

Bayou Classic 2020-2021

BATTLE OF THE SCIENCES

*From Rivalry To Research. Protecting The
Mississippi River Watershed*



National Wildlife Federation Staff



KIM BARRETT
Equity & Justice
Manager for Education
and Engagement



SIMONE LIGHTFOOT
Associate Vice President
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& Climate Justice



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Coordinator



America's Largest Most Trusted Conservation Organization Supports The Bayou Classic

When it became apparent that Covid-19 would interrupt Bayou Classic 2020 and thwart the annual football battle on the field, I refused to accept skipping a year of investment and helping students, it didn't sit well in my spirit. The National Wildlife Federation had built and fostered trusted, functioning, and working relationships with both campuses over the years and more recently, with the Southern University Agriculture Research and Extension Center. Somehow and in some way, that was not going to be interrupted.

After employing a level of creativity and thoughtfulness, Bayou Classic 2020-21: A Battle of the Sciences was born. All that was needed next was the support of our longtime partners at the Lower 9th Ward Center For Sustainable Education & Development (CSED). Once that was in place, we went to work, and together, we built a team of partners, staff, students, faculty, and friends that were essential, every step of the way.

With great intentionality, we centered the science, research, faculty, and student scholar capabilities of both campuses while highlighting a rich, regarded, and historic rivalry turned research collaboration. Research scholars applied their lived experience and scientific knowledge to highlight connections between climate change, environmental-related impacts, and the need to protect the Mississippi River.

It was the direction and guidance of Grambling's own **Dr. Waneene Dorsey**, along with Southern's own **Tamara Foster-Montgomery, Ms. Denise Rankins, Dr. LaShunda Anderson Hodges, Dr. Janana J. Snowden, and Dr. Luria Young** that helped lead the way. Louisiana's **General Russel Honorè** was vital in helping to identify key science talent for this project.

Although we focus on wildlife conservation at National Wildlife Federation, with COVID-19, we are first and foremost, facing a human tragedy. One that has disrupted lives and killed far too many people. At this moment, we have a rich opportunity to make sure that our nation responds to these realities in ways that create a smarter, more resilient, and more nature-based future through equitable and just recovery policies, programs, relief, infrastructure, and environmental justice packages. This science and research will inform our federal policy work.

We hope you enjoy it!



SIMONE LIGHTFOOT

Associate Vice President of Environmental Justice & Climate Justice



The Partners



City of New Orleans

Mayor LaToya Cantrell



Dear Friend,

As the Mayor of New Orleans, I believe that when we support our environment, we support the people who live here. Therefore, I am encouraged by our partnership with the Center for Sustainable Engagement and Development and the National Wildlife Federation in support of the Bayou Classic 2020 Battle of the Sciences.

The Bayou Classic commemorates historically black colleges and universities (HBCU), academic achievement, tradition, sportsmanship, marching bands, and friendly competition.

The “Classic” is an exhibition of the high standards of academic achievement deeply embedded in the traditions of the two institutions. The Bayou Classic is arguably the highest-profile, most eagerly awaited annual HBCU game in the nation, and quite possibly the most important intra-state Louisiana college football rivalry match-up.

I truly value the importance of education, research and community engagement as a significant bridge that blends the soul of this competition. The Battle of the Sciences theme recognizes the true role that academics and student athletics play in the formulation of the quality of life throughout Louisiana. Most important is the scientific research, community empowerment and economic development focused around our most significant water shed, the Mississippi River.

I implore the work engaged by all our HBCU scholars and look forward to their professional contributions as scientists, researchers and leaders to creating a safer, healthier and stronger environment for all!

2021 will mark the 47th annual meeting of HBCU rivals Southern University and Grambling State University – and I welcome you all back to New Orleans.

Sincerely,

LaToya Cantrell

Mayor, City of New Orleans



Office of the Mayor-President

City of Baton Rouge
Parish of East Baton Rouge

222 St. Louis Street
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SHARON WESTON BROOME
Mayor-President

January 25, 2021

To Whom It May Concern:

As the Mayor-President of the City of Baton Rouge and East Baton Rouge, I am firmly committed to protect its environmental assets, and to foster a green, active, ecologically diverse and economically sound community.

Recent public outreach and surveys have found that Parish residents are ready for a more proactive approach to local natural resource conservation. Making a natural alignment for our partnership with the National Wildlife Federation in support of the Bayou Classic 2020 Battle of the Sciences.

The Bayou Classic commemorates historically black colleges and universities, academic achievement, tradition, sportsmanship, marching bands, and friendly competition. The “Classic” is an exhibition of the high standards of academic achievement deeply embedded in the traditions of the two institutions.

Grambling State University and Southern University are public, four-year institutions of the Historically Black Colleges and Universities (HBCU). Both are recognized for their academics and athletics, and their rivalry is on display each year during the Bayou Classic. Grambling State University is located in Grambling, Louisiana, and Southern University is located in Baton Rouge.

This year will mark the 47th annual meeting of HBCU rivals Southern University and Grambling State University. We look forward to enjoying the return of our sports programs next Spring and to welcoming back loyal fans to support our teams and student athletes, in addition to the \$50 million estimated annual economic impact of the Classic.

Sincerely,

Sharon Weston Broome
Mayor-President
City of Baton Rouge/ Parish of East Baton Rouge Parish

City of Grambling

EDWARD R. JONES, MAYOR

COUNCIL MEMBERS

TOBY BRYAN, *Mayor Pro Tempore*
YANISE DAYS
G. DENISE DUPREE
CATHY HOLMES
PHYLLIS MILLER



HOME OF GRAMBLING STATE UNIVERSITY

February 2, 2021



Greetings:

As Mayor of the City of Grambling, it is my pleasure to express the explicit support for outstanding science, technology, engineering and mathematic (STEM) programs offered at Grambling State University and Southern University. The notion of incorporating the “Battle of the Sciences” as part of Bayou Classic 2020 underlines the important role these two historically black institutions of higher education play in preparing African Americans to successfully compete in the national research efforts designed to enhance the environmental and ecological impacts of the Mississippi River on the communities surrounding it.

Grambling State University has a history of producing graduates who have excelled in these programs and who have made significant and longstanding contributions to numerous areas – from cancer and other health-related research to projects that positively impact our environment and ecology. We are proud of those undergraduates whose have been and who are currently involved in research partnerships. They personify the high standard of excellence that is a hallmark of our beloved university, and we are proud to have this opportunity to show our support to them.

Finally, I want to thank the National Wildlife Federation for its continued support of Grambling State University by taking the lead in many of these very worthwhile undertakings.

Thank you.

Sincerely,

Edward R. Jones

Edward R. Jones
Mayor

127 King Street • P. O. Box 109
Grambling, Louisiana 71245

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“This institution is an equal opportunity provider and employer.”



Natchez THE HISTORIC CITY OF NATCHEZ

The Mississippi River is the second largest river in the United States, it is the second largest drainage system in the United States, and it is vitally important to global trade. The National Wildlife Federation is critically important to conservation and the preservation of wetlands and wildlife in Louisiana. This year the National Wildlife Federation is a strong proponent of the 2020 Bayou Classic-Battle of the Sciences between two iconic Southwest Athletic Conference Institutions (SWAC) Grambling State University of Grambling, LA and Southern University of Baton Rouge, LA., both are institutions of Historically Black Colleges and Universities (HBCU). These two institutions have a storied athletic history and proud contributors to academia.

The 2020 Bayou Classic Battle of the Sciences will examine how the Mississippi River contributes to economic development to Baton Rouge, New Orleans, and surrounding communities in Louisiana. Annually Louisiana transports billions of dollars- worth of goods across the United States via the Mississippi River. Annually, millions of tons of exports pass through Louisiana to areas around the world. Louisiana's freshwater and saltwater fisheries supply seafood across the United States and the wetlands attract fishermen and waterfowl hunters annually.

This academic Bayou Classic will examine how the Mississippi River has an impact on ecology. Hurricanes, rising sea levels, erosion, construction of levees, and loss of sediment contributes to loss of land and wildlife in Louisiana at a rate of a football field every one-hundred minutes. Louisiana's precious commodities are alligators, marshes, swamps, bayous, and barrier islands. The Mississippi River brings freshwater and sediment to Louisiana from thirty-two States and two Canadian Provinces. Wildlife and land are disappearing at alarming rates. The National Wildlife Federation is contributing to the preservation and conservation of Louisiana and its ports.

I envision this academic Classic Bayou between these two powerful HBCU institutions continuing for years to come. The Mississippi River is an iconic body of water. This powerful source of water is crucial to human life, animal and fowl life, and the survival of our land. Time is precious.

Thank you, National Wildlife Federation for your investment in conservation and your support to the State of Louisiana.



Valencia M. Hall
VALENCIA M. HALL
ALDERWOMAN WARD 1 CITY OF NATCHEZ

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SOUTHERN UNIVERSITY AND A&M COLLEGE SYSTEM

J.S. CLARK ADMINISTRATION BUILDING
4TH FLOOR
BATON ROUGE, LOUISIANA 70813



OFFICE OF THE
PRESIDENT - CHANCELLOR
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(225) 771-5522

Greetings,

As we prepare to enjoy the 47th Annual Bayou Classic to be held in Shreveport, we are not only excited to celebrate a long-standing tradition in Black college football, we are equally proud to partner with Grambling State University to highlight and showcase the essence and excellence of Historically Black Colleges and Universities.

As Louisiana's only public HBCUs, Southern and Grambling State universities bring rich legacies of academic and scholarly achievements, research, public service, and economic impact, that contribute to the health, wealth, and wellbeing of our communities, the state, and nation,

Southern University, located on a scenic bluff overlooking the Mississippi River in Baton Rouge, is committed to efforts to ensure and maintain a healthy environment and thriving communities through research initiatives throughout our five campuses. Our College of Agriculture, Family and Consumer Sciences, Department of Urban Forestry and Natural Resources offers the first B.S. degree program in urban forestry in the nation, in addition to M.S. and Ph.D. degrees in urban forestry, which prepare graduates through ground-breaking research, evaluate, plan, and resolve problems of urban forest ecosystems and contribute to the environmental well-being of urban societies.

In 2018, the Southern University Board of Supervisors approved a pilot clean water initiative helmed by the Southern University Law Center in partnership with Apollo Water LLC that provides the SU Law Center faculty and students an opportunity to engage in research related to environmental regulation and patent law regulations. Another Apollo Water partner, the Southern University Ag Center's Air, Nutrient, Soils, Water, Ecosystem and Remote Sensing Institute, was presented in 2019, with a \$50,000 donation to support student training and research on water pollution.

Also of note is the work of our famed alumnus Lt. General (ret.) Russell L. Honoré, noted for his leadership as commander of Joint Task Force Katrina. Gen Honoré, as an environmental crusader, has teamed with environmental groups, including the Sierra Club and the Louisiana Environmental Action Network, to form the "Green Army" to take action for clean air, safe water, and healthy communities in Louisiana.

Our students are ably engaged in clean water advocacy as well. In 2019 students from the School of Nursing held a drive for bottled water donations for a Head Start program in Clayton, Louisiana as a response to a water crisis Tensas Parish.

The Southern University System, along with our faculty, students and researchers, acknowledge and appreciate the ongoing support and sponsorship of the National Wildlife Federation, in partnership with Lower 9th Ward Center for Sustainable Engagement (CSED) of New Orleans, of the Bayou Classic, Southern and Grambling, and its work to help protect the Mississippi River and the communities that rely on it.

