gang unit has had on an officer’s ability to gather gang intelligence and arrest gang members; exploring if predictive policing tactics lead to racially biased arrests; using risk terrain modeling to forecast gang violence; analyzing the temporal and spatial relationship between gang violence and the structural characteristics of a neighborhood; comparing and contrasting the attributes of deviant groups, such as ISIS, skinheads, “alt-right,” and white power groups, to conventional street gangs; assessing the role of intergenerational closure and collective efficacy on juvenile delinquency; and examining the changes in concentrated poverty in rural America.

Science, Technology, Engineering & Mathematics

Weiwei Xie, Department of Chemistry, College of Science



Credit: LSU

Assistant Professor Weiwei Xie researches non-molecular inorganic materials involving nearly the whole periodic table and diverse theories and methods to design, predict, and synthesize new materials. She is also an emerging leader in the design and discovery of quantum materials at LSU.

Xie obtained her bachelor’s degree from Nankai University in China and her PhD from Iowa State University. She conducted postdoctoral research at Princeton University and she received the Beckman Young Investigator award in 2018. She is one of 20 inorganic chemistry professors in the U.S. to be selected for the first cohort of Virtual Inorganic Pedagogical Electronic Resource, or VIPER, Fellows. As a fellow, she will work to improve undergraduate education in science, technology, engineering, and math, or STEM, in the U.S. with support from the National Science Foundation’s Improving Undergraduate

STEM Education program. Recently, she received a five-year Faculty Early Career Development, or CAREER, award from the National Science Foundation for her work on new superconductors.

Mid-Career Scholar

Arts, Humanities, Social & Behavioral Science

Raymond Pingree, Manship School of Mass Communication

The Doris Westmoreland Darden Professor and Associate Professor Raymond Pingree is a quantitative communication researcher and a former professional software engineer. He received his PhD in mass communication from the University of Wisconsin–Madison. He was an assistant professor at The Ohio State University before joining the LSU faculty in 2013.



Credit: LSU

His research interests include news media effects, media trust, agenda setting, game framing, and fact checking. His research aims to inform journalists as well as their audience about how they could make more of a difference in helping society better prioritize problems, create a shared understanding of important facts across lines of political difference, and focus the national debate on substance instead of treating politics as a sport.

Science, Technology, Engineering & Mathematics

Michal Brylinski, Department of Biological Sciences, College of Science and Center for Computation & Technology



Credit: LSU

Associate Professor Michael Brylinski’s research focus is on the design and development of novel tools for the modeling and analysis of biological networks. His field of computational systems biology can be considered a complex platform that integrates many algorithms from different research areas such as structural bioinformatics, functional genomics, cheminformatics, and pharmacogenomics. He applies various tools to study the evolution and organization of pathways into biological networks with the primary application in modern drug discovery and design.

He has combined his training as a pharmacist and as a researcher as part of the interdisciplinary LSU team that competed for the IBM Watson AI XPRIZE to use artificial intelligence, or AI, to advance new drug discovery. Brylinski received his PhD from Jagiellonian University in Krakow, Poland, and conducted postdoctoral research at Georgia Tech before joining the faculty at LSU in 2012.

Senior Scholar

Arts, Humanities, Social & Behavioral Science

Jinx Coleman Broussard, Manship School of Mass Communication

The Bart R. Swanson Endowed Memorial Professor at LSU Jinx Coleman Broussard teaches public relations, strategic communications, media history, and mass media theory. The public relations campaigns her students have produced have won two first-place and one second-place national awards since 2014. Her research interests include the Black press, representations of racial and ethnic minorities, media history, alternative media, crisis communication, public relations strategies and tactics, and the civil rights movement. These interests date back to her PhD dissertation, “Lifting the Veil on Obscurity: Four Pioneering Black Women Journalists: 1890-1950” and subsequent book on these women. Broussard is also the author of the national award-winning book, *African American Foreign Correspondents: A History*. Her most recent book, *Public Relations and Journalism in Times of Crisis: A Symbiotic Partnership*, was published last year.

As a public relations professional, she was the director of public information for the city of New Orleans and simultaneously served as press secretary to Mayor Sidney J. Barthelemy in New Orleans for nearly eight years.



Jinx Coleman Broussard teaching LSU Manship School of Mass Communication students.

Science, Technology, Engineering & Mathematics

Samithamby “Jey” Jeyaseelan, Department of Pathobiological Sciences, School of Veterinary Medicine

Samithamby Jeyaseelan “Jey” is the Dr. William L. Jenkins Endowed Professor in the Department of Pathobiological Sciences. He is the director and principal investigator of the National Institutes of Health-funded Center for Lung Biology and Disease through a \$11.6 million grant from the Centers of Biomedical Research Excellence. His research aims to understand the immunological mechanisms responsible for neutrophil recruitment, priming, and activation in infected lungs, smoke-exposed lungs, and extrapulmonary organs followed by infection. His work is supported primarily by federal funding and has both basic science and translational applications. He has more than 50 peer-reviewed articles and 14 editorials and commentaries on various topics ranging from infectious to cigarette smoke-induced diseases. He received the Pfizer Award for Research Excellence in 2011 and Distinguished Faculty Scholar Award in 2013 from the LSU School of Veterinary Medicine. He is the organizer of the annual Louisiana Lung Conference and was the immediate past president of the Phi Zeta Tau Chapter, the only honor society of veterinary medicine in Louisiana.

