



THE UNIVERSITY OF
SOUTHERN
MISSISSIPPI

COASTAL USM

ANNUAL REPORT
2022

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“The University of Southern Mississippi’s Coastal Operations is committed to fulfilling its vision of being a national leader in addressing issues relevant to people living in coastal and maritime settings.”

DR. SHANNON CAMPBELL
Senior Associate Vice President | Coastal Operations

This report shares stories about Coastal USM’s contribution to educating students for in-demand careers, outreach services for the benefit of our communities, and research initiatives that are solving complex problems and generating new innovations.

Coastal USM has contributed to our university’s national ranking as an “R1: Doctoral University-Very High Research Activity” by the Carnegie Commission on Higher Education. Our Gulf Coast Research Laboratory (GCRL) is one of the largest marine laboratories in the southeastern United States with more than 200 faculty, researchers, and staff. As Mississippi’s designated marine laboratory, GCRL is a tremendous asset in Jackson County with two locations covering 274 acres with a diverse array of facilities.

Our Gulf Park campus celebrated its 50th year of operations for USM and has undergone amazing transformations this year! As the main teaching location for undergraduate and graduate students on the Gulf Coast, the Gulf Park campus added new laboratories and classrooms for film studies; new ocean engineering laboratory and classroom; and renovated classrooms and labs for the Accelerated Nursing Pathway program. Nearly every building across campus underwent physical upgrades and renovations with the central focus on creating experiential learning opportunities for students.

Our School of Coastal Resilience launched two new academic programs, Sustainability Sciences and Sustainability Studies. Sustainability sciences focuses on the physical aspects of sustainability with a holistic inclusion of the human element, while sustainability studies focuses upon the humanities

aspects of sustainability with a holistic inclusion of the physical elements.


School of Ocean Science and Engineering is producing graduates in high-demand and achieved another milestone with its Ocean Engineering program undergoing Accreditation Board for Engineering and Technology (ABET) accreditation visit in October.

As the leading research university of the Mississippi Gulf Coast, we answer the call on a daily basis of the important role we play in keeping Mississippi competitive with other coastal communities worldwide. Our Gulf Blue regional initiative is focused on the innovation sector of the blue economy. This term “blue economy” represents the portion of our state’s economy that is dependent on having a coastline and direct access to the ocean.

We have spent time over the last couple of years determining new roles that we can play to drive economic development that will attract new jobs to the region for the benefit of our students graduating and wanting to stay in Mississippi. In June, our USM Research Foundation, in partnership with Boston-based Sea Ahead, successfully launched the Gulf Blue Navigator Program designed to accelerate time-to-revenue for late-stage startups. The goal was to attract at least 30 companies submitting applications, and this goal was exceeded with 48 submissions from companies around the world. A team of experts and mentors selected six companies from among the submissions to participate in a six-month cohort program providing access to physical infrastructure, expertise and a support system of practitioners to help the companies reach new milestones. Gulf Blue Navigator Program is the innovation gateway to the Gulf of Mexico for these companies.

HANCOCK COUNTY

HARRISON COUNTY

 John C. Stennis
Space Center

 Gulf Park
Campus



Roger F. Wicker Center
for Ocean Enterprise
(opening 2023)



Marine Research Center

2022 LEADERSHIP TEAM



Dr. Heather Annulis

Director
School of Leadership
Professor of Human
Capital Development



Lucas Applewhite

Director
Facilities Planning and
Management
Coastal Operations



Anita Arguelles

Ocean Enterprise Content
and Brand Manager
Roger F. Wicker Center for
Ocean Enterprise



Dr. Kelly Darnell

Interim Director
Gulf Coast Research
Laboratory



Dr. Bridgette Davis

Assistant Teaching
Professor
School of Education



Dr. Westley Follett

Interim Director
School of Coastal
Resilience
Associate Professor
of History

JACKSON COUNTY

Point Cadet



Gulf Coast
Research Laboratory



Gulf of Mexico



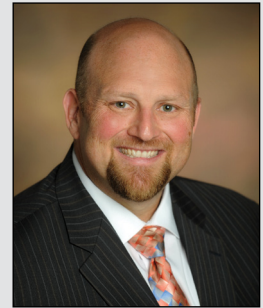
Dr. Jacob Breland
Associate Vice President
Academic Affairs
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Dr. Shannon Campbell
Senior Associate
Vice President
Coastal Operations