Best wishes,

Ray L. Belton, Ph.D.
President-Chancellor
Southern University System

"Five Campuses, One Vision... Global Excellence"

WWW.SUS.EDU



Office of the President



Greetings:

As an alumnus of Grambling State University, I can provide personal testament to the friendly competition the Bayou Classic provides. Knowing that there is an opportunity to bridge from competition on the field to collaboration is an exciting outcome to envision. Knowing that there are students from Minnesota to Louisiana researching ways to protect, maintain, and clean the Mississippi river, it would be of mutual interest to combine our efforts to benefit the communities that rely on it. Whether the research is centered around impacts from toxins, coastal erosion, pharmaceuticals, and flooding as well as climate change impacts on sports, recreation, and tributaries, it is evidence that Science, water, and community interest research is critical. It also shows that both institutions are firmly committed to protecting their environmental assets, and fostering a green, active, ecologically diverse and economically sound community.

Recent public outreach and surveys have found that Parish residents are ready for a more proactive approach to local natural resource conservation. This makes a natural alignment for our partnership with the National Wildlife Federation in support of the Bayou Classic 2020 Battle of the Sciences. With the humbling task of serving as an example of how to prepare next generation of natural resource stewards, it can't be fully realized without more resources from the federal level. The amount of potential jobs connected to the maritime industry also shows that the partnership is equally beneficial to student success.

The Bayou Classic commemorates historically black colleges and universities, academic achievement, tradition, sportsmanship, marching bands, and friendly competition. The "Classic" is an exhibition of the high standards of academic achievement deeply embedded in the traditions of the two institutions. Grambling State University and Southern University are public, four-year institutions that are designated as Historically Black Colleges and Universities (HBCU). Both are recognized for their academics and athletics, and their rivalry is on display each year during the Bayou Classic. Located in Grambling, Louisiana, and Baton Rouge, the story of the longstanding rivalry is well known. The beauty of this opportunity is that it doesn't have to end there. We can enhance the story by adding a narrative that tells the story of our interpretation of science, data, stats, and facts. The game happens once a year – the impact of collaborative research can last for generations to come. 2021 will mark the 47th annual Bayou Classic. As we enjoy the return of our sports programs this semester and welcome back loyal fans that support our teams and student-athletes, let's also look to enjoy every opportunity to expand the story of rivalry to one that includes research.

Sincerely,

Richard J. Gallot, Jr, JD
President



Office of Vice-President for Student Affairs/Director of Athletics

Vice President for Student Affairs/Athletic Director

On behalf of the Grambling State University's student body, as the Vice President for Student Affairs/Athletic Director, I extend our sincerest thanks to the National Wildlife Federation for your continued support of the Bayou Classic and the Battle of the Sciences. The Classic is a historical showcase between two nationally renowned and respected Historically Black Colleges and Universities, Grambling State University and Southern University. It is the largest African American collegiate sporting event in our nation today with an estimated economic impact of over \$50 million annually.

The Mississippi River has had an indelible impact on both our universities. Southern University literally rests on the banks of the Mighty Mississippi and both universities have benefited from the natural resources, commerce and research opportunities associated with it. Although we fiercely compete on the football field and at the Battle of the Bands/Greek Show, our students are ultimately winning educationally through the collaboration and support of the National Wildlife Federation.

The Battle of the Sciences is representative and indicative of intentional collaborative efforts by the National Wildlife Federation urban initiatives and environmental justice program and both institutions connecting our students with evolving opportunities. This event is pivotal in bridging the knowledge gap and reaffirms the invaluable research and preservation efforts of National Wildlife Federation specifically with our institutions. Our administrations, faculty, staff, and students are committed to the advancement of science and look forward to sharing the research and knowledge obtained in our classrooms and labs with the global society. The 47th Annual Bayou Classic is highly anticipated and will be welcomed by our institutions, teams, fans, and supporters.

With Tiger Pride,

David C. Ponton, Jr., Ed.D.



CURRENT HEAD COACHES



Grambling Head Coach Broderick Fobbs

The head coach of the Grambling Tigers Football Team, Broderick Fobbs, is an alumni of the school hailing from Monroe, La. In Monroe, he was one of the star players for the Carroll High School Football team, where he had the role of team captain and earned many awards in several sports. He came to Grambling as a star running back, and played under the legendary Eddie Robinson; throughout his time there, Fobbs was an honor roll student and served as a two-time team captain for the Tigers.

From there, he has worked with a variety of NFL Teams, colleges, and universities over the course of his career in coaching football before coming back to Grambling as the head coach in 2013. Since 2013, Fobbs has earned a host of awards for his excellent coaching style, and has made the Grambling Tigers into a national leader of blocked kicks and one of the top leaders in the SWAC Conference. Fobbs is entering into his 8th season with the Grambling Tigers.



Southern Head Coach Dawson Odums

Dawson Odums, a native of Shelby, NC, came down to Southern as a part of the defensive staff after various positions with North Carolina A&T Aggies. He was a star player for Crest High School, and ended up playing for the North Carolina Central University Eagles, where he became the team captain in his Senior year.

After working his way up the ladder of the coaching ranks for Southern, Odums became the head coach of the Southern Jaguar Football team in 2012, and won the SWAC West Title and SWAC Championship while being named the SWAC Coach of the Year all in his first season. Over his career with the Jaguars, Odums has led the team to the highest ranks of the SWAC Conference, and has helped launch the NFL careers of six of his former players. Odums is now entering his 10th season with the Southern Jaguars.



COACHING LEGEND

Grambling Head Coach Eddie Robinson

Eddie Robinson is known as the giant of college football, especially among historically Black Colleges and Universities. Starting his coaching career at Grambling in 1941, he coached at the institution until his retirement in 1997. Eddie Robinson won 17 championships in his conference (SWAC), held the championship title 9 times for Black Colleges and established a staggering streak of 27 consecutive winning seasons from 1960 through 1986.

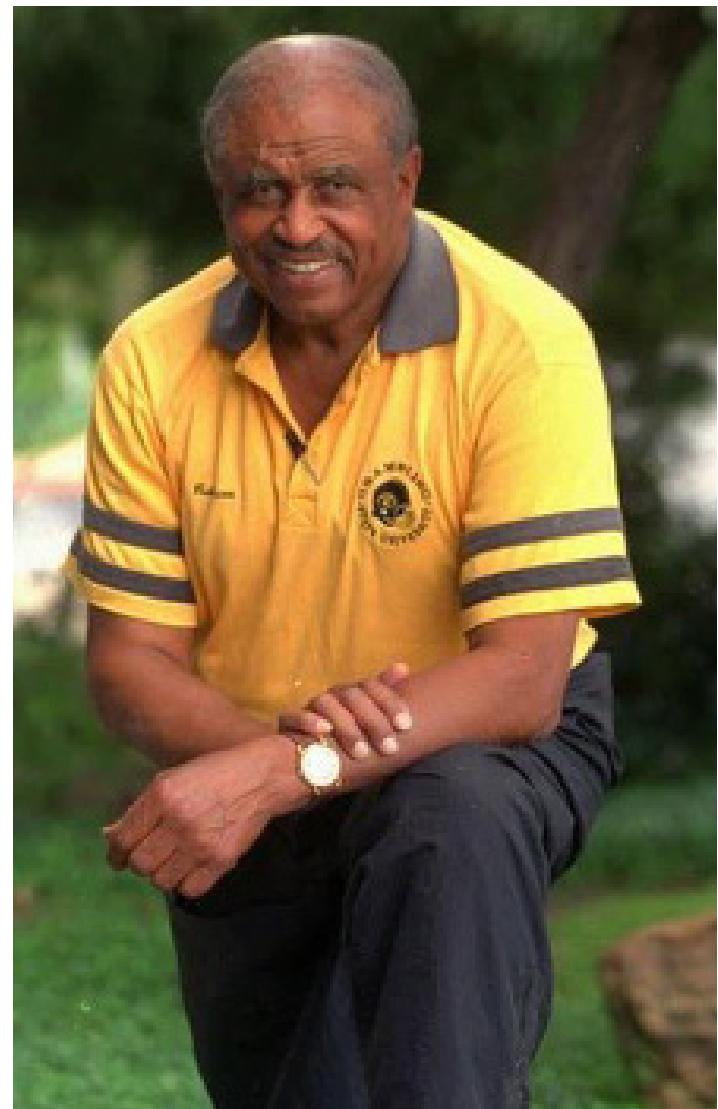
During his tenure, Robinson established himself as the "winningest coach in college football history", becoming the first coach to record 400 wins. Robinson retired with a record of 408 wins, 165 losses and 15 ties. More than 200 of Eddie Robonson's players went on to play in the National Football League including Super Bowl XXII MVP, Redskins quarterback Doug Williams, who would ultimately succeed Robinson as Grambling's head coach in 1998.

Segregation left black colleges in the South with almost exclusive access to great black Southern athletes. If players wanted to play ball and stay close to home, they went to black schools. That gave coaches like Robinson, Florida A&M's Jake Gaither and Prairie View's Billy Nicks the common denominator of great coaches: talent.

Eddie Robinson started coaching before coaches were CEOs, when they were still educators. Like many coaches of his day, he coached multiple sports and saw himself as a teacher. In his autobiography Eddie Robinson stated "The most important thing in football is the boy who plays the game, you can't coach 'em unless you love 'em."

Born April 13, 1919 in Jackson Louisiana, Edward Gay Robinson was the son of a sharecropper and a domestic worker. Eddie Robinson graduated from McKinley Senior High School in Baton Rouge in 1937. Neither of Coach Robinson's parents graduated from high school, but they encouraged their son's desire to stay in school and earn a college degree.

A young Robinson moved on from high school to become a star quarterback at Leland College under Reuben Turner,



a Baptist preacher who introduced Robinson to the concepts of a playbook and coaching clinics. Robinson was a member of Alpha Phi Alpha, the first intercollegiate Greek letter fraternity established for African Americans.

Robinson would later go on to obtain his Master's degree from the University of Iowa in Iowa City in 1954.



Bayou Classic 2020-21: A Battle of the Sciences Project History

In early 2018, the nation's largest and most trusted, conservation education and advocacy organization, the National Wildlife Federation, through its urban initiatives and environmental justice program, committed its support to the annual Bayou Classic.

In partnership with our local community partner – the Lower 9th Ward Center For Sustainable Education & Development (CSED) – we engaged directly with the campuses of Grambling State University, Southern University, and more recently, the Southern University Agriculture Research and Extension Center on efforts that included student, sports, and science support.

It was the direction and guidance of **Mr. Quinton Thomas** that connected both campuses, their leadership, and the National Wildlife Federation. Grambling's own **Mr. Marc Newman**, **Dr. Sheila Fobbs** (now retired), and **Dr. Waneene Dorsey**, along with Southern's own **Tamara Foster-Montgomery** and **Ms. Denise Rankins** helped lead the way. Louisiana's **General Russel Honore** was vital in helping to identify key science talent for this project.

Almost three years later, our partnership has included campus visits, student professional development, research opportunities, career day engagement, Founder's Day participation, and faculty grant and research projects. During Bayou Classic 2019, the National Wildlife Federation and CSED hosted a partnership awards luncheon in New Orleans, to honor the leadership of both campuses and pledged continued support for Bayou Classic 2020-21.

When the Covid-19 pandemic struck, everything changed. Everything except our collective will to reimagine and restructure our annual commitment. The National Wildlife Federation and CSED worked with the faculty at Grambling State University and Southern University to produce a new competition between the schools titled Bayou Classic 2020-21: A Battle of the Sciences. We would center the science, research, and student scholar capabilities of both campuses while highlighting the rich, regarded, and historic rivalry turned research collaboration.

Research scholars from both campuses would apply the lived experience and research to make meaningful connections between climate change, environmental-related impacts, and opportunities to protect the Mississippi River.