He earned his veterinary and master’s degrees from the University of Peradeniya in Sri Lanka in 1992 and 1996 and his PhD from the University of Minnesota in 2001. He was a James Hudson Brown - Alexander Brown Coxe Postdoctoral Fellow in Pulmonary Immunology at Yale University School of Medicine using *Legionella pneumophila* as a model pathogen to understand innate immune mechanisms. He was then a postdoctoral scholar at National Jewish Health, where his research focused on immune responses in the lungs and extrapulmonary organs to infectious agents. He joined LSU in 2007 as an assistant professor and became a full professor in 2013. ■



Credit: LSU

ACCOLADES



Michael Khonsari, the Dow Chemical endowed chair in rotating machinery in the LSU Department of Mechanical Engineering, is the project director for the Louisiana Materials Design Alliance.

Credit: LSU

Louisiana Engineers and Scientists Awarded \$20M in Federal Funding to Find and Test the Best 3-D Printing Materials

LSU is leading an innovative \$20 million project that will introduce new technologies and materials to boost a range of manufacturing industries, with federal support from the National Science Foundation, or NSF.

3-D printing technology holds the potential to reinvent the manufacturing industry, but the materials currently available do not meet the needs for structural safety and integrity. To solve this, LSU scientists and engineers, along with collaborators throughout the state, will be discovering and testing the composition, processing, microstructure, performance, and structural integrity of materials that can be used in advanced 3-D printing.

“This game-changing work is at the frontiers of science, engineering, and education. We are committed to connecting our research discoveries to industry, so they can have real-world impacts,” said Michael Khonsari, the Dow Chemical endowed chair in rotating machinery in the LSU Department of Mechanical Engineering, who is the project director for the newly established Louisiana Materials Design Alliance, or LAMDA, in his capacity as associate commissioner for research at the Louisiana Board of Regents.

LAMDA is composed of scientists and engineers at five Louisiana universities—Louisiana Tech, University of Louisiana Lafayette, Southern University A&M, Tulane University, and LSU. The Louisiana Board of Regents is administering this grant, and NSF has funded the project for five years.

LAMDA researchers will develop and use state-of-the-art machine learning, a form of artificial intelligence, to efficiently hone in on the specific materials that can deliver the best performance metrics and structural integrity for 3-D printing.

“Any trial and error in the lab would take days and years of design. This is why the team will use machine learning to figure out what type of materials to use and how to optimize them,” Khonsari said.

At LSU, the researchers involved include co-principal investigator and the Jack Holmes Professor in Mechanical Engineering Shengmin Guo; co-principal investigator and the Major Morris S. & DeEtte A. Anderson Memorial LSU Alumni Professor of Mechanical Engineering Guoqiang Li; Assistant Professor of Mechanical Engineering Genevieve Palardy; the A. K. and Shirley Barton Professor of Mathematics Blaise A.

Bourdin; LSU Chemistry Professor Leslie G. Butler; the Oskar R. Menton Professor of Electrical Engineering and the Center for Computation & Technology faculty member Xin “Shane” Li; the Smiley and Bernice Romero Raborn Chair in Mechanical Engineering Wen Jin Meng; Assistant Professor in the Division of Computer Science & Engineering Mingxuan Sun; Associate Professor in the Division of Computer Science & Engineering Jian Zhang; the Alexis and Marguerite Voohries Professor of Mechanical Engineering, the Richard J. and Katherine J. Juneau Distinguished Professor, and Department Chair of Mechanical & Industrial Engineering Dimitris E. Nikitopoulos; LSU Department of Physics & Astronomy Professor Phillip T. Sprunger; and LSU Chemistry Professor John A. Pojman.

In addition, the faculty will develop new courses and student-led LAMDA research projects to grow the skilled and diverse STEM workforce in Louisiana.

The NSF grant will support 14 new faculty at the five universities part of LAMDA.



Professor Jacqueline Stephens is the director of the Metabolic Basis of Disease Center.

NIH Funds New Biomedical Disease Center in Louisiana

Pennington Biomedical Research Center scientists have been awarded a new federal grant to establish a new Center of Biomedical Research Excellence, or COBRE. The new Metabolic Basis of Disease Center will allow young scientists to delve into the mechanisms of diabetes, preeclampsia, and anxiety-driven eating.

“The grant provides Pennington Biomedical with the opportunity to establish a new research focus that will hopefully be a significant benefit for the state of Louisiana, which has a disproportionately high incidence of metabolic diseases,” said Jacqueline Stephens, professor, center director, and the principal investigator of this new five-year center grant.

The initial projects include research by Susan Burke, assistant professor of research at Pennington Biomedical, who will investigate lipid metabolism, how fats are broken down and burned, in the pancreas. It will also include studies led by Jenny Sones, assistant professor of theriogenology in veterinary clinical sciences at the LSU School of Veterinary Medicine, who will determine how reproductive fat tissue contributes to preeclampsia, a condition of dangerously high blood pressure that can occur during pregnancy. Worldwide, more than 75,000 women and 500,000 infants die as a result of preeclampsia each year, and the numbers are rising. It will also include research from the laboratory of Emily Qualls-Creekmore, assistant professor and director of behavioral neurosciences at Pennington Biomedical, who will seek to identify the neural circuit and molecular mechanisms that link metabolism and anxiety. These studies may help in finding a treatment for anxiety-associated eating disorders.

Each of these research projects fall within Pennington Biomedical’s core mission to study disorders where metabolism clearly affects the incidence and progression of chronic diseases that reduce human life and health spans. The incidence of metabolic-related diseases continues to increase in the U.S., and Louisiana has been disproportionately affected because of demographics, economics, and a high incidence of health disparities.

The primary focus of the new Metabolic Basis of Disease Center is to provide mentoring and training for Pennington Biomedical’s young scientists and help them establish themselves so they can eventually secure their own independent research funding. The grant will support 14 professional jobs in Louisiana for five years.

An overall benefit of the grant will be to strengthen Pennington Biomedical so it can be more competitive with other major research facilities that study metabolic diseases, Stephens said.