Dr. Jim Coll
Chief Communication Officer
Office of University
Communications



Dr. Brian Cuevas
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Dr. Leila Hamdan
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and Engineering



Pam Moeller
Director
External Relations
Coastal Operations



David Sliman
Chief Information Officer
iTech



Dr. Jennifer Walker
Associate Dean
Coastal Operations
College of Arts and
Sciences



Coastal USM Signature Moments

Online MBA Program Receives Impressive Ranking

USM has received a No. 8 ranking for Best Online MBA Programs in the South by online resource guide *Fortune Education*. No other Mississippi college or university is ranked in the top 30.

The top-10 ranking marks a significant jump for USM, which was ranked No. 19 last year. Dr. Steven Stelk, MBA director and assistant teaching professor of finance at USM, notes that faculty and leaders within the College of Business and Economic Development recognized several years ago the value of online delivery for students.

Fortune Education invited more than 200 online MBA programs to participate. In all, 104 programs completed the questionnaire. That information, along with data collected from companies and executives, was used as the core of each ranking. The final ranking is made up of four components: Program Score, *Fortune* 1000 Score, Brand Score and Prestige Score.

Hydrographic Science Program Graduates

USM's unique hydrographic science program has produced another diverse and talented group of graduates who were honored during a Class of 2022 recognition ceremony held



July 29 on USM's Gulf Park campus in Long Beach, Miss.

USM is the only university in the United States to offer an undergraduate program in hydrography and one of just two to offer master's and doctoral degree programs in this challenging field. Since the program's debut in 1999, USM has graduated 240 students, including 59 international students from 33 different countries.

The hydrographic science program is administered through

Board of Trustees Names Dr. Joe Paul President of Southern Miss

The Board of Trustees of State Institutions of Higher Learning completed its search for the 11th president of The University of Southern Mississippi by voting to name Dr. Joe Paul, serving as interim president of the university, as president.

A Southern Miss alumnus, Dr. Paul previously served the university as an administrator in student affairs for more than 40 years. Before becoming vice president for student affairs in February 1993, he held a variety of positions, including assistant director of student activities, assistant vice president and dean of student development. He also held faculty rank in USM's College of Education and Psychology.

Between his retirement from the university in 2015 and being named interim president, Dr. Paul held part-time positions with the USM Foundation as a fundraiser (2015-16), as citizen service coordinator for the City of Hattiesburg (2017-20), as an executive coach for the Horne Business Advisor Group (2016-20), and as an executive coach and strategic advisor for the Blue Hen Consulting Agency.

Paul holds a Ph.D. in administration of higher education from the University of Alabama and was named the university's Most Outstanding Doctoral Student in the field in 1985. The Bay St. Louis native earned a bachelor's degree in communication and political science from USM in 1975, graduating *magna cum laude* from the University Honors College, and received a master's degree in communication and management from Southern Miss in 1978. He was inducted into the University of Southern Mississippi Alumni Hall of Fame in 2000.

Among many civic activities, Paul has served two terms as president of the United Way of Southeast Mississippi. He has served as Board chairman for the greater Hattiesburg Area Development Foundation and as a Board trustee for the Mississippi Public Employees Retirement System. He has also been president of the Hattiesburg Area Education



DR. JOSEPH S. PAUL

President — The University of Southern Mississippi

Foundation, on the Board of Directors for the Hattiesburg Boys and Girls Club, and has been a trustee for the Hattiesburg Public School District. He is co-founder of the Hattiesburg Leadership Pinebelt program and has served on a statewide basis in leadership positions with the Mississippi Economic Council. Paul and his wife Meg reside in Hattiesburg, Miss., and are active members of Trinity Episcopal Church. They have two grown children and two grandsons.

USM's School of Ocean Science and Engineering. The graduation ceremony honored all of the graduates of the "Category B" undergraduate program and "Category A" graduate program in hydrographic science. The "Category B" and "Category A" certificates they were awarded indicate that they have successfully completed programs certified by the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers at each of those two respective levels.