Dr. Waneene Dorsey



Dr. Sheila Fobbs



Louisiana's General
Russel L. Honore



Susan Kaderka



Tamara
Foster-Montgomery



Mr. Marc Newman



Ms. Denise Rankins



Mr. Quinton Thomas



The Scientists

Noted Cancer Researcher Dr. Waneene C. Dorsey Grambling State University



Dr. Waneene C. Dorsey is a tenured professor at Grambling State University in the Department of Biological Sciences. She received her

Bachelor of Science degree in Microbiology from Southern University (SU); Master of Arts in Teaching degree in Natural Sciences from Grambling State University (GSU); and Doctor of Philosophy degree in Environmental Science Toxicology from Jackson State University (JSU). Dr. Dorsey is a guest editor for the International Journal of Environmental Research and Public Health for the special issue, "The Health Influences of Organochlorine Pesticides."

Dr. Dorsey was recently awarded a \$326,100.00 grant from the National Institutes of Health-Louisiana Biomedical Research Network to study the development of cancer influenced by autophagy mechanisms. Dr. Dorsey explained that 90% of all cancers are caused by exposure to chemicals. The other 10% are cancer cases that are inherited. When a person inhales air, eats food, or drinks water with chemicals in them, the chemicals initiate damaging changes in the DNA of cells. There is a protein (p53) inside of the cell that serves as an executioner and a gentleman.

The gentleman's side of protein gives the cell time enough to repair the

DNA and then pushes the cell through the cell cycle. On the other hand, if the cell does not repair the damaged DNA, the executioner side of the protein sends a signal to the cell to kill itself. This is known as apoptosis or programmed cell death. Moreover, many times, the chemical will silence the executioner and gentleman protein. When this happens, the cells with damaged DNA will begin to multiply until there is a group of cells with damaged DNA called a tumor and what we know as cancer.

It would be great if the cancerous tumor cells would just stay in one place once they are formed. First, tumor cells need oxygen and nutrients to stay alive. They begin to recruit blood vessels to bring them nutrients and oxygen. This is known as angiogenesis. The cancer cells, on their own, will move to another part of the body, which is known as metastasis. This is why it is hard to get rid of cancer cells.

Dr. Dorsey's research involves investigating cancer and autophagy mechanisms. She gave the analogy that when you need to clean your house, you put old things in a pile and proceed to put them in the trash bin. The garbage truck puts them up and hauls them off. This cleaning event also happens inside our cells. Old parts of the cell that are worn out are gotten rid of by a mechanism called autophagy. However, this same autophagy clearance event makes a strong and fortified environment

for cancer cells. Because of this, cancer patients who are receiving chemotherapy become resilient to their medication. Consequently, doctors have to add more medicine or some other type of treatment to their regimen for the chemotherapy to become effective. Once Dr. Dorsey identifies the proteins involved in autophagy mechanisms, she blocks those proteins with inhibitors. The inhibitors can become a potential anticancer medicine for cancer patients.

Dr. Dorsey is an avid educator and teaches the Principles of Toxicology and Water Quality Management courses to undergraduate biology juniors and seniors at GSU. Her philosophy is "Each One, Teach One." Before COVID-19, Dr. Dorsey and her research students would travel to elementary schools in the area to involve 4th through 6th grade students in experiments and to get them excited about science.

At GSU, she has facilitated summer science camps for youth and continues to provide cancer research training for six undergraduate biology students. Dr. Dorsey is passionate about mentoring students so they can become excited about graduate school and biomedical careers. She also serves as a doctoral advisor and committee member in three Ph.D. programs: Educational Leadership at GSU, Environmental Science at JSU, and Environmental Toxicology at SU.



Dr. LaShunda Anderson Hodges



Dr. LaShunda Anderson Hodges is a native of Tupelo, Mississippi. She earned her B.S. and M.S. in Agronomy from Alcorn State University. In 2007, She became the 1st African-American woman to earn a Ph.D. in Agronomy/ Environmental Planning and Management from Louisiana State University.

Her current position is Associate Research Professor of Soil and Plant Sciences at Southern University.

In 2016, she was awarded a \$200,000 visiting scientific fellowship from the USDA Agricultural Research Service. She has devoted her life to developing the next generation

of African-American STEM students via her professional engagement in MANRRS (Minorities in Agriculture and Related Sciences), as well as, serving as the Zeta Phi Beta Sorority, Incorporated “Pearls in the Wild” U.S. Fish and Wildlife Service National Program Director.

In 2020, Dr. Hodges was named one of the Top 100 Inspiring Black Scientists in America.

Dr. Hodges’ research interests include Industrial Hemp, FAA Drone Pilot Licensing, Precision Agriculture, Phytoremediation, Soil, Water, and Plant Conservation, and Medicinal Plants.



Dr. Janana J. Snowden



Dr. Janana Snowden is the Executive Director and Chief Scientist for the Southern University Agricultural Research and Extension Center's - Southern Institute for Medicinal Plants. In addition, she serves as Coordinator/Liaison for the University's Medical Marijuana and Industrial Hemp Programs and Assistant Professor for the Department of Agricultural Sciences.

Dr. Snowden earned her B.S. in Biology (Wildlife) from Grambling State University and both her M.S. (Urban Forestry) and Ph.D. (Environmental Toxicology) from Southern University and A&M College. She is passionate about advancing cancer, autism and Alzheimer's research and

has devoted over a decade to investigating the cellular migration and drug resistance capabilities of cancer cells. Her current work focuses on investigating the anti-cancer and neuro-protective properties of the medicinal plant, Roselle hibiscus.

Dr. Snowden also serves as the Faculty Advisor to the Southern University Chapter of Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS) Student Organization. She is a strong advocate for student professional development, believing that we must prepare students to be successful in the classroom, in the field as well as in the board room.



Dr. Luria Young



Dr. Luria Young is a native of Berwick, Louisiana. She earned a B.S. in biology from Southern University and A&M College (SUBR), M.Ed. and Ed.S. in science education from Louisiana State University (LSU) and a Ph.D. in educational leadership, research, and counseling from LSU. Dr. Luria Young served in several administrative positions at SUBR, including the Senior Associate Vice Chancellor for Academic Affairs, the Interim Executive Vice President and Provost, and Interim Vice Chancellor for Student Affairs and Enrollment Management and Dean of Students. She served as a leader on several highly successful programs totaling over \$40M dollars in external funding. Dr. Young is a Professor in the SUBR Science/Mathematics Education

Doctoral Program and Principal Investigator/Science Education Specialist of the SUBR Laser Interferometer Gravitational Wave Observatory Science Education Center (LIGO-SEC) Partnership "Strengthening Communities of Learners," funded by the National Science Foundation. Dr. Young is committed to providing opportunities for minority students to excel in college and careers.

Dr. Young's research interests include:

- minority participation in STEM disciplines and the STEM workforce
- informal science education
- the persistence of students in higher education
- maximizing the potential of African American males



The Ecosystem of Economic Development

by Tammi Davis, Director of Compliance and Policy Engagement Gary Sanitary District, Gary, Indiana

If the African proverb, "It takes a village to raise a child," is true (and I believe that it is), then it takes an ecosystem to further develop and support that child academically, socially and professionally into and throughout adulthood. As children grow to become adult members of society, every person and everything – living and nonliving – plays a role in his/her ability to have a productive quality of life and a sustainable quality of living.

It is fair to presume that when that African proverb was first spoken centuries ago, the term, "village" referred to all of the members of a particular tribe. The charge to those members to collectively "raise a child" surely meant that everyone had equal input as well as an equal responsibility to instill in every child the core values, beliefs, traditions and teachings and to do so not simply because he/she is a member of that specific tribe but also because she is a living, breathing human being. Today, that "village" symbolizes every block, neighborhood, town and city. It includes every household, school and church. Collectively, they are the village that set the foundation as to how families co-exist with each other as well as within their respective surroundings that are often defined by and in some cases limited by the quality or even existence of academic, healthcare, jobs, transportation, housing and cultural options. Even more, the environments by which families find themselves in are not always self-imposed or self-inflicted. They are the result of policies, practices and people put in place to protect communities from harmful elements such as contaminated air, water and land, crime, failing infrastructure, unemployment and underemployment.



The villages cannot and do not eradicate these restricting conditions alone; they are just a microcosm of the total ecosystem that influences the way people live, work and breathe.

Economic Development, when viewed as a collection of living and non-living parts, reflects the intricate complexities of providing city services, improving infrastructure, training existing workforce for future jobs and industries, expanding internet access to all homes in a neighborhood, deconstructing abandoned buildings, building affordable housing and recruiting anchor institutions to attract additional businesses to underserved communities. The living are the policy makers, issue lobbyists, community advocates, subject matter experts, corporate executives, educators, students and yes, citizens. Representing the non-living components of the economy are the buildings that make up homes, hospitals, schools and places of worship; modes of transportation such as automobiles, airplanes, trains and bicycles; and environmental elements such as air and water. While these factors are individual contributors to development, they are also interdependent. Each one, with its own unique identifier, contributes to the overall health and wealth of a community. The lack in one creates a shortfall in another. The abundance from one stimulates growth in another. If communities, particularly those of color, are under-resourced, then they lack the means to support a quality of life that produces a physically, emotionally, mentally and socially well citizenry. If schools, at any level, are under-funded, then their ability to teach and train prospective candidates for employment opportunities generated by economic development is stifled. This is why Historically Black Colleges and Universities (HBCUs) are such a vital organism in the economic ecosystem.

HBCUs have a demonstrated and consistent history of being located and investing in underserved communities by supporting them with technical or financial resources. They are the academic conduit through which people of color receive the knowledge, skills, training and exposure to compete for and receive employment opportunities. Graduates of HBCUs are mentally tough and socially prepared to enter the workforce and contribute to their field of study or profession. They fill the gap between building one's ability as a child and building one's capacity as a progressive member of society.

Tammi Davis is the Director of Compliance and Policy Engagement for the Gary Sanitary District in Gary, Indiana. She has over 20 years experience developing, auditing and implementing diversity workforce and purchasing programs as well as providing subject matter expertise in the areas of economic development and procurement to organizations in the public, private and non-profit sector. She holds a Bachelor's Degree in English from #Thee HBCU, Jackson State University, and a Master's Degree in Public Affairs from Indiana University.



The Science

Mississippi River Restoration and Resilience Initiative

This document outlines key domains and areas of research in contribution to the Mississippi River Restoration and Resilience Initiative (MRRRI) forthcoming white paper in collaboration with the National Wildlife Federation Urban Initiatives & Environmental Justice Program. Specifically, with the Historically Black Colleges and Universities (HBCU) of Grambling State University and Southern University and A&M College – and the Mississippi River Delta as our connector. The final document which will include the commissioned white paper will be widely distributed, particularly around Washington D.C. and Congress to secure federal dollars to clean up and protect the Mississippi River.

The Mighty Mississippi River is the centerpiece of the second largest watershed in the world, covering over 1.2 million square miles, and includes tributary rivers from 33 states and two Canadian provinces. It begins as a tiny brook and 2,350 miles later empties into the Gulf of Mexico. Millions of people each year use the Mississippi River for recreation, but the Mississippi is, and always has been a working river. An average of 175 million tons of freight are shipped each year on the Upper Mississippi. The 29 lock and dams on the Upper Mississippi make that shipping possible, allowing for navigation from St. Louis, Missouri, to Saint Paul, Minnesota, a total distance of 854 miles.

The delta has a diversity of habitats—from uplands to the open waters of the Gulf of Mexico, and everything in between, including wet forests with cypress trees, freshwater marsh, brackish marsh, salt marsh, and sandy beaches. These habitats provide homes for an abundance of migratory and year-round wildlife.