LSU Team Receives Award to Boost Diversity in Biomedical Research

For decades, LSU has participated in national efforts to encourage diversity in undergraduate research—especially in science, technology, engineering, and mathematics. In 2004, the university joined the National Institutes of Health, or NIH, Initiative for Maximizing Student Development, or IMSD, R25 program to increase the participation and retention of minority, disabled, and economically disadvantaged students in various biomedical fields, such as chemistry, biology, human and veterinary medicine, kinesiology, psychology, and biological and mechanical engineering. That initiative was recently replaced by the NIH with the Maximizing Access to



Graça Vicente, the Charles H. Barré Distinguished Professor of Chemistry, is the principal investigator for the Maximizing Access to Research Careers program at LSU.

Research Careers, or MARC, T34 program, geared specifically toward college juniors and seniors who are interested in pursuing a PhD or MD-PhD in biomedical or behavioral sciences after they graduate.

“One of the reasons we were successful in securing this funding is that we had 14 years of experience with the IMSD program and were able to unify our efforts,” said Graça Vicente, the Charles H. Barré Distinguished Professor of Chemistry, IMSD program director at LSU since 2007, and principal investigator, or PI, for MARC. “LSU has emerged as a national model for advancing and promoting inclusion, equity, and diversity and improving the success rates of underrepresented students.”

More than half of the students who participated in the IMSD program as undergraduates ended up pursuing a PhD. Six incoming juniors will now be selected as MARC scholars for this fall—with a total of 30 undergraduates participating in the program over the next five years. Research experience is not required, but students must show real interest in biomedical research.

Mentorship is a big part of the program. In fact, four LSU faculty on the MARC leadership team are past recipients of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. Co-PIs on the grant are Tyrslai Williams-Carter, director of research, education, and outreach programs in the LSU Office of Strategic Initiatives, and Vice President of Strategic Initiatives Isiah Warner, Boyd Professor and Phillip W. West Professor of Surface and Analytical Chemistry. Last year, he received the lifetime achievement Nature Award for Mentoring in Science as he helped LSU become the top producer of women and African Americans with a PhD in chemistry among all universities in the U.S.

One difference between the IMSD and MARC programs is that the latter offers year-round support for students, including over the summer. Before their junior year, MARC scholars will be able to get research experience working with faculty on the LSU campus and, the following summer, at research-intensive facilities anywhere in the U.S.

“We are really looking forward to having the students come back to share their experience [and] contributing what they’ve learned in the summer between their junior and senior years to the other MARC students,” Vicente said. “Keeping students active in research over the summer is quite important; we saw that with the IMSD program. Supporting the students so they don’t take a non-academic summer job instead of staying on track to their future careers.”

Interdisciplinary LSU Superfund Research Team Receives \$10.8M to Fight Pollution From Waste Sites

LSU researchers have been working to protect communities from dangerous pollution from hazardous waste sites since 2009 through the Superfund Research Program, or SRP. Now, an interdisciplinary LSU team has received \$10.8 million from the National Institutes of Health, or NIH, to continue and expand their efforts over the next five years and train future interdisciplinary scientists.

With a new app and broader collaboration with researchers as far as Australia, the SRP team is attacking environmentally persistent free radicals, or EPFRs, from every angle. EPFRs are a newly recognized class of pollutants discovered in the early 2000s that LSU researchers have linked to lung and heart

disease, as well as childhood obesity and enhanced severity of respiratory tract infections.

EPFRs, pronounced ep-fers, are produced during thermal processing, such as burning or oxidization, of hazardous wastes. They are stabilized on the surface of small, emitted particles that remain in the air for a long time, allowing for inhalation exposure.

Since its inception, the LSU SRP has shown that EPFR exposure can worsen outcomes from respiratory tract infections and heart attacks; increase the risk for childhood obesity after maternal exposure; and lead to the development of a severe form of asthma that is unresponsive to treatment.

There are currently no rules or regulations for limiting or monitoring EPFRs in the environment, neither at the state nor federal level. The LSU SRP is working diligently to come up with enough data to change this, having already changed how some Louisiana Superfund sites are remediated.

Superfund sites are designated by the Environmental Protection Agency and concentrations of EPFRs in those areas are between 10 and 400 times higher than surrounding areas. Superfund sites are sometimes remediated by scooping up toxic dirt and sending it to a treatment site or remediating it onsite with an incinerator and sometimes by covering it up and burying the dangerous waste.

Louisiana currently has 24 Superfund sites. Among them, 16 are remediated using thermal treatment, capable of producing EPFRs. But Superfund waste is often transported away from Superfund sites to be treated elsewhere. This is the case for 13 of the Louisiana Superfund sites where waste is taken to treatment facilities in often socioeconomically disadvantaged areas, raising important questions about health disparities and environmental justice.

With new funding from NIH, the LSU Superfund team is developing an app where Louisiana residents who live near hazardous waste sites can report on their own health and day-to-day air quality. In return, the team will communicate what they know in real time, answering questions such as, “Is it safe to eat the tomatoes in my garden?” or “With my heart condition, should I stay inside?”

The team is also developing innovative field sensors that community members will help place to pinpoint risk zones depending on where the wind blows, and other factors. Together with community partners, the LSU Superfund team has already helped create a Louisiana Citizens’ Guide to Environmental Engagement to provide an overview of the laws that protect the public from pollution.

LSU College of Science Professor Among 2019 AAAS Fellows

Associate Dean of Research & Administration Robb Brumfield in the College of Science has been named a Fellow of the American Association for the Advancement of Science, or AAAS, the world’s largest general scientific society.

Brumfield’s research focuses primarily on the evolutionary genomics of birds, which often involves traveling to international locations, like Peru, Bolivia, and Brazil, to conduct fieldwork.