School of Coastal Resilience Adds Two New Majors

The School of Coastal Resilience located on the Gulf Park campus began offering two new bachelor's degree programs starting fall 2022—Sustainability Sciences (Coastal System Dynamics), BS and Sustainability Studies, BA.

The Bachelor of Science degree in sustainability sciences is a multidisciplinary science major aimed at addressing

resilience and sustainability of coastal zones as a combination of human and ecological systems. Leveraging USM’s coastal location, expertise and community partnerships, students will learn about the physical aspects of sustainability with a holistic inclusion of the human element as a well-rounded multidisciplinary scientist.

The Bachelor of Arts degree in sustainability studies will provide students with the cultural, social and scientific

understanding of human-nature interaction necessary to achieve meaningful environmental change. By bridging approaches from the humanities, social sciences and natural sciences, this interdisciplinary major will attract students with a wide range of interests and prepare them to take leadership roles in careers in environmental communication, policy and research.

Uncrewed Maritime Systems Certification Programs Graduates

USM’s School of Ocean Science and Engineering (SOSE) honored graduates of its Tier 1 Uncrewed Maritime Systems (UMS) certification program during a special ceremony held April 22, at the University’s Marine Research Center in Gulfport, Miss.

The 2022 graduating class included nine students who earned certification in the nation’s only academic course in uncrewed marine vessel operations. Since its debut in 2017, the program has produced 98 graduates.

This sixth graduating class underscores the effective cooperative partnership that exists between USM and the U.S. Navy, which continues to grow and thrive. The graduating class was noted as being highly interactive, which is a testament to both the students, as well as the learning environment fostered by the instructors (Carl Szczechowski and Kevin Martin) from USM’s School of Ocean Science and Engineering.

USM continues to play a leading role in education and research for the nation’s maritime industry and blue economy, remaining an enduring partner institution in national defense. The UMS program serves as a primary catalyst to the University’s and Mississippi’s prominence in the burgeoning blue economy.

Through the UMS Certificate program, students learn foundational material in oceanography and ocean engineering principles related to uncrewed undersea and surface vehicles (UUVs and USVs), such as powered vehicles and gliders.



Hendon Collaborates with Scholastic on Shark Activity Kit

Jill Hendon, director of the Center for Fisheries Research and Development at USM, collaborated with the Scholastic Corporation on the creation of an activity kit that features the fascinating world of sharks and rays.

The “Shark Lab” kit is designed for kids in grades 2-7 (ages 7-12). The kit includes a 32-page book of facts, a diving shark toy, an “egg case” with a growing shark embryo toy, and fossilized shark and ray teeth.

Hendon’s background and shark research efforts at USM are also featured in the book. Scholastic reached out to Hendon to help develop this activity kit to promote women in STEM (science, technology, engineering and math).

A native of Minnesota, Hendon notes that being from a land-locked state inspired a love of reading that really deepened her interest in fish and ocean science. She hopes this kit will inspire others to pursue their dreams.



Summer Field Program Celebrated 75 Years on the Mississippi Gulf Coast

USM's distinctive Summer Field Program is best described by those who have lived it – past participants and instructors of the intensive program located at USM's Gulf Coast Research Laboratory nestled along Davis Bayou in Ocean Springs, Miss.

Operating since 1947, the Summer Field Program is a residential, hands-on summer learning experience that provides undergraduate and graduate students an unrivaled academic experience studying coastal and marine environments. Participating students experience field trips on USM research vessels, research laboratory work, residence hall living, and a variety of coastal activities.

The first official summer field classes took place in the summer of 1947 at Magnolia State Park in Ocean Springs, Miss., and quickly grew.

By the summer of 1949, boats were available for field trips to Mississippi's barrier islands, scientific specimens were collected in glass jars, and college students from across Mississippi and neighboring states came to live and learn on the Gulf Coast. In the summer of 1950, courses included botany, invertebrate zoology, general ichthyology and parasitology, among others. The number of participants grew rapidly from 40 in 1955 to 80 in 1971.

This year, the Summer Field Program celebrates 75 years of providing unique educational opportunities for those who go on to become future professors, researchers and more.