The Mississippi River Delta is where the Central and Mississippi flyways meet. It provides a place for neotropical migratory songbirds to rest and feed before or after crossing the Gulf of Mexico, and is a winter home to 70 percent of the waterfowl that migrate along these flyways, such as the gadwall, green-winged teal, northern shoveler, and snow goose.

The American alligator is a well-known resident of the Mississippi River Delta. The delta's estuaries and wetlands are also nurseries for young fish and shellfish. The delta has many plants that live only in wetlands, and they provide habitat for wetland wildlife. Some of these plants are cattails, swamp rose, spider lilies, and cypress trees.

The Mississippi River Delta also has a number of federally endangered or threatened animals—such as the Louisiana black bear, piping plover, and green sea turtle—that struggle to survive in the remaining coastal habitat.

Threats & Conservation

At one time, there were extensive wetlands around New Orleans and other coastal communities that provided a natural resilience to storms. In total, about 50 miles (80 kilometers) of marshland once protected New Orleans from the Gulf with trees and marsh grasses that blocked the winds and blunted storm surges. Today coastal Louisiana is losing 24 square miles of wetlands each year—roughly equivalent to a football field every 100 minutes. Since the 1930s, Louisiana has lost an area of coastal land equal to the size of the state of Delaware. If this rate of wetland loss is not slowed, by the year 2040 the coastal shoreline will advance inland as much as 33 miles (53 kilometers) in some areas.

Wetland loss occurs because of natural causes—subsidence and wave erosion—and human causes. Humans cause wetland loss with the construction of river levees, channels, canals, and dams that regulate water flows or make it easier for ships to pass through an area. Humans also drain wetlands for agriculture or urban development.

Human activities disrupt the natural balance of the wetlands in the Mississippi River Delta. Prior to human development, natural wetland loss was replenished by Mississippi River sediments and nutrients creating new wetlands. Human activities have the unfortunate side effect of causing Mississippi River sediments to go straight down the river's channel and into the Gulf of Mexico. Not only are we destroying wetlands, but we are disrupting the natural cycle that rebuilds them.

In the aftermath of Hurricane Katrina, one of the lessons learned is that a healthy system of wetlands between New Orleans and the Gulf almost certainly would have slowed down the storm and dampened the storm surge. Without natural storm buffers, breaches in levees such as those after Hurricane Katrina could become an even bigger threat. Wetlands serve as nature's first line of defense by absorbing much of damage caused by hurricanes.

Climate Change

Climate change is exacerbating the habitat loss felt all along the area's coast. Estuaries and coastal habitats are experiencing habitat loss from sea level rise, and warmer average temperatures are fueling more intense hurricanes.

Climate change is caused by humans. Scientists have concluded that most of the observed warming is very likely due to the burning of coal, oil, and gas. This conclusion is based on a detailed understanding of the atmospheric greenhouse effect and how human activities have been changing it. At the same time, other reasonable explanations, most notably changes in the sun, have been ruled out. The atmospheric greenhouse effect naturally keeps our planet warm enough to be livable. Sunlight passes through the atmosphere. Light-colored surfaces, such as clouds or ice caps, radiate some heat back into space. But most of the incoming heat warms the planet's surface. The earth then radiates some heat back into the atmosphere. Some of that heat is trapped by greenhouse gases in the atmosphere, including carbon dioxide.

Restoring the Delta

The National Wildlife Federation's southcentral region covers 12 states along the Gulf Coast and into the Midwest. Our regional work focuses on protecting and restoring healthy rivers and estuaries; conserving wetlands, springs, and aquifers; protecting wildlife habitats; and connecting both children and adults with the natural world.

As part of this effort, the National Wildlife Federation is helping to protect the delta by partnering with the Environmental Defense Fund and the National Audubon Society for the Restore the Mississippi River Delta coalition to move projects in the Mississippi River Delta from plan to action. The National Wildlife Federation is also partnered with two local, in-state groups: Lake Pontchartrain Basin Foundation and Coalition to Restore Coastal Louisiana. Our overall objective is to ensure the river delta is safe and sustainable for people and wildlife.

Almost half of the population of Louisiana lives near the coast, including in the city of New Orleans. The coast's unique culture is made up of people whose way of life is tied to the bayous and nearby wetlands, including Native Americans, Acadians (Cajuns), Creoles, and other peoples who have settled here from all over the world. Much of its economy is tied to its coast and wetlands. The coast has extremely productive commercial fisheries, and the wetlands and wildlife draw birders, hunters, anglers, boaters, and other outdoor enthusiasts. The navigable waterways, including the Mississippi River, support shipping and transit. The offshore oil fields and refineries provide numerous jobs. The wetlands that make up most of the Mississippi River Delta are an extremely valuable resource that provides critical services to people, called ecosystem services. These include providing seafood and wildlife for us to enjoy; improving water quality by filtering out pollutants and absorbing excess nutrients; replenishing aquifers; controlling erosion; and helping to dissipate storm surges. In Louisiana, communities of color are integral to the state's economy and people of color represent a large segment of the state population.

Historically Black Colleges and Universities

Rising from a historic environment of legal segregation, Historically Black Colleges and Universities (HBCUs) were established prior to 1964 with the intention of offering accredited, high-quality education to African American students across the United States. These schools do, however, admit students of all races. Students can choose from 99 HBCUs across America, including public and private schools, two-year and four year schools, and professional schools. In Louisiana, six colleges/universities are historically Black colleges (HBCUs). For this project, Grambling State University and Southern University and A&M College are our partners.

The Mississippi River and Southern University: A Historic Environmental Relationship

The Mississippi River is the second-longest river in the world. Its 2,318 miles, moving through the middle of the United States, has been an economic superhighway before establishing the United States. The river is home to diverse cultures, ancient civilizations, and higher learning institutions, such as Southern University and A&M College.

In 1880, Southern University and A&M College was initially founded in the Mississippi River town of New Orleans, Louisiana. After the passage of the 1890 Morill Act, Southern gained land-grant university status. Thus, establishing its Agricultural and Mechanical department. Furthermore, in 1890, Southern moved its campus from New Orleans to its current location on Scott's Bluff in Scotlandville, Louisiana, which overlooks a bend in the

Mississippi River. Southern values present and past achievements in teaching, research, and extension to preserve the Mississippi River for Louisiana citizens now, as well as generations to come.

Impact of Plant Life Upon Mississippi River Environmental Health

Plants play a significant role in the health of the Mississippi River. One of the plants impacting river health is a perennial grass called Switchgrass (*Panicum virgatum*). It grows on the riverbank, as well as the soils throughout the Mississippi River Valley. Switchgrass roots can grow 10 feet deep into the ground. Thus, increasing environmental quality by filtering pollutants and decreasing soil erosion caused by rainwater and river flooding, Switchgrass can grow to a height of 9 feet tall. Therefore, they provide shelter for local wildlife, such as quail and deer. Deer use Switchgrass as bedding for their fawns. Quail prefer Switchgrass because it allows for protection from predators and provides seed for food. Switchgrass is also being researched as an environmentally friendly alternative to using corn to produce gasoline fuels.

Hemp or Industrial Hemp is another plant playing a significant role in the Mississippi River environment. Its rapid growth and long fibers allow hemp to process into food, medicine, fiber, building materials, and biofuels. It also can grow in soil areas that are typically not suitable for traditional agriculture crops. However, it does have benefits to the river environment. Hemp can absorb toxic heavy metals, such as lead, mercury, cadmium, and copper. It can also absorb carbon dioxide from the atmosphere and deposit into the soil. Thus, industrial hemp can help to reduce global warming. Therefore, it is creating a cleaner environment for future generations living along the Mississippi River.

Non-point Source Pollution and River Health

The Mississippi River and the Atchafalaya River are the two major waterways in the state of Louisiana. Although these two water bodies are not physically connected today, the Atchafalaya basin is the historic outlet for the Mississippi River to enter the Gulf of Mexico. A threat to the livelihood of both water systems is non-point source pollution. Non-point source pollution is a toxic chemical or soil sediment that cannot be traced back to where they initially entered the river.

Citizens of Louisiana have been working for a long time to deal with non-point source pollution. In the 1800s, The Atchafalaya River, the only remaining distributary of the Mississippi River, became polluted because it captured a significant amount of water and sediment discharge from the Mississippi River. The U.S. Army Corps of Engineers at the Old River Control Station dredged the Wax Lake Outlet in 1942 to aid in the increased flooding of the Atchafalaya Basin and Morgan City, LA. The Bonnet Carre' Spillway and Wax Lake Outlet are the oldest diversion systems constructed for flood control in the basin. The Mighty Mississippi River and its other connected water bodies are severely affected by non-point source pollution. Most rivers in the United States eventually empty into the Mississippi River. Therefore, the Mississippi river receives non-point source pollutions from all over the nation. Every day, this pollution passes right by our cities of Baton Rouge and New Orleans.

How does the non-point source pollution enter the Mississippi River from all over the United States? Rainfall flows across the landscape. It then washes soil particles, bacteria, pesticides, fertilizer, pet waste, oil, and other toxic materials into the lakes, streams, and groundwater, which drain into the Mississippi River.

Agricultural Runoff is one of the leading causes of water pollution in the United States. Agricultural runoff adds nutrients like nitrogen and phosphorus to water systems, which cause them to become eutrophic. Eutrophic is when there is an increased and dangerous amount of nitrogen and phosphorus in a water system. It results in green algae blooms that remove oxygen from the water—thus killing fish and marine life and creating a dead zone. In 2017, the Dead Zone in the Gulf of Mexico caused by non-point source pollution existing from the Mississippi River was the size of New Jersey. It is the largest one on record.

Mississippi River Educational Opportunities

The Mississippi River tells a great, historical story. It is a part of Southern University and provides great opportunities for Southern University and the local community. Below are several recommendations for incorporating the Mississippi River into the educational infrastructure of Southern University and the local community.

- Create an inquiry-based, STEM and history-based curriculum, and other educational materials that can be incorporated into the local school districts, including the Southern University Laboratory School, a PK-12 school that is on the campus of Southern University.
- Create college courses that can be taken as electives across all disciplines.
- Design a professional development workshop/institute for teacher candidates and educators focused on the Mississippi River and related topics.
- Create a Mississippi River Museum near the banks of the river on the campus of Southern University. This informal space should be inviting to the general public by taking the ongoing scientific research and relaying it in simple formats through interactive exhibits, historical documents, multimedia, etc.
- Host educational symposiums to provide awareness on and interests in the Mississippi River and related topics.

The Mississippi River impacts the lives of every Louisiana citizen. It may be a place for recreation for some and home to others. The river has been a huge impact upon Louisiana cultural practices, such as the food we eat. River soils provide a way for farmers to provide for their families, as well as families throughout the whole United States. The Mississippi River provides educational opportunities via Southern University. Therefore, as Louisiana citizens, we must make sure that the river is here to provide education, research, and outreach opportunities for generations to come.

Cancer, Toxicology, Food Markets, and Wetlands in the Mississippi River Delta Watershed

The name of the Mississippi River originated from Native Americans meaning “Father of Rivers.”

Historically, it was the key waterway for the African American slave trade while also serving as a passageway of escape to freedom.¹ Moreover, the river was used for military maneuvers to transport soldiers and supplies to strategic locations during the Civil War.² Today, the Mississippi River is an economic conduit and lifeline for several states. It serves as a navigable highway, commercial trading route, and water recreational site for boating and fishing. It is the second longest river in the United States (U.S.) and home to over 280 species of fish with surrounding and distinctive wildlife habitats and biomes.³ Lake Itasca, found in the northern part of Minnesota, is the primary water source that feeds the Mississippi River. The hydrologic free-flowing movement of the river has carved out winding curvatures in the landscape as it starts the journey from Lake Itasca and travels 1,557 miles downstream towards its mouth called the Mississippi River Delta, Figure 1. The delta area of the river is a bird's foot mosaic of new and abandoned lobes of silt and sediment which empties into the Gulf of Mexico.