He previously led the university’s Museum of Natural Science as its director from 2013 until 2019, when he moved into his current position. He has also continued to serve as the museum’s curator of genetic resources since 2003, helping to grow what has become one of the world’s largest university-based tissue collections of birds. Additionally, Brumfield serves as the Roy Paul Daniels Professor in the Department of Biological Sciences.

The 443 newly elected fellows represent each of AAAS’ 24 sections, from neuroscience and psychology to social, economic, and political sciences. Fellows are chosen because of their efforts toward advancing science applications that are deemed scientifically or socially distinguished.



Entrance to Camp Livingston Enemy Alien Internment Camp

Credit: National Archives at College Park, Maryland

LSU Librarians Receive NEH Grant

LSU Libraries’ Hayley Johnson and Sarah Simms have been awarded a National Endowment for the Humanities Digital Projects for the Public Discovery grant. This grant supports projects that interpret and analyze humanities content in primarily digital platforms and formats.



Baton Roots Community Farm



Credit: The Walls Project

The grant will help fund the project, Louisiana’s Hidden History of Japanese Internment, which will explore the creation of a curated digital archive of materials relating to Japanese internment in Louisiana during World War II.

Johnson and Simms are building this project from the research they’ve been doing for the past few years. They will look at archives and museum collections across the U.S. to identify pieces that could be digitized for an online exhibit or repository related to the internment of men of Japanese ancestry in Camp Livingston and Camp Algiers.

Baton Roots Community Farm Awarded National Endowment for the Arts Grant

Baton Roots Community Farm opened last year in North Baton Rouge as a restorative landscape to support healthy lifestyles, mental welfare, and environmental security. With recent support from the National Endowment for the Arts, the LSU Coastal Sustainability Studio will partner with the nonprofit organization, The Walls Project, which operates Baton Roots Community Farm at BREC Howell Park, and Mayor-President Sharon Weston Broome’s HealthyBR initiative, to develop a comprehensive master plan and design for the 115-acre site. LSU Coastal Sustainability Studio faculty and students will lend their expertise in design and engineering to help develop the plan with the local community, BREC, and Build Baton Rouge, the parish’s redevelopment authority.

“The LSU Coastal Sustainability Studio will facilitate design studios where our students and faculty will work collaboratively with artists and design consultants to help develop a master plan for the Baton Roots Community Farm. Our intention is to help this valuable community space expand in scope from urban agriculture to creative place-making by incorporating public art with community gardening, green infrastructure, and urban ecology,” said Nicholas Serrano, LSU assistant professor of landscape architecture, who is a principal investigator for the project.

Baton Roots Community Farm grew from the mayor’s Geaux Get Healthy initiative, a project of HealthyBR, to improve the well-being of citizens by promoting active lifestyles and access to fresh foods in one of the city’s largest food deserts.

LSU and Louisiana Public Schools Team Up to Expand Computer Science Courses and Careers

An interdisciplinary team of LSU faculty and staff, in partnership with East Baton Rouge Parish School System, or EBRPSS, teachers, and administrators have received an additional \$4 million grant from the U.S. Department of Education. These funds will be used to improve and expand opportunities in computational thinking and computer science in five public school districts. With a total of \$5 million in federal support, LSU will be able to expand the successful LSU Computing STEM Pathway from East Baton Rouge Parish to four additional parishes in rural Louisiana—Pointe Coupee, West Feliciana, Washington, and Evangeline.

The initial \$1 million grant from the National Science Foundation, or NSF, Computer Science for All program supports the project, BRBYTES: Baton Rouge: Bringing Youth Technology, Education, and Success,” which began October 1, 2019. With the additional \$4 million grant from the U.S. Department of Education, the team will also be able to further develop the curriculum for the 9th grade course, Introduction to Computational Thinking, and be able to assess its effectiveness over the next five years. This course teaches the fundamentals of computing and programming while reinforcing mathematics content in a project-based setting.

LSU was among 41 recipients nationwide to be awarded the U.S. Department of Education’s Education Innovation and Research, or EIR, grant. The LSU team scored fifth amongst the 27 awards granted in the early-phase Science, Technology, Engineering, and Math, or STEM, category of proposals, just behind the Smithsonian Institution, Code.org, Massachusetts’ Education Development Center, and Old Dominion University Research Foundation in Virginia.

“Everybody on our team is passionate about providing opportunities for all students in EBRPSS and throughout Louisiana to engage in high-quality computing courses. The Department of Education award will allow us to study the effect of LSU Computing STEM Pathway curriculum on student math scores, accumulation of computer science and advanced math credits, and graduation rates,” said Juana



LSU Department of Physics & Astronomy Associate Professor Juana Moreno (front center) leads an interdisciplinary team of educators, who have garnered \$5 million in federal funding to provide computational skills courses for all middle and high school students in East Baton Rouge Parish and four rural Louisiana parishes.

Moreno, associate professor in the LSU Department of Physics & Astronomy and the Center for Computation & Technology, who is the principal investigator of both projects.

Moreno and her collaborators' plan encompasses several strategies to grow computational literacy and computational thinking in public schools. Her team has developed a five-year plan for introducing computing in all EBRPSS middle and high schools, where every student takes at least one computing course in grades 6th through 12th. To lay the foundation, they will increase the awareness among principals, counselors, and parents about careers in computing and the importance of equity in the recruiting and advising of students in this area.

The team will develop new courses and expand existing ones in computational thinking and computer science for 7th to 10th grade students and work closely with EBRPSS practitioners to increase the number of minority teachers who are willing and ready to teach computing courses as well as encourage the use of culturally responsive practices and pedagogies to inspire underrepresented groups.