Three-quarters of a century of learning about the coastal and marine environments has brought many new, eager young individuals to experience the salty summer air and warm waters of coastal Mississippi.

USM to Introduce Accelerated Nursing Option to Gulf Park

USM has devised a unique plan to combat the nation's ongoing nursing shortage by offering an accelerated degree pathway through the University's Gulf Park campus in Long Beach, Miss.

Pending full academic and accreditation approvals, this distinctive, accelerated pathway will help eligible students earn a Bachelor of Science in Nursing (BSN) degree in a shorter time and decrease barriers to admission, while providing benefits to those who have already earned a higher education degree.

Students expected to enroll in this degree option will be eligible to bypass some typical BSN requirements because they have already earned a degree. Prospective applicants must have completed a BS degree from an accredited college or university.





Retired USM Research Vessel Transformed into Artificial Reef in Gulf of Mexico

On May 18, the longtime University of Southern Mississippi marine trawler, R/V *Hermes*, was officially transformed into an artificial reef in the Gulf of Mexico during a special ceremony at sea.

For more than 60 years, the vessel had been used in a variety of capacities by USM's Gulf Coast Research Laboratory, located in Ocean Springs, Miss. Last year, GCRL officially retired R/V *Hermes* and transferred the vessel to Mississippi Gulf fishing banks under the agreement that the group would turn it into an artificial reef.

R/V *Hermes* was a 38-foot, steel-hulled trawler that served as a floating classroom and laboratory, granting students and scientists access to the Gulf of Mexico. A typical day aboard the vessel included trawling for fish, shrimp and crabs; dolphin watching, and field excursions to Mississippi's barrier islands.

R/V *Hermes* was named for State Senator Hermes of Gautier, Miss., who helped then GCRL Director Aubrey Hopkins secure the vessel. The vessel came to GCRL in 1955 after being retrofitted at Kramer Marine in Gulfport.

The Gulf Blue Navigator Program Selects Inaugural Six Startup Companies

The University of Southern Mississippi Research Foundation and SeaAhead, with the support of partners including Jackson State University, has selected the first cohort of blue technology startup companies for the Gulf Blue Navigator. This six-month program provides scaling startups, with innovations relevant to the ocean, with market access to the Gulf of Mexico region, proximity to federal agencies, technical facilities and expertise. With an emphasis on shortening the timeline of development and market access, the Gulf Blue Navigator positions blue technology startups for success by leveraging the existing strengths and capabilities of the Mississippi Gulf Coast.

The selection committee narrowed the total applicant pool from 48 applicants across 12 countries to select the final six startup companies. Each will receive support for their costs for the program, including travel to the Gulf Coast over the six-month program.

Participants in the Gulf Blue Navigator will benefit from SeaAhead's global network of expertise and success with the Blue Swell Incubator, along with The University of Southern Mississippi's renowned facilities, faculty and staff. The program includes advanced interactive workshops taught by practitioners in the field, site visits with large industry and federal agencies, co-working space at the historic Gulf and Ship Island Building in Gulfport, and customized mentorship to meet the needs of each startup.



Distinguished Marine Policy Fellowship Awarded to USM Student

USM's Sara Marriott, a marine scientist who describes herself as determined to support the production of sustainable seafood through effective domestic and international fisheries management, was one of 86 finalists chosen for this competitive fellowship. The Mississippi-Alabama Sea Grant Consortium endorsed her application for the fellowship, and she is the only finalist from a Mississippi university. Following a rigorous interview process this fall, she was matched with a federal government office to begin her fellowship in February 2023. Some of the offices in which she may be placed include the National Oceanic and Atmospheric Administration, the White House, the Department of State, the Environmental Protection Agency, the National Science Foundation and other agencies, as well as many legislative placements.

NOAA Director Visits Coastal USM

The leader of the National Oceanic and Atmospheric Administration's (NOAA) ocean mapping and nautical charting program visited two University of Southern Mississippi Coastal Operations sites to learn more about hydrographic science education programs, research, capabilities, and potential areas of collaboration.