Figure 1. Mississippi River and meandering course to delta area. Adapted from Delta-Alliance
<http://www.delta-alliance.org/deltas/mississippi-delta>

After hundreds of years of traveling the same course, the meandering Mississippi River has become vulnerable to man-made activities which pose a major threat to human health, natural resources, and wildlife habitats. Up and down the Mississippi River are industrial factories that release heat-trapping emissions into the atmosphere and cause an invisible blanket to hover over the Earth. Sun rays that hit the Earth's surface cannot penetrate the invisible blanket to go back into the atmosphere. This event causes the Earth's temperature to rise, and thus, we have global warming. Interestingly, a warmer climate changes environmental conditions of the weather that result in extreme rainfall events, irregular flooding, hurricanes, stormwater runoff, and

coastal disturbances. Collectively, these climate-changing activities pose a potential danger to the livelihood of communities and to the water quality of the Mississippi River Delta watershed. More importantly, irregular flooding is a growing concern because communities are subjected to a polluted floodplain that exposed residents to infectious illnesses, toxic chemicals, and injuries.⁴ According to CDC, exposure to contaminated floodwater can cause wound infections, skin rash, gastrointestinal illness, Tetanus, and Leptospirosis.⁴

The Clean Water Act (CWA) governs safety regulations for water pollution in the U.S. The CWA specifically aims to mitigate pollution in the nation's water in order to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters", as described in CWA section 101(a).⁵ However, the assessment of CWA's legislative limits is enforced by the U.S. Environmental Protection Agency (EPA). Non-point source (NPS) pollution is globally problematic and remains a serious problem in our nation. While water quality degradation is a rapidly unfolding event in the Mississippi River Delta watershed, tracing NPS pollutants back to their original sources can be difficult. Discharges from agricultural fertilizers, pesticides, construction activities, dredging activities, and urban infrastructure run-off containing toxic chemicals are all culprits of NPS pollution. Excessive rainfall causes stormwater flooding to swiftly move across urban infrastructures (streets, parking lots, and golf courses), farmlands, industrial wastewater, and sewage water. Floodplains are lower land areas that are adjacent to the Mississippi River. The movement of NPS pollutants mixes into a toxic cocktail and is transported across residential floodplains and to various river locations. When NPS contaminants become prevalent due to flooding, the livelihood of residents, community infrastructures, natural resources, and wildlife habitats are threatened.

The challenges of creating sustainable management programs for the Mississippi River Delta watershed are indeed great. Glaring facets of risks and dangers involved with exposure to toxic chemicals in the watershed are vocalized through Grambling State University's student biology researchers and toxicology professor. Understanding these vulnerabilities and risks is necessary for local organizations, national networks, and stakeholders to implement resiliency management programs that impact the community, episodic flooding, natural resources, and wildlife habitats. With a watershed approach, we steadfastly encourage support for projects that foster activities to protect basic human needs, address public health issues, and sustain the infrastructure of communities in the Mississippi River Delta region.

Rushing to Exhale: Black and Breathing in Cancer Alley, East Baton Rouge, and New Orleans Upper 9th Ward

Louisiana ranks third in the U.S. with the highest death rate of cancer.⁶ In the Mississippi River Delta watershed and in Congressional District 2, there were an estimated 20,555 new cases of cancer between 2013 to 2017.⁶ The global demand for the production of commercial and consumer goods continues to rapidly increase. Chemical industries provide useful resources of plastic and polymers for automotive, aerospace, domestic, medical, and military applications. Moreover, petroleum industries use raw crude oil to produce restricted-use fertilizers, gasoline products, pesticides, and pharmaceuticals. Manufacturing this market of products generates toxic pollutants which pose a great health risk to humans and their environment. Cancer Alley is an area of chemical and petroleum industries that extends 85 miles and covers the landscape along the Mississippi River between New Orleans and Baton Rouge, LA, Figure 2.7 The chemical corridor consists of more than 150 petrochemical industries and is located in the heart of the Mississippi River Delta watershed.⁸ Seven parishes in Louisiana form the fabric of Cancer Alley which include: East Baton Rouge, West Baton



Figure 2. Petrochemical industries in Cancer Alley releasing toxic pollutants in the atmosphere, and Mississippi River. Retrieved from: <https://www.latimes.com/great-reads/la-me-c1-subra-enviro-20130827-dto-htmlstory.html> (Jerry Grayson/Helifilms Australia)

Rouge, Ascension, St. John the Baptist, St. Charles, St. James, and Iberville Parishes. Local residents of St. Charles, St. James, and St. John the Baptist Parishes initially welcomed petrochemical factories because residents were promised jobs. Unfortunately, residents now find themselves and their communities being exposed to toxic smokestacks of pollutants on a daily basis. Cancer Alley is also referred to as "Death Alley," because the life expectancy of residents is shortened as a consequence of inhaling toxic chemicals. This area is well-documented as having the highest rate of air pollution caused in the U.S., which is 50 times more than the national average.⁷ Although many petrochemical companies insist that they are compliant with U.S. EPA regulations, exposure to the toxic pollutants has become a way of life for local residents. Mortality rates have increased which includes the unborn. According to a team of researchers, about 40% residents have experience chest pain and heart palpitations, while one-third residents have trouble breathing or have wheezing episodes.⁷ Other symptoms include headaches, lightheadedness, and dizziness. Almost half of the residents reported regular episodes of eye pain and irritation along with skin rash and fatigue.⁷ Long-term exposure to the toxic mixture of pollutants has caused nosebleeds and headaches in children.⁷ Cancer rates in Cancer Alley residents reach 700 times the national average along with high incidences of liver and kidney illnesses.⁸ According to U.S. EPA, St. John Parish had the highest cancer risk because of chloroprene production.⁸ Inhaling chloroprene fumes causes injury to the "central nervous system, lungs, liver, spleen, gastrointestinal tract, and kidneys."⁹ Chloroprene is lethal because it can lower blood pressure, impair the function of vital organs, and cause asphyxiation as well as respiratory depression.⁸ Another disproportional pollutant that encroaches the atmosphere in Cancer Alley is ethylene oxide which is manufactured by Dupont. Ethylene oxide has been documented as a hazardous air pollutant by U.S. EPA. Other applications of ethylene oxide include the manufacturing of fiber glass and its use as an intermediate to produce other types of chemicals.¹⁰ Excessively high amounts of ethylene oxide have been found in St. Charles Parish and residents face the highest risk in the nation of developing lymphoid and breast cancers from exposure.⁸

Research has shown that vulnerable populations are often faced with circumstances that are stressful. Most communities in Cancer Alley are populated with Black residents who have experienced high levels of cancer and other diseases. For example, Reserve, LA, located in St. John the Baptist Parish, was once a sugarcane plantation. Around the first part of 20th century, Reserve, LA was described as a small town that sits on the east bank of the Mississippi River with mostly white citizens. However, in the 1960s, when petrochemical industries began to move in, white residents began to move out and the racial decorum of the town was changed. Blacks began to move in and occupy the region because of jobs and the ability to get easy access to home loans. Unfortunately, Blacks that once worked the sugar cane fields, "now pray for medical help to endure the high rates of cancer, respiratory illness, diabetes, and kidney disease."¹¹ The Clean Air Act (CAA) sets the boundaries for air pollution in the U.S. However, the U.S. EPA is the regulatory agency to make sure that standards for chemical emissions are enforced. Robert Taylor, a 77-year-old environmental activist, began to cry out and protest against the environmental injustices of breathing the polluted air. He caused such a disturbance that in December 2015, the U.S. EPA did an air quality study in the Reserve, LA region and found exceeding amounts of chloroprene in the atmosphere. From that study, "the U.S. EPA confirmed that Reserve, LA had the most polluted air in the region," and "nearly every household has had someone to die from cancer."¹² A representative, on behalf of the Denka Performance Elastomer company maintained that the company operated within all of the Louisiana Department of Environmental Quality regulatory permits and "in accordance with existing standards designed to protect the public health and the environment."¹² However, U.S. EPA ordered the Denka company to reduce chloroprene emissions by 85 percent.

Several African American neighborhoods are known as fence-line communities because residents "breathe whatever erupts from the nearby smokestacks and drink what the companies release into the local water supply."¹³ East Baton Rouge and Orleans Parishes are the urban districts that demonstrate low income and minority residents in inner cities have an excessive proportion of health disparities.¹⁴ Standard Heights, an African American neighborhood in the northwest inner city section Baton Rouge, LA and on the east bank of the Mississippi River, is located along the fence-line of Exxon Mobil's gigantic Baton Rouge plant and refinery, which is the 11th largest oil complex in the world.¹⁴ Standard Heights used to be a flourishing community. Interestingly, nearly all the residents have disappeared, died with cancer, and other unexplained diseases. According to Mrs. Brunetta Sims, the last resident standing, "they all gone now. Nobody here but me." Although the foul-smelling aroma from the Exxon plant would saturate her home, she continues to ignore her burning eyes and scaly throat. Mrs. Sims contracted mysterious sores on her feet and doctors had no idea what caused them. Her brother, family members and friends had early deaths because of cancer or lung disease. However, it almost seems normal to die with cancer, if your neighborhood is poor, Black, and a "stone's throw away" from the petrochemical plants.¹⁴

Gordon Plaza, a Black residential neighborhood, was built on the Agriculture Street Landfill in New Orleans

Upper Ninth Ward. Previously, the landfill was the major dumping ground for industrial and residential waste. Following U.S. EPA testing of the neighborhood in 1994, the area was declared as a federal superfund site.¹⁵ Superfund sites are regulated through the U.S. EPA to clean up the nation's most contaminated areas in order to protect the public from a contaminated and polluted environment.¹⁶ The U.S. EPA report found 150 toxic chemicals, 50 of which were cancer-causing chemicals. After New Orleans closed the landfill in 1960, the city's housing authority-built Press Park housing development. Press Park consisted of 237 townhouses for striving Black families. Gordon Plaza was constructed next to Press Park and Moton Elementary school was also built in the neighborhood. The school was forced to close its doors because children tested positive for lead and the land was full of toxic chemicals.

More issues began to escalate when neighbors would inhale foul-smelling odors and find all sorts of debris in their yards. Healthwise, residents contracted cancer, children were born with deformities, and women had miscarriages.¹⁷ After the devastation of Hurricane Katrina in 2005, residents could not receive federal funding to renovate or rebuild because Gordon Plaza was a toxic superfund site. Shannon Rainey, the community spokesperson, and residents of Gordon Plaza filed a class action civil suit. The outcome of the civil suit ruled that residents get paid for emotional stress and property damage. In addition, school-age children were to receive payment for each that they attended school on toxic land. Sadly, to say, Gordon Plaza residents were paid pennies and attorneys walk away with 1.7 million dollars each.¹⁷ In 2013, FEMA documented that the Press Park area site was still filled with toxic chemicals.

People's right to a healthy environment should be protected and respected. The Black communities in Cancer Alley, East Baton Rouge, and New Orleans Upper 9th Ward are steadily trying to find new ground to help them adapt to the ills of toxic pollution. There is a blatant difference of influence between petrochemical firms and residents. The chemical and petroleum industries generate \$80 billion dollars for Louisiana.¹⁸ The U.S. EPA and the Louisiana Department of Environmental Quality should make sure that these petrochemical companies are adhering to the strict standards and guidelines that are set by the CWA and CAA. Clear evidence has been presented for persistent judicial proceedings to be taken. Currently, toxic tort cases are being litigated on behalf of residents that live in compromised communities. So far, these petrochemical companies have been successful because of pro-business politicians and scant environmental oversight.