LSU Faculty and Graduates Selected for Prestigious Gulf Research Program Fellowships

The National Academies of Sciences, Engineering, and Medicine's Gulf Research Program has selected two LSU faculty for its Early-Career Research Fellowships and two LSU graduates for its Science Policy Fellowships. LSU Department of Environmental Sciences Assistant Professor Rebeca de Jesús Crespo and LSU School of Architecture Assistant Professor and LSU Coastal Sustainability Studio Managing Director Traci Birch are among the 20 Early Career Research fellows selected for 2019. With nearly 70 fellowships awarded since 2015, the program supports emerging young scientists working at the intersections of environmental health,

community health and resilience, and offshore energy system safety in the Gulf of Mexico and other U.S. coastal regions.

De Jesús Crespo's research links landscape-level patterns of anthropogenic activities, ecosystem services, and socio-economic factors to indicators of ecological integrity and human health. She previously worked as a biologist for the Puerto Rico Department of Environmental and Natural Resources and as a postdoctoral researcher for the Environmental Protection Agency's National Health and Environmental Research Laboratory, where she earned the Gulf Ecology Division Scientist of the Year Award and the EPA Environmental Justice Award.

Birch's research focus is ecosystem management and facilitating local implementation of regional planning efforts. Her doctoral research was on the ability and effectiveness of local communities to implement ecosystem management, and her postdoctoral research was on developing planning frameworks for coupled coastal-inland community resilience and well-being in the face of increased climate change. Birch was a research faculty member at LSU for three years before becoming an assistant professor in the School of Architecture.

The Gulf Research Program's Early Career Research Fellowship helps early-career researchers, like Birch and de Jesús Crespo, during the important pre-tenure stage of their careers. Fellows are provided with a \$76,000 financial award along with mentoring support to help them maneuver this period with independence, flexibility, and a built-in support network. This allows them to take risks on research ideas, pursue unique collaborations, and build a network of colleagues who share their interest in improving offshore energy system safety and the resilience of coastal communities and ecosystems.

The fellowships are awarded to individuals who demonstrate a strong scientific or technical background, superior scholarship, effective communication skills, and an ability to work across disciplines, among other attributes.

In addition, two LSU graduates have been selected as National Academies of Sciences, Engineering, and Medicine's Gulf Research Program Science Policy Fellows. LSU Oceanography & Coastal Sciences doctoral graduate Lauris Hollis from Silsbee, Texas, and coastal environmental science graduate Abbey Hotard from River Ridge, Louisiana, are 2019 science policy fellows, who will serve one year on the staff of federal, state, local, or non-governmental environmental, natural resource, oil and gas, and public health agencies in the Gulf of Mexico region. Hollis joined the staff of the Texas General Land Office in Austin, Texas. Hotard joined the staff of the Environmental Protection Agency, Gulf of Mexico Program in Gulfport, Mississippi. ■



Distinguished Research Master Heather McKillop holds an ancient Maya flint tool and a 3-D replica created in her lab at LSU; Distinguished Dissertation Award recipient Angela Farizo McCarthy; Distinguished Dissertation Award recipient Julie Butler; and Distinguished Research Master Joseph A. Giaime at LIGO Livingston.

GOING THE DISTANCE

Distinguished Research Masters

Since 1972, the LSU Council on Research has presented the university-wide Distinguished Research Master award in recognition of outstanding faculty accomplishments in research and scholarship. The recipients are chosen by the council from nominees proposed by the university community. Each year, one recipient is chosen from the arts, humanities, social sciences, and behavioral sciences disciplines and another from the science, technology, engineering, and mathematics disciplines.

The Distinguished Research Master award provides winners a salary stipend and the University Medal—the symbol of exceptional academic accomplishment at LSU.

Arts, Humanities, Social & Behavioral Sciences

Heather McKillop, Department of Geography & Anthropology, College of Humanities & Social Sciences

Heather McKillop is a Canadian-American archaeologist, academic, and Maya scholar, who is noted in particular for her research into ancient Maya coastal trade routes, seafaring, littoral archaeology, and the long-distance exchange of commodities in pre-Columbian Mesoamerica. Since the 2004 discovery of ancient Maya wooden architecture and a wooden canoe paddle preserved in a peat bog below the sea floor, McKillop and her team of LSU students and colleagues have been focused on the discovery, mapping, excavation, sediment coring, and analyses of the waterlogged remains. She started the DIVA Lab, or Digital Imaging and Visualization in Archaeology, in 2008 to make 3-D digital images of the waterlogged wood, pottery, and other artifacts from the underwater Maya sites that comprise the Paynes Creek Salt Works. Since 2016, McKillop has been the Thomas and Lillian Landrum Alumni Professor in the LSU Department of Geography & Anthropology.

Science, Technology, Engineering & Mathematics

Joseph A. Giaime, Department of Physics & Astronomy, College of Science

Joseph A. Giaime’s research focuses on laser interferometer design and vibration isolation systems for interferometric gravitational wave detectors. He worked for three years at JILA at the University of Colorado before going back to MIT to spend a year working on the initial LIGO installation. In 1999, he joined the LSU faculty, where he now holds the position of professor of physics and astronomy. With Caltech, he is currently the observatory head of LIGO Livingston. Giaime was elected a fellow of the American Physical Society in 2009 for his contributions to gravitational wave physics, particularly key aspects of LIGO.

Distinguished Dissertation Awards

Since 1983, the LSU Alumni Association has sponsored the Distinguished Dissertation Awards. A committee of the graduate faculty selects the winning dissertations.

Arts, Humanities & Social Sciences

Angela Farizo McCarthy, Josephine A. Roberts Alumni Association Distinguished Dissertation Award

Angela Farizo McCarthy’s dissertation, “The Religious Impact: Understanding the Influence of Religiosity on Attitudes toward Policy Issues,” sheds light on the influence of religion on Americans’ attitudes toward policy concerns. In a comprehensive analysis, McCarthy discovered the importance

of including religious dimensions in models of public policy attitudes. She offers considerations for developing a unified theory that involves the influence of the clergy and religious social groups, and religious beliefs as the driving force behind many policy opinions. Collectively, she demonstrates that religious belonging, religious behavior, and religious belief are important considerations when studying public opinion on policy concerns.