Rear Admiral Benjamin Evans, director of NOAA's Office of Coast Survey, toured USM's Marine Research Center and the Roger F. Wicker Center for Ocean Enterprise, which is currently under construction at the Mississippi State Port Authority at Gulfport. Evans and staff members from

the Office of Coast Survey visited with USM leadership, Mississippi State Port Authority at Gulfport leadership, and representatives for the offices of Senators Roger F. Wicker and Cindy Hyde-Smith and U.S. Congressman Steven Palazzo.

Dr. Kelly Lucas, interim vice president for research at USM's Coastal Operations, briefed the NOAA team on how the University's **Gulf Blue initiative** brings together scientists, innovators, and industry and government partners, often co-located in the same buildings. That collaborative environment drives breakthroughs in blue technology and brings higher-paying jobs to Mississippi.





USM Hosts MGCCC Students for STEM in the Sound Day

Coastal USM granted special access to Mississippi Gulf Coast Community College (MGCCC) students for STEM in the Sound Day, enabling the group to engage with faculty scientists and engineers aboard the R/V *Jim Franks*.

While aboard the vessel, students learned how remote underwater vehicles operate and studied coastal environments. They conducted water quality sampling and analysis, interacted

with researchers and faculty members to observe uncrewed maritime systems at work.

MGCCC students received one-on-one time with educators, scientists and engineers experienced in the natural sciences (marine science, hydrographic science, geoscience and environmental science). They also discovered how societies are becoming increasingly more dependent on the oceans.

USM Gulf Park Begins the Ambassador Series on the Mississippi Gulf Coast

In September 2022, Coastal USM launched the Ambassador Series, a cultural outreach project, which included various live musical performances along the Mississippi Gulf Coast. The eclectic series, with concerts ranging from jazz and steel pans to classical soloists and choral ensembles, includes something for everyone.

“I am excited for us to be able to offer these opportunities to our students, visitors and residents all along the Gulf Coast,”

said Shannon Campbell, senior associate vice president for Coastal Operations.

The Ambassador Series kicked off on October 3 with the Gulf Coast Civic Chorale’s Festival of Choirs, which showcases some of the region’s exceptional high school and community college choirs in a celebration of multi-generational music making. On October 4, Flutissimo 4x4x4, was held on the Gulf Park campus. This recital featured professional musicians playing music from four countries, spanning over four centuries. This special event celebrated the centennial of the great 20th century flute virtuoso Jean-Pierre Rampal. The Southern Miss Gulf Coast Civic Chorale held two holiday season concerts in mid-November at the Gulf Park campus in Long Beach and Biloxi’s Nativity of the Blessed Virgin Mary Cathedral.



USM's Marine Education Center Wins First Season of TV Series *America By Design: Architecture*

The MEC captured first place in the inaugural season of “America By Design: Architecture,” a magazine-style television series produced by CBS that shines a spotlight on American architectural innovation, ingenuity and design excellence to a broad audience. The MEC emerged from 10 finalists to secure the coveted title by a unanimous vote from the judges.



Belgium Blue Economy Mission

In May, USM partnered with Mississippi Development Authority’s (MDA) International Trade and Investment Office (ITIO) to coordinate a blue economy-focused business development and trade mission to Antwerp, Belgium, in May 2022. USM and MDA have been partnering on a number of projects focusing specific attention on promoting Mississippi’s blue economy to encourage business-related activity, particularly in the innovation sector. The Belgium trade mission included the promotion of Mississippi-based companies and the expansion of Mississippi exports by bringing together Belgian companies, port authorities and researchers together with their Mississippi counterparts in an effort to foster closer business relationships.

The Flemish region of Belgium is home to a thriving blue economy and is anchored by the Port of Antwerp, Europe’s second

largest port. It is also home to Ghent University, which focuses heavily on marine research and is supported by blue economy and blue tech hubs such as the Ostend Science Park and the Blue Cluster. MDA has developed relationships with these and other partners in the region to strengthen ties and promote bilateral trade and investment.

Our primary goals are to promote Mississippi companies as trading partners with Belgian businesses while also promoting Mississippi as a key destination for blue economy-related foreign investment in the Gulf Coast region. This business development and trade mission was the first of several missions, each with the goal of building long-term partnerships across the multiple centers of marine-related business and research in Europe.