The environmental inequality and health disparities in Cancer Alley, East Baton Rouge, and New Orleans Upper 9th Ward are examples that are pitted against African American communities in the nation.

Toxicology

Toxicology is the scientific study of detrimental effects that occur in the body due to chemical exposure. Individuals develop chronic illnesses when they are exposed to toxic pollutants over and over again. Pollution of rivers dates back to the late 1800s when there was an upsurge in the American Industrial Revolution. People became ill, because they drank polluted water, or they ate animals that were exposed to the toxic pollutants. Today, exposure to toxic pollutants will cause injury to humans and animals. The mass production of global products by petrochemical industries in Cancer Alley has resulted in the distribution of toxic pollutants in the air, soil, and surrounding water which is the Mississippi River. When petrochemical industries manufacture materials, cooling towers are needed to remove excess heat from the circulating water as it cools various industrial operations. This water is known as spent water and it is discharged into the Mississippi River with large volumes of byproducts, and toxic pollutants. It is interesting to note that this mixture of pollutants is very poisonous and will cause severe injury to humans and animals upon repeated exposure.

Long term exposure to toxic pollutants is known as chronic toxicity, and the effects can sometimes cause irreversible damage to the human body such as heart disease, kidney damage, and cancer. A limited percentage of cancer cases are genetically predisposed, however, exposure to toxic contaminants in the environment is the cause of most cancers. Chemicals that have the ability to change the structure of DNA are called carcinogens. Cancer develops when cells continue to grow and divide with a defect in their DNA structure. An important factor to consider is that the more you are exposed to toxic chemicals, the more DNA becomes damaged and eventually the initiation phase of cancer is started. In the Cancer Alley region, 50 toxic chemicals in air have been identified, including benzene, 1,3-butadiene, formaldehyde, chloroprene, and ethylene oxide which present life-threatening health risks to residents.¹⁹ Benzene is used to make plastic products, resins, detergents, dyes, and pesticides.²⁰ Breathing benzene on a long-term basis can cause a decrease in red blood cells leading to anemia, cancer, excessive bleeding, and leukemia.²⁰ There are many

uses for 1,3-butadiene such as refining gasoline, rubber and latex production, agricultural pesticides, water treatment, and the production of new material for nylon.²¹ Human epidemiological studies have shown an rise in cardiovascular diseases and cancer from 1,3-butadiene exposure.²¹ Formaldehyde is widely used in domestic products such as adhesives, cosmetics, paints, pharmaceutical products, and disinfectants.²² Long-term exposure to formaldehyde is associated with cancer of the nose and accessory sinuses, nasopharyngeal and oropharyngeal cancer, and lung cancer in humans.²³

Denka Performance Elastomer, headquarters Tokyo, Japan, acquired the chloroprene plant from the Dupont Company, November 1, 2015. This company is located in Reserve, LA and it is the only plant in the U.S. that manufacture chloroprene. Although chloroprene has shown some evidence of cancer in laboratory animal studies, however, U.S. EPA has categorized chloroprene as Group D, not classifiable as human carcinogenicity. Chloroprene exposure can lead to liver function defects, cardiovascular disease, and immune system suppression.²⁴ Chloroprene is released in the air in a gaseous form during the polymerization process. It is used to make synthetic rubber products such as gloves, cables, diving suits, and various types of industrial hoses.²⁴ Ethylene oxide is used adhesives, detergents, solvents, medicine, and as an intermediate to make antifreeze.²⁵ Small amounts of ethylene oxide is used for sterilizing food, cosmetics, and hospital equipment.²⁵ Louisiana ranks high among the top states in production of toxic wastes and the amount of hazardous chemicals released into the air, soil, and water.²⁶ People who get their drinking water from the Mississippi River and who live in the confines of Cancer Alley have a 2.1 chance of getting rectal cancer compared to residents who get their drinking water from other sources.²⁷

Food Markets in the Mississippi River Delta Watershed

The Mississippi River Delta watershed provides a rich diversity of food products that are beneficial and economical for Louisiana citizens and communities. Traditionally, rice was grown along the Louisiana banks of the Mississippi River to feed slaves on the plantation.²⁸ New Orleans was once an important agricultural hub for rice milling and marketing activities. Today, rice is a natural commodity that is exported nationally and internationally.²⁹ When traveling throughout the communities in southern Louisiana, you will see endless fields of rice that are supplied with water from the Mississippi River. Rice is the one commodity that has survived persistent flooding in the region, and it grows favorably in the wet climate of Louisiana. Rice farmers strategically use the rice fields as breeding grounds for crawfish. This is known as rotation agriculture. One year would be the time to grow rice and the other year would be crawfish production. The crawfish feed on the remaining rice straw and stubble the winter and spring seasons.³⁰ This process takes about six weeks for them to grow in time to consume them in the restaurants from the time they are hatched.

In the U.S. crawfish is the largest aquaculture commodity. Ninety percent of the world's crawfish production comes from Louisiana which is considered a true American success story. On average, roughly 5,000 pounds of crawfish are harvested, generating roughly 1.5 million dollars in income for small fishermen.³¹ Not all the crawfish make it to market, the small remnant ensures that the harvest can continue. The survivors are transferred into a rice field that is still growing. When an area is available for digging their barrel, the crawfish will dig deep down in the soil about 5.6 ft in search of moisture through the air as the temperature in Louisiana gets warmer they will dig deeper to ensure they get sufficient moisture.

The waterways in the Mississippi River Delta supports a boundless diversity of fish and seafood such as: speckle trout, redfish, flounder, blue crabs, shrimp, catfish, largemouth bass, oysters, and sunfish.³² The Gulf region around the delta of the Mississippi River provides 33% of the U.S. seafood produce. Louisiana ports lie at the entry of the Mississippi River Delta which make them attractive for companies to disburse goods to the rest of the U.S. Three of the Louisiana landing ports located in Empire-Venice, Intracoastal City, and Cameron are also in the top six national seafood landing ports. Seven of the top five seafood landing ports in the Mississippi River Delta. Louisiana ports support 270,000 employees and add 32.9 billion to the state's economy.³³

Louisiana is the second largest seafood producer in the U.S. According to the Office of Science and Technology NOAA Fisheries, for the last 35 years, more oysters have been produced in Louisiana than in any other state in the nation.³⁴ In the delta region of the Mississippi River is the habitat for greatest source of oysters, which

accounts for 51% of the nation's supply.³⁵ However, there are many factors that wreak havoc on oyster reproduction. For example, extreme rainfall events caused the U.S. Army Corps of Engineers to open the Bonne Carré Spillway to keep north of New Orleans from flooding. This activity caused the breeding grounds of oysters to be flooded with fresh water from the Mississippi River. Because oysters need a semi-saltwater environment to thrive, they could not reproduce efficiently in a freshwater environment. Now the production of oysters has remarkably been reduced. Other seafood markets are profitable in the state of Louisiana. The shrimp industry in the Mississippi River Delta supports 15,000 jobs and has a yearly impact of 1.3 billion dollars.³⁶ Crabs generate about \$293 million and provides 3,000 jobs.³⁶ In April 2010, the Deep Horizon oil spill compromised the habitats of oysters, shrimps, and crabs with crude oil. In one of the settlements to Louisiana, BP industries paid 157 million to "restore, sustain, and monitor" up to 1,430 acres of brackish and saline marsh areas as well as 80 acres of earthen levee on the east side of Bayou Terrebonne and Chauvin.³⁷ This restoration project, in part, will help replenish the saline environment that is needed for oyster production.

Choking the Flow: Wetlands in the Mississippi River Delta Watershed

Wetlands are water-submerged areas of land with plants that can flourish and grow in water. All wetlands have distinguishing features such as the presence of standing water for some period of the growing season, water-logged soils, and vegetation that can survive saturated soils.

Wetlands may be inland areas or coastal regions and called a variety of names such as bogs, cypress swamps, mangrove swamps, freshwater marshes, tidal marshes, and peatlands. Wetlands are valuable to the landscape because they function as a filtering system that cleanse incoming water, provide diverse food sources (fish, shellfish, and other animals), a navigational waterway, a sink to sequester carbon, and a place for water storage. In the past four years, wetlands New Orleans have steadily vanished. The value of wetlands is so significant that environmentalists and ecologists propose that if wetlands around the New Orleans area were better protected, the damage after Hurricane Katrina would not have been as devastating.³⁸ During a hurricane, wetlands have the potential to weaken storm surges and protect the city.³⁹

In 1968, the U.S. Army Corps of Engineers completed the Mississippi River Gulf Outlet (MRGO) to shorten the navigation route between Port of New Orleans and the Gulf of Mexico, Figure 3. As time progressed, the Corps dredged the channel and allowed 20,000 acres of wetlands to be transformed to open water. Once this happened, saltwater began to move in from the Gulf of Mexico, which damaged additional acres of wetlands and lagoon habitats.³⁸ Freshwater cypress forests of Orleans and St. Bernard Parishes were destroyed by the saltwater intrusion that flowed up the channel.³⁸ Moreover, a section of Lake Pontchartrain became a dead zone.³⁸ The cypress trees that use to serve as natural buffers were now damaged or dead. In addition, because of the thousands of destroyed wetlands, there was limited storage capacity to catch the storm surge water. The Lower 9th Ward and St. Bernard Parish were highly populated with black residents. The planners of the MRGO project probably felt that because the Lower 9th Ward and St. Bernard Parish were elevated, flooding would not have occurred. The MRGO channel breached the earthen levees while the surge was still in effect. This made it easier for storm surge water to be funneled to the inner part of the city. At the same time this was happening, waves from the surge caused earthen levees and flood wall to collapse.³⁸ The aftermath of Hurricane Katrina lead to the closure of MRGO. Seventeen advocacy groups were instrumental in the deauthorization of MRGO.³⁸ Now, the restoration of wetlands is essential to achieve maximum community resilience from storm events. Wetland restoration and ecosystem management must become a priority with community, local, and national organizations so that they can contribute to the decision-making processes and stages of planning.

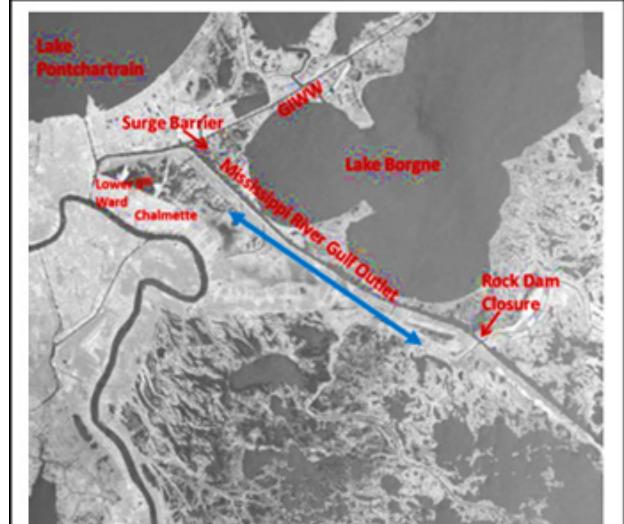


Figure 3. Map showing location of MRGO, GIWW, Lower 9th Ward, Lake Pontchartrain and large neighborhoods affected by storm surge of Hurricane Katrina. Adapted from: Mississippi River Gulf Outlet <https://scienceforourcoast.org/pc-programs/coastal-coastal-projects>

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The Students



Jynelle Liverpool

My name is Jynelle Liverpool. I am an international graduating senior from the island of Dominica pursuing a bachelor's degree in Biological Sciences at Grambling State University (GSU). Also, I am proud to say that I am one of GSU's researchers for this Bayou Classic Publication. After graduation, my main goal is to further my studies in the Environmental Science field with the ultimate goal of acquiring a doctorate and obtaining a career position as an Environmental Scientist.