She currently is a permanent lecturer in the University of Florida’s Department of Political Science, where she teaches Religion and Politics; American Public Opinion; Policy, Leadership, and Ethics; Environmental Politics; and Conduct of Inquiry, which is a research methods course for master’s students. She is the director of the undergraduate research program called Junior Fellows as well as the experiential learning coordinator for the political science department. Her scholarly work has been published in *Political Research Quarterly*, *The Journal for the Scientific Study of Religion*, and *Geographical Review*.

She received her Bachelor of Arts in general studies and master’s and doctoral degrees in political science from LSU.

Science, Technology, Engineering & Mathematics

Julie Butler, LSU Alumni Association Distinguished Dissertation Award

Julie Butler’s dissertation, “The Impact of Anthropogenic Noise on Fish Behavior, Communication, and Development,” found that human-caused noise had negative impacts on the social behaviors, acoustic communication, and juvenile development in fish. Human activities, such as shipping and oil exploration, have caused underwater ambient sound levels to rise more than 30 decibels in most fishes’ hearing range. Noise exposure resulted in altered territorial interactions, lower spawning rates, decreased parental care behaviors, and higher juvenile mortality. Overall, Butler’s data indicate that increased background noise, similar to that found in a shipping lane or harbor, can have negative impacts on fish species’ success and persistence.

Butler is currently a postdoctoral scholar at Stanford University, where she is investigating how sensory information informs complex social decisions. While at LSU, she was very involved in BioGrads, the biology graduate student organization, and was one of the founding members of LSU Women in Science.

She was awarded a Louisiana Board of Regents Fellowship and a National Science Foundation Graduate Research Fellowship in support of her graduate work at LSU. ■

The Distinguished Dissertation award recipients receive a monetary gift and a certificate of commendation.

MEDIA SHELF

By Sarah Catherine LaBorde



The Mysterious Sofía: One Woman’s Mission to Save Catholicism in Twentieth-Century Mexico

Stephen J.C. Andes
Assistant Professor of History

In *The Mysterious Sofía*, Stephen J.C. Andes tells the remarkable story of Sofía del Valle, a devout Catholic single woman who resisted religious

persecution in an era of Mexican revolutionary upheaval, became a labor activist in a time of class conflict, founded an educational movement, toured the U.S. as a public lecturer, and raised money for Catholic ministries—all in an age dominated by economic depression, misogyny, and racial discrimination. Through del Valle, Andes illustrates the history of Catholicism’s global shift from north to south and the critical role of women within the religion.

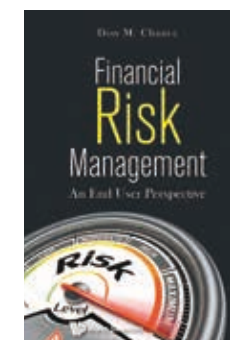


Five Years Ahead of My Time: Garage Rock from the 1950s to the Present

Seth Bovey
Professor of English

Five Years Ahead of My Time: Garage Rock from the 1950s to the Present tells the story of a musical phenomenon whose continuing influence on global popular culture is immeasurable. The

story runs from 1950s America to when classic rock 'n' roll was middle age and teenaged musicians kept its primal rawness with rough-hewn instrumentals and by practicing guitar riffs in their parents’ garages. Seth Bovey follows the sensation from its rise in the 1950s and 1960s, during the era of classic rock 'n' roll and the British Invasion, to its rebirth in the 1980s and 1990s.



Financial Risk Management: An End User Perspective

Don M. Chance
James C. Flores Endowed Chair of MBA Studies and Professor of Finance

This user-friendly textbook levels the playing field between buyers and financial institutions who offer risk management products. Chance approaches risk management by

focusing on educating corporate and institutional users on the essential knowledge they need to be an intelligent buyer. The sell side of risk management is often at a significant advantage with expert employees capable of understanding the highly technical and mathematical existing body of knowledge on risk management. *Financial Risk Management: An End User Perspective* covers the principles that corporations, governments, and institutional investors should know to enable them to ask the right questions and avoid being misled by the complexity often presented by sellers.



Absence Like Sun

Vincent A. Cellucci
College of Art + Design’s Communication across the Curriculum Studio Coordinator

This book of lyric poetry presents a creative, mythic worldview, which orbits the title imagery’s subverted symbolism, where the sun becomes the warming image of absence. Some of the predominant recurring themes

of the manuscript are haunting—homelessness, filiation and affiliation, post-Katrina New Orleans, Christian myth, and the paradoxical nature of the universe.



Classical Antiquity in Heavy Metal Music

Co-edited by Kristopher Fletcher
Associate Professor of Classics

Classical Antiquity in Heavy Metal Music demonstrates the rich and varied ways the genre draws on the ancient Greek and Roman world. Contributors examine how bands from around the globe draw inspiration from classical

literature and mythology, historical figures, and even pagan and occult aspects of antiquity. The authors demonstrate how this music—often dismissed as lowbrow—engages in sophisticated dialogue with the ancient world. They also write about the continued appeal of the Classics while arguing that the engagement with myth and history is a defining characteristic of heavy metal music, especially in countries that were once part of the Roman Empire.