Academic Affairs at Gulf Park



Academic Affairs is an administrative unit in the Office of the Provost based at the Gulf Park campus. This unit houses, creates and delivers student engagement, achievement and enrichment experiences in partnership with academic instruction across the nearly 50 programs offered from Coastal USM's campus, teaching and research sites. We serve as a point of convergence for the academic experience on the Mississippi Gulf Coast, and, if something happens on the Coast that impacts academic programs, students or faculty, someone from our 28-person team is likely involved.

JACOB BRELAND, Associate Vice President for Academic Affairs | Coastal Operations

In my capacity as associate vice president for Academic Affairs, Coastal Operations, I serve as the representative academic officer for Coastal USM, reporting directly the provost and senior vice president for Academic Affairs, where we engage in both strategic creation and tactical implementation of larger University and Coastal USM goals. We support the creation and delivery of distinctive programming centered around three pillars of Coastal USM, and through the formation of marketing strategies, space planning and allocation, and general partnerships, we strive to ensure the success of the academic enterprise. Our day-to-day activities include management of activities that span college- and provost-level responsibilities such as class scheduling, instructional support, extra-mural student activities, and ensure academic policies within the larger University are met.

Within Academic Affairs, work is segmented into specific teams and leaders whose work revolves around particular functions, including academic advising, Academic Success Center, executive education, Event Services, recruitment, Student Affairs, Student Services One Stop, and student support. They each serve as an official operating unit within Academic Affairs, and a description of all of them are shown below.

Our office serves as the financial center for academic budgeting for Coastal USM, and we invest heavily in our people, programming and possibilities. Recent highlights are the first Coastal USM Symposium, which was a series of micro-presentations by 49 faculty and research centers across our full range of disciplinary diversity. The Symposium was created to bring together leaders in new ways as we promote

interdisciplinary and pillar-centric work.

We continue to be committed to the success and support of our faculty and staff's success. Through the introduction of the Faculty and Staff Development Awards, we provided awards designed to support innovative research and professional development. For this current fiscal year, we funded nine faculty proposals (four of which were collaborative) and seven staff awards for a total investment of \$41,000.

Our pledge to student success and pioneering new ways of collaboration for students, staff and faculty is student-centric, results-oriented, and heavy on resolve. Our aspirations are lofty, and with our team, we aspire to inspire as we continue to strive to empower futures.

In the best spirit of cooperation, collaboration and partnership, we have worked with our colleagues in the Gulf Coast Library to begin the process of collocating our services into the physical spaces of the library. Our collaborative vision is simple: While ensuring the persistence of library operations, we are creating a future that co-locates integrated services in one place. This plan will place services in the same vicinity to create opportunities for student and employee success and cooperation that we have even yet to conceive. We plan to co-locate into the shared spaces within the next academic year.

Academic Advising

The Gulf Park Advisement Center was established in 2018 with the mission to assist students in developing a meaningful educational and professional plan in pursuit of their goals. Academic advisors facilitate success by providing students with information about degree programs, coursework, academic support services, career options, and University policies and procedures. Additionally, this office houses the Veteran Affairs (VA) benefits coordinator to counsel students regarding their VA educational benefits and the corresponding application procedures.

In the Center, students are assigned an academic advisor corresponding with their major upon admission, and advisors assist students with their transition to the university. Each student is required to meet with their assigned academic advisor to register for classes the upcoming semester, and they remain with them for the duration of their college experience, which provides for deeper relationships that produce higher-quality experiences and outcomes for students. We are passionate about encouraging students to persevere, and the Center has established a semesterly retention plan aimed at increasing student persistence. Our staff conducts proactive, personalized outreach to students at regular intervals throughout the semester to ensure that students are meeting expectations and to refer students to resources as appropriate. We collaborate with all units within Academic Affairs to

On July 1, we held our Academic Affairs Summit, where we met as a full group to consider how we can maximize our impact in promoting success for our students, employees and communities. Together, we created the following mission, vision and tag line to drive our initiatives, all of which revolve around people:

Mission — Our enduring purpose is to create a sustainable future by cultivating a diverse community of lifelong learners through relationships and partnerships that inspire success. We support a collaborative environment of distinct, forward-thinking programming and pathways resulting in academic achievements and enriching growth opportunities.

Vision — Academic Affairs empowers