I chose GSU because as the motto states, "Grambling is the place where Everybody is Somebody." This motto captivated me, and I felt like this University is ideal for an international student like me. While attending GSU, I was a member of the Favrot Student Union Board in my first year and I am currently a member of the International Student Organization. I am also a member of the Biology Club where I have contributed significantly to beautifying the campus by participating in general school clean-ups and by assisting in the preparation of the Annual High School Day event. Recently, I have been inducted to the Earl Lester Cole Honor College. There, I have a wide perspective of the real definition of leadership and becoming a good role model in the future.

My part of this publication was to discuss the food industries along the Mississippi River. Two of the main



industries along the river are Agriculture and Aquaculture. They are considered the main food industries closely linked to the Mississippi River. Agriculture plays a major role in boosting the state's economy by profiting from careful conservation and strong management.

The African American communities are trying their best to restore the Louisiana coast for wildlife and economies despite the challenges they face yearly. This research has opened my perspective of the Mississippi River and has strengthened my research skills in the biological field.



Morgan Adams



Morgan Adams, a native of Monroe, Louisiana, is a graduate of Ouachita Parish High School. Morgan is a senior at Grambling State University where she is majoring in Leisure Studies with a concentration in Therapeutic Recreation. She is a four-year starter of the Grambling State Softball Team and has served as the captain for three years.

She serves as the Vice-President of the Student-Athlete Advisory Committee and is a member of Zeta Phi Beta Sorority Incorporated. Morgan has a cumulative GPA of 3.53 and has maintained academic honors every semester. Upon Graduation, Morgan plans to earn her masters in Sports Administration as she aspires to one day work in the NFL Football Operations.



Harry Lee Hooker III



My name is Harry Lee Hooker III. I am a graduating Senior at Grambling State University (GSU), “The place where everybody is somebody.” I am a Chemistry major with a minor in Biology. I chose GSU because it was a “family school.” My grandfather and mother both graduated from GSU as well as my uncle, a handful of cousins, and many more family members. I always knew that I was going to pursue my undergraduate studies at GSU from a young age. My family started taking me to the GSU campus and the Bayou Classic from the time I was able to walk. GSU has been instrumental in cultivating me into the young man and researcher that I am today. I have been blessed with many opportunities during my time at GSU. I have had the privilege of interning with the Louisiana State University Shreveport Health Science Center doing cardiovascular research and also with Eli Lilly and Company doing Pharmacy Research. Both internships played an integral role in crafting my research skills and techniques.

I am an active student on my campus, involved in many extracurricular activities. I am a member of the World-Famed Tiger Marching Band where I play the alto saxophone and the flute. I am also a member of Alpha Phi Alpha Fraternity Inc. and Kappa Kappa Psi National Honorary Band Fraternity Inc. I have thoroughly enjoyed all of the extracurriculars and opportunities that have come my way. GSU has really opened many doors for me and I am forever grateful! My plans after graduation are to attend pharmacy school. Pharmacy school has been my goal since I was a young child and now that dream is turning into a reality.

This Mississippi River White Paper is the first paper that I had the privilege to co-author. My section of the White Paper focuses on Toxicology. Toxicology is one of my favorite classes that I have taken at GSU because my professor has a deep passion which shows in the way that she teaches. She instilled the same love that she has for the subject in me. The research was very interesting about the toxic chemicals that are present in “Cancer Alley.” I researched how detrimental the effects of chemical pollution could be on people, wildlife, and the environment. I also found that exposure to chemicals can cause an irreversible negative effect. It is critical that we address chemical pollution, if want a safe and clean environment. This paper opened my eyes to what underprivilege communities have to deal with on a daily basis; the findings were not favorable to these people. Chemical pollution is a problem that has to be tackled because environmental justice is a basic human right that all people are entitled to it.



Stevie Wilson

My name is Stevie Wilson, and I am from Winnfield, LA. I am a Biology-Pre-med major and graduating senior at Grambling State University (GSU), “the Place Where Everybody is Somebody.” Interestingly, I always knew that I would attend an HBCU because of my encountered family-oriented experiences when attending events on different HBCU campuses with my family.

I chose GSU because I wanted to be a part of the rich history in our family and to continue the legacy of my mother and other family members that attended GSU as far back as the 1950s. Attending GSU has afforded me many rewarding opportunities, thus being a great influence on the young man and researcher I am today. I have been fortunate to work as an intern with Des Moines University School of Medicine and Health Science. Through Des Moines internship, I shadowed medical doctors, and got hands-on experience by interacting with patients from different ethnicities. However, conducting research based on cultural competencies was significant in treating patients. I was able to gain valuable insight into the preparation for the Medical College Admission Test (MCAT) and interview. Similarly, I had the privilege to work as an intern with



the University of Connecticut Health in which I was able to acquire additional knowledge, skills, and medical doctor experiences that will be useful for the MCAT preparation. Both internships proved to be rewarding experiences in my quest to prepare for medical school.

I am actively involved in numerous cocurricular activities on campus. I am a member of the GSU “World-Famed Tiger Marching Band” in which I play the alto and tenor saxophones. Additionally, I am a member of Alpha Lambda Delta National Honor Society, Earl Lester Cole Honors College, Center of Academic Excellence in Mathematical Achievement for Science and Technology (CMAST), and Biological and Pre-Doctoral Club. I am eternally grateful for the many experiences I have encountered while at GSU. Upon graduation, I plan to continue my education by enrolling in a Doctor of Medicine program at a university of my choice.

My area of concentration in the Mississippi River White Paper is on “Cancer Alley,” which is the first paper that I have had the honor to co-author. Being aware that cancer has so many detrimental effects on people, I have always had a desire to make an impactful contribution on this obnoxious disease.

When the idea of the white paper presented itself, I knew that I could provide meaningful research. The research on “Cancer Alley” proved to be very intriguing. My focus was on how black communities situated along the Mississippi River, known as “Cancer Alley”, were affected. In my research, I learned why the area became known as “Cancer Alley”, the experiences the people faced, and how residents fought petrochemical plants that are producing cancer causing toxins and pollutants in the air. The fight for clean air in this area is still relevant today as those with ties to the area are determined to not give up on this issue.



Jalen Triplett



Jalen Triplett, a native of Jackson, MS is a senior at Southern University and A&M College pursing a bachelor's degree in Civil Engineering.

Throughout his matriculation, Mr. Triplett has been honored to serve as a member of several prominent organizations on the university campus including the Southern University Human Jukebox Marching Band, Student Government Association, Men's Federation, University College Mentor and the Collegiate 100 of Southern University and A&M College. In 2016, with the help of his business partner, Jalen co-found JiggAerobics® Fitness, LLC. JiggAerobics has become a growing fitness trend around the world.

Currently, Mr. Triplett serves as a Student Trainee Hydrologist at the United States Geological Survey and is a part-time graphic designer for the greater Baton Rouge community. Jalen plans to graduate from Southern University with a Bachelor of Science in Civil Engineering in December 2020 and continue his work as a Hydrologist with the USGS.

Shaeda Nickle



My name is Shaeda Nickle, captain of the Southern University Women's Tennis team. I am 5'1.5" senior from Montego Bay, Jamaica, born on January 1st, 1999. I am an Honors College Student under the major, biology. I aspire to be an Orthodontist and become an advocate for health in general. I love to go on adventures and try out new restaurants!





The Intentionality



January 26, 2021

Ms. Simone Lightfoot
Associate Vice-President, Environmental Justice
National Wildlife Federation



Dear Ms. Lightfoot,

Being a lifelong resident of New Orleans and graduate of a historically black college and university (Xavier University of Louisiana), I am ever so familiar with the long-standing competition and celebration folded into the iconic event known as The Bayou Classic (*The Classic*).

This long-standing tradition between two titanic institutions of Grambling State University and Southern University celebrates the two universities, their academic achievements, traditions, sportsmanship, marching bands, and overall friendly competition that both institutions have enjoyed with much honor and pride. While the premier focal point of the Classic might arguably be the football game between Grambling and Southern, the Classic is also an exhibition of the high standards of academic excellence that have come to be synonymous with both institutions.

The academic publication known by the title of ***Bayou Classic 2020 – A Battle of the Sciences: From Rivalry to Research & Protecting the Mississippi River Watershed***, is an academic endeavor that is squarely in keeping with the decades old tradition of the Classic. The publication and academic research expressed therein presents the case for taking a bold new approach for how we treat and care for the Mississippi River Watershed. The publication highlights the great work of Grambling and Southern Universities' prized assets – the student bodies of each institution.

The publication also points out numerous educational opportunities that the Mississippi River and its watershed can provide to the campus of Southern University and its surrounding community. It also gives important mention on public health implications, culture and cuisine as well as the undeniable importance that the Mississippi River has relative to the restoration of the vanishing wetlands of southeast Louisiana.

The very knowledgeable and accomplished team of students and their faculty mentors that contributed to the scientific rigor demonstrated in this publication are to be commended for their very scholarly and use-inspired work. And, I am forever grateful for the opportunity to review and celebrate their very impressive body of work.

Sincerely,

Charles E. Allen, III
Community Engagement Director
National Audubon Society



River to Bayou

Created through a dynamic partnership with the National Wildlife Federation, The Lower 9th Ward Center for Sustainable Education & Development (CSED), has engaged directly with scholars, athletes and scientists from the campuses of Grambling State University and Southern University in an effort to showcase our environment, our student scholars and our communities in Louisiana in support of the 2020 Bayou Classic.

The Bayou Classic commemorates historically Black Colleges and universities, academic achievement, tradition, sportsmanship and healthy competition. The “Classic” displays an exhibition of the highest standards of academic achievement and athletic accomplishment deeply embedded in these two HBCU power houses!

Over the last three years, we have work to establish engagements through campus visits, student professional development and career day activities, Bayou Classic 2018 and 2019 sponsorship and support, Founder's Day and press conference celebrations, a partnership appreciation awards luncheon, and planned support for Bayou Classic 2020, prior to the pandemic.

The unprecedented pandemic of 2020 challenged everything except the ability of our team to engage and propel the wit and focus of competition in another area of merit. We worked with faculty at both Grambling State University and Southern University to create a new competition between the schools and Bayou Classic 2020: A Battle of the Sciences was born. This effort is indicative of the forces incorporated through science, research, and student scholarship of both campuses that has added a research collaboration into the famed Bayou Classic of 2020.

Research scholars and scientists from Grambling and Southern worked with the National Wildlife Federation, the Lower 9th Ward Center for Sustainable Engagement, and The National Audubon Society to highlight environmental, climate change and quality of life domains relevant to the Mississippi River.

CSED is extremely proud of this extraordinary effort!



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A Defining Moment



We are in a defining moment that requires deliberate reflection, bold leadership, intentionality and collaboration to reach collective success in a quickly changing climate. At this moment, I am proud to be part of the National Wildlife Federation's continued partnership with the Lower Ninth Ward Center for Sustainable Engagement and Development to highlight the traditions, culture and contributions of historically Black colleges and universities (HBCUs). This year's initiative, Bayou Classic: Battle of the Sciences, centers scholars from Southern University and Grambling State University who unite in science research to present Mississippi River impacts on communities and the environment.