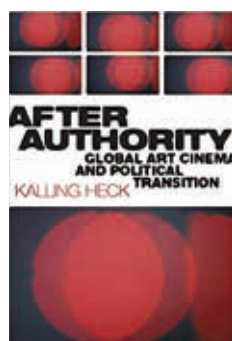


Common Cause: A Novel of the War in America

Edited by John Maxwell Hamilton
Hopkins P. Breazeale Professor of Journalism

This novel, written by Samuel Hopkins Adams in 1919, tells the story of Jeremy Robson, a crusading newspaper editor in the fictional midwestern town of Fenchester. Muckraking has led special

interests to withhold advertising in order to drive Robson out of business, but he and local plutocrats put their differences aside when war is declared in 1917 to attack the German-American community for its supposed loyalty to their fatherland. *Common Cause* provides a vivid picture of the America-first fear and hate that gripped the midwestern United States during the Great War. John Maxwell Hamilton provides supplemental context and an informative introduction in this 2019 republishing of a lost literary relic.

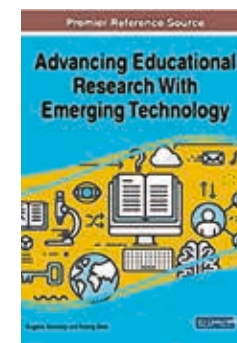


After Authority: Global Art Cinema and Political Transition

Kalling Heck
Assistant Professor of Screen Arts and English

By comparing films from Italy, Hungary, South Korea, and the U.S., *After Authority* contends that the aesthetic tradition of ambiguity in art cinema can be traced to post-

authoritarian conditions. Heck argues that in the context of a transition away from authoritarianism, art cinema aesthetics become legible and then can be seen as a mode of cinematic practice that is, at its core, political. It is rooted in the rejection of centralized and hierarchical configurations of authority. Ultimately, *After Authority* proposes a history of art cinema predicated on the potentials, possibilities, and politics of ambiguity.



Advancing Educational Research with Emerging Technology

Co-edited by Eugene Kennedy
Associate Professor of Education

Yufeng “Jennifer” Qian
Associate Professor of Education

Advances in technology and media have fundamentally changed the way people perceive research, how research

studies are conducted, and the ways data are analyzed and presented. Emerging internet-enabled technological tools have enhanced and transformed research in education and the way educators must adapt to conduct future studies. *Advancing Educational Research with Emerging Technology* provides innovative insights into cutting-edge and long-standing digital tools in educational research and addresses theoretical, methodological, and ethical dimensions in doing research in the digital world. This publication examines such topics as computational linguistics, individualized learning, and mobile technologies.

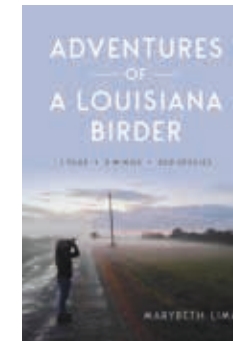


Free Will, Responsibility, and Crime: An Introduction

Ken M. Levy
Holt B. Harrison Professor of Law

In this book, philosopher and law professor Ken Levy explains why he agrees with most people, but not with most other philosophers, about free will and responsibility. Most people believe an individual’s choices, decisions, and

actions are neither determined nor undetermined but rather fully self-determined. In this book that provides a historically informed discussion on the critical intersection of metaphysics, ethics, and criminal law, Levy explains how free will and responsibility are indeed metaphysically possible. But he also cautions against the dogma of metaphysical libertarianism, a widespread belief that continues to cause serious social, political, and legal harm.



Adventures of a Louisiana Birder: 1 Year, 2 Wings, 300 Species

Marybeth Lima
Cliff and Nancy Spanier Alumni Professor of Biological and Agricultural Engineering

In *Adventures of a Louisiana Birder*, Marybeth Lima chronicles five years in which she chased and “listed” birds across the state with her spouse, Lynn.

Lima reveals both the arduous and uplifting sides of her travels, including nemesis birds and embarrassing misidentifications, alongside hardships, including a nearly fatal accident and her mother-in-law’s decline in health. A tale of competition and camaraderie within a community that traverses Louisiana’s diverse, lush, and endangered habitats, *Adventures of a Louisiana Birder* shows how the joy of birding can bind people together.



Becoming Ronald Reagan: The Rise of a Conservative Icon

Robert Mann
Manship Chair and Professor in Media and Public Affairs

In *Becoming Ronald Reagan*, Robert Mann explores how Reagan’s early life and career during the 1950s and early 1960s shaped his politics and

influenced his career as an elected official. Mann not only demonstrates how Reagan the actor became Reagan the political leader and how the liberal became a conservative, he also shows how the skills Reagan learned and the lessons he absorbed made him the inspiring leader so many Americans remember and revere to this day. *Becoming Ronald Reagan* is a compelling story and an indelible portrait of a politician and American icon.



Porcelain: A History from the Heart of Europe

Suzanne L. Marchand
LSU Boyd Professor of History

Weaving together the experiences of entrepreneurs, artisans, state bureaucrats, female consumers, chemists, and peddlers, *Porcelain* traces the remarkable story of “white gold” from its origins as a coveted

luxury to household necessity and flea market staple in Germany’s cataclysmic 20th century. For 300 years, porcelain

firms have come and gone, but the industry itself, at least until very recently, has endured. *Porcelain* offers a fascinating alternative history of art, business, taste, and consumption in Central Europe through its sweeping cultural and economic history of porcelain from the 18th century to the present.

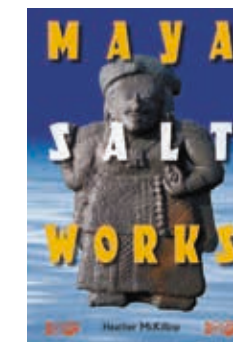


Black Community Uplift and the Myth of the American Dream

Lori Latrice Martin
Professor of Sociology and African and African American Studies

Black Community Uplift and the Myth of the American Dream uses the politics of respectability concept as an appropriate framework to show why

racial disparities between Black and white Americans persist. Martin uses this concept that originated with Black Baptist women in the late 19th and early 20th centuries to examine three important myths: the myth of the American Dream, the myth of America as a meritocracy, and the model minority myth. Martin also uses the politics of respectability concept to interpret the #BlackLivesMatter movement and NFL protests led by Colin Kaepernick.

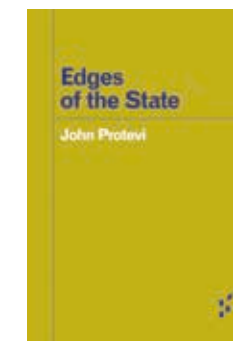


Maya Salt Works

Heather McKillop
Thomas and Lillian Landrum Alumni Professor of Geography and Anthropology

In *Maya Salt Works*, Heather McKillop details her archaeological team’s groundbreaking discovery of a unique and massive salt production complex submerged in a lagoon in southern

Belize. Exploring the organization of production and trade at the Paynes Creek Salt Works, McKillop offers a fascinating new look at the role of salt in the ancient Maya economy and provides a model for interpreting existing salt works sites as well as future discoveries along the Yucatán Peninsula.

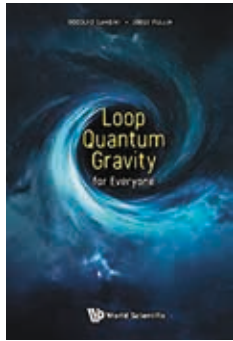


Edges of the State

John Protevi
Professor of Philosophy and Phyllis M. Taylor Professor of French Studies

In this book, John Protevi asserts that humans are predisposed to “prosociality,” or being emotionally invested in social partners and patterns. He applies readings from

Jean-Jacques Rousseau and James C. Scott; a critique of the assumption of widespread pre-state warfare as a selection pressure for the evolution of human prosociality and altruism; and an examination of the different “economies of violence” of state and non-state societies. *Edges of the State* sketches a notion of prosocial human nature and its resulting rules of conduct.

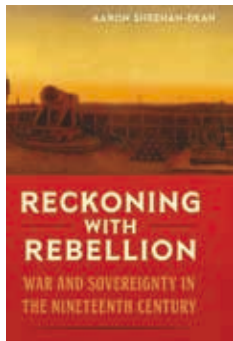


Loop Quantum Gravity for Everyone

Co-authored by Jorge Pullin
Professor and Hearne Chair of Theoretical Physics

Loop quantum gravity, or LQG, is one of the main contenders to unify Albert Einstein’s general theory of relativity and quantum mechanics, therefore providing a quantum theory of gravity.

Loop Quantum Gravity for Everyone describes LQG and its applications to cosmology, black holes, and spin foams without using formulas. The text’s simple term definitions, concise nature, and light style make it easy reading while also covering many of the cutting-edge developments in the field and addressing some of the controversies that surround these topics as they are incomplete science.



Reckoning with Rebellion: War and Sovereignty in the Nineteenth Century

Aaron Sheehan-Dean
Fred C. Frey Professor of Southern Studies

As an innovative global history of the American Civil War, *Reckoning with Rebellion* compares and contrasts the American experience with other civil

and national conflicts that happened at nearly the same time—the Indian Rebellion of 1857, the Polish Insurrection of 1863, and China’s Taiping Rebellion. Aaron Sheehan-Dean identifies surprising new connections between these historical moments across three continents. While the stories of these conflicts are often told separately, Sheehan-Dean argues that the participants understood them in relation to each other. *Reckoning with Rebellion* demonstrates that the causes and issues of the American Civil War were also global problems and reveals the important paradigms at work in the age of 19th century nation-building.

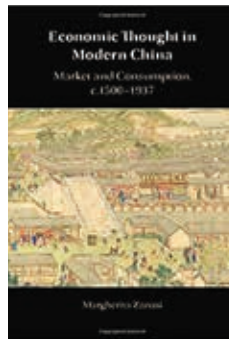


Exoskeleton III: Omniscient

Shane Stedler
Professor of Physics

Part three of Stedler’s *Exoskeleton* fiction series, *Omniscient* continues the story of William Thompson. After returning from the Antarctic Seas, Thompson finds himself in the CIA’s secret Space Systems building, trying to recover implanted memories that

might help them to avert the existential consequences of the irreversible events that he set into action. Stedler uses his background in government and defense labs to paint vivid, appropriately clinical looks at the very base concept of torture. He creates a tale of supernatural vengeance wrought with complex questions of faith, spirituality, and the afterlife.



Economic Thought In Modern China: Market and Consumption, c.1500-1937

Margherita Zanasi
Associate Professor of History

In this book, Margherita Zanasi argues that basic notions of a free market economy emerged in China a century and half earlier than in Europe. In response to the

commercial revolutions of the late 1500s, Chinese intellectuals and officials called for the end of state intervention in the market, recognizing its power to self-regulate. They also noted the elasticity of domestic demand and production, arguing in favor of ending long-standing rules against luxury consumption, an idea that emerged in Europe in the late 17th and early 19th centuries. Zanasi challenges Eurocentric theories of economic modernization as well as the assumption that European Enlightenment was unique in its ability to produce innovative economic ideas. ■

FIERCE
ASKS A
QUESTION
AND FINDS A
SOLUTION

At LSU, we embody the promise of tomorrow, breaking through boundaries to knowledge and unlocking solutions to some of the world's most pressing issues. Our researchers lead the charge to restore our coast, advance new forms of healing, and educate and empower the next generation of leaders, creators, and cultivators.

You can help advance academic excellence by supporting students, faculty, staff, and projects like those highlighted in this issue. If learning about the research happening at LSU has inspired you to give to the LSU Foundation, please visit lsufoundation.org/ored or call 225-578-3811.

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