The Mississippi River is a critical water resource that weaves the very fabric of our country. The River fuels diverse economies, sources drinking water for millions of people and is a treasured ecosystem with abundant fish and wildlife – but it is managed for navigation and flood control without true regard for ecosystem restoration and protection. Recent record-breaking floods, weather patterns and future climate predictions underscore that we must rethink river management practices. From Minnesota to the Mississippi River Delta in coastal Louisiana, the impacts of climate change are ravaging communities.

The time to prepare for a future with more water is now.

As we envision a future, we must remember the past. The fate of the River depends on our ability to employ holistic solutions that center frontline communities and manage navigation, flood control and ecosystem needs.

HBCUs are deeply rooted in the community and strive for academic excellence. HBCUs educate innovative leaders and produce graduates that enrich every field of science. HBCUs are uniquely positioned to inform decisions relative to connected communities and beyond. This is especially true for these two dynamic institutions that hold strong ties to the Mississippi River, its natural land and ecosystems. The Southern Jaguars and Grambling Tigers have a demonstrated commitment to understanding challenges and designing innovative solutions to address them.

As a proud HBCU alumna, I am delighted to support this initiative led by rising science and policy leaders.

Faye Matthews, Esq.
Legal Policy Advisor



The importance of HBCU research on addressing global climate change.

by Carla Walker
CEO, think BIG strategies, llc

Most will choose to remember this year because of the shared experiences we have lived through. A global pandemic that has daylighted and exacerbated existing health inequities. The public killings of more unarmed black people at the hands of the police. The collective realization that this country is built on systemic racism and the intersectionality of that foundation on issues of climate policy. Movements blended and coalitions entangled that now force a coordinated response informed by a broad and diverse table.

Global climate scientists speak about this year as the milestone year, the climate turning point. It is the year when the world should have begun to see the downturn of the carbon emission curve and the start of its steady decline in order to achieve the goals of the Paris Climate Agreement. A recent “State of Climate” report by World Resources Institute and ClimateWorks Foundation notes that “while numerous countries, cities, and companies have committed to greater emissions cuts, much greater ambition is needed if we are to meet the Paris Agreement’s objectives.” Actions taken over the next ten years will be critical to the world’s ability to achieve necessary reductions needed to attain net zero emissions globally by 2050.

As a scientist from an HBCU, where do you play in this scenario? I submit that you and your scientific colleagues are at the very center of this setting and the key to unlocking the climate challenge as we head toward the next milestone years of 2030 and 2050. Achieving the Paris Agreements cannot happen without addressing climate justice. And, climate justice cannot be addressed without addressing racial justice. The research you produce, share, present, and publish will contribute to climate and sustainable policies and initiatives needed to bend the emissions curve with an understanding of the impact



climate change has on black and brown people and our communities.

Your data and results should be seized upon by cities, city leaders, and decision makers. They are on the frontline for climate policy and that must be based on findings that consider how those strategies impact all their constituents. According to the United Nations Environment Programme, “urban activities are major sources of greenhouse gas emissions with estimates suggesting that cities are responsible for 75 percent of global CO₂ emissions.” Cities in the 10-state Mississippi River Basin are already experiencing climate change as seen by extreme weather events that have caused frequent flooding, algal blooms, and more high-temperature no-rain days leading to agricultural droughts.

Cities need to make a drastically different commitment to addressing climate change and that must be one that centers solutions for those who are most burdened by its impact. If there is any hope of finding our way out of the multitude of crisis that have formed the perfect storm of 2020, it is and will be the ideas that you put forth to crack open the climate policy landscape.

About Carla:

Carla Walker is a global climate and environmental justice advocate, urbanist, political strategist, and president of Think BIG strategies, a consultancy working with decision makers to achieve game changing initiatives. She can be reached at carla@thinkbigstrategies.com



In Memoriam

A TRIBUTE TO

Dr. Keith Jennings

The Human Right to Water and Sanitation: From Theory to Practice



by Dr. Keith Jennings
Ambassador for Human Rights

In our globalized world today there are a few basic issues that affect everyone who inhabits the earth. Climate change is one of them. Another issue that is often overlooked is access to clean water and sanitation. It should be clearly understood that access is mainly conditioned by availability and affordability. Unfortunately, in many societies, one's ability to enjoy this basic right is so determined by your ability to pay for water. This should not be the case because the enjoyment of other human rights, such as the right to an adequate standard of living or physical and mental health, is connected to this basic right.

The Water Action Decade initiative points out that "weak water and sanitation systems aggravate the

COVID-19 crisis and the COVID-19 crisis in turn impose extraordinary pressures on already stretched water and sanitation systems. Currently, 2.2 billion people lack access to safe drinking water, 4.2 billion lack access to safe sanitation, and 3 billion lack access to basic hygiene depriving people of the most basic and effective preventative measure against the virus: frequent handwashing."

Access to clean water and sanitation is the sixth goal found within the Sustainable Development Goals (SDGs), a set of globally agreed targets designed to meet 21st-century development challenges, especially those that exist in the global south. In fact, according to the United Nations "while substantial progress has been



made in increasing access to clean drinking water and sanitation, billions of people-mostly in rural areas-still lack these basic services. The global body also reports that "the COVID-19 pandemic has demonstrated that critical importance of sanitation,

hygiene and adequate access to clean water for preventing and containing diseases” In fact, according to the World Health Organization (WHO) handwashing is one of the most effective actions you can take to reduce the spread of pathogens and prevent infections, including COVID-19 virus. Yet billions of people still lack safe water [and] sanitation...”

So why does this situation exist and more importantly what can be done about it? Often where one lives remains a determining factor. The public policies pursued by governments and the levels of inequality tolerated within various societies are also determining factors. To counter these realities, and help people get on the right side of history, we must ensure that everyone understands that access to clean water and sanitation is a human right.

That right is clearly defined in the Universal Declaration of Human Rights (UDHR) and the International Convention on Economic, Social, and Cultural Rights (ICESCR). In fact, the right to clean water and sanitation is directly linked with the human right to an adequate standard of living and to the right to the attainment of the highest level of physical and mental health, --rights also featured in the UDHR and ICESCR.

The right to clear water and sanitation is also supported by the International Covenant on the Elimination of All Forms of Racial Discrimination (ICERD) which guarantee that everyone, without distinction to race, color, ethnic or national origin, among other characteristics, should have access to all basic services and public accommodations. Unfortunately, in many northern capitalist countries including the United States, economic, social, and cultural rights are not treated as rights but “aspirations.”

Moreover, views on poverty continue to be measured only in terms of money, while alternative views that place the emphasis not only on money but also on spiritual values, community ties, and the availability of common resources are ignored.



I am saddened by the passing of my dear friend and colleague, Dr. Keith Jennings. He was a tremendous force for human rights and dedicated his career at @NDI to the advancement of democracy in African nations.

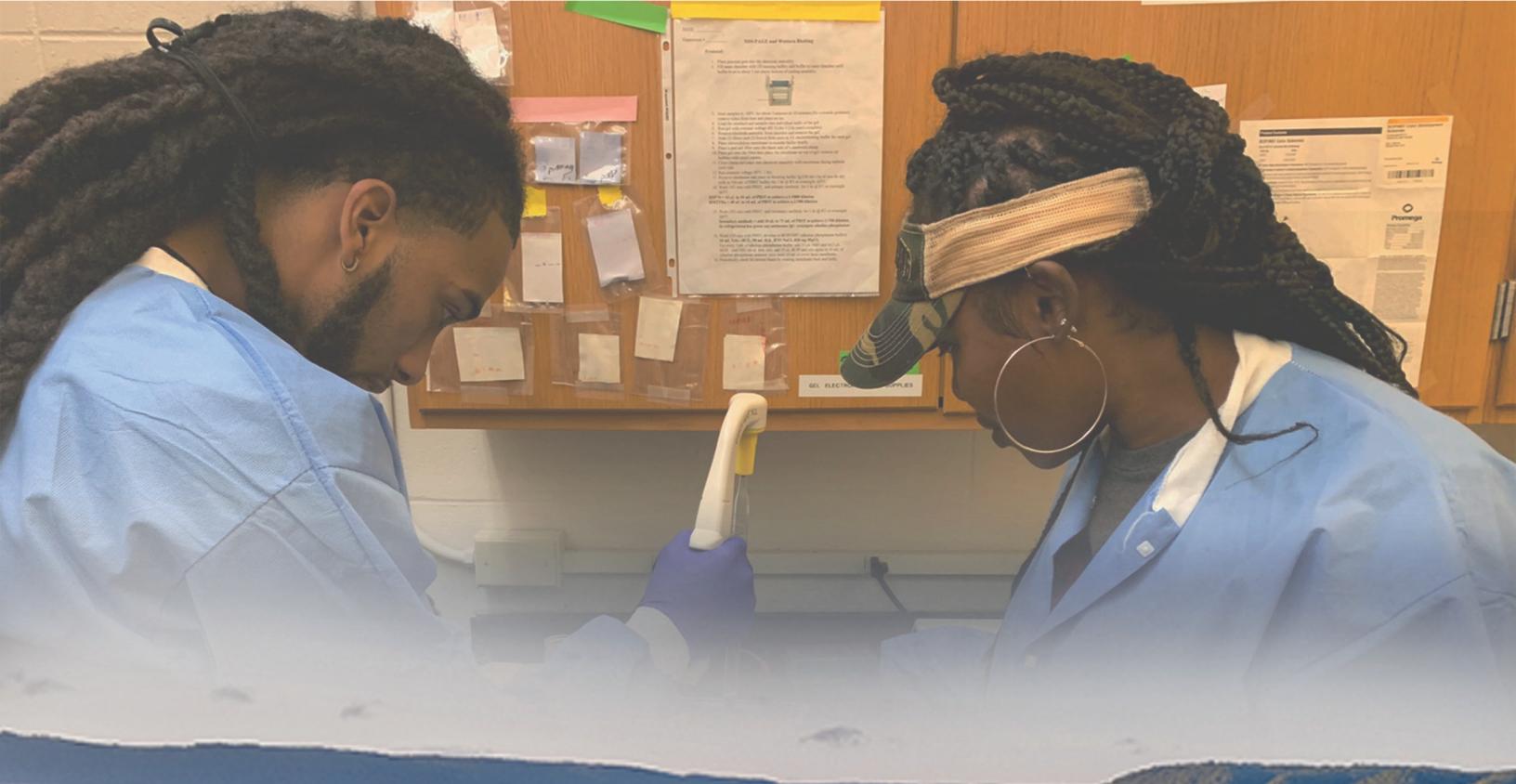
Martin Luther King III

Water must be defined as a common resource for humanity if we are to avoid the coming global water crisis. A new definition and interpretation of poverty also would prioritize the disparate impact that the lack of clean water and sanitation is having on the dignity of women and girls, national minority, and Indigenous communities.

In the past, many people thought that those complaining about unsafe water and sanitation had overactive imagines or were just “whiners” trying to “beat the system.” However, today, from Michigan to Alabama and South Dakota to Texas and from West Virginia to California the problem of access to clean water and sanitation, and its connection to race, class and gender are reluctantly being acknowledged, although the urgency of action is still missing. For example, in Detroit, Michigan, perhaps the city in the United States with the highest percentage of African Americans, over 100,000 people in the past couple of years have had their

water turned off by public officials simply due to their inability to pay for the semi-privatized service, whose rates continue to increase annually. Moreover, within numerous Indigenous Peoples communities, especially on reservations, access to clean water and sanitation has never existed, ever since Native Americans were forced to live there.

Given the current situation in the United States and around the globe, the importance of socially responsible research and analysis about water pollution, reliable access, water resources management, and humane public policies cannot be overstated. Therefore, the Southern-Grambling Initiative is an extremely important starting point for addressing a critical need to develop additional, and more diverse researchers, and committed human rights defenders capable of championing the basic right of all human beings to clean water and sanitation.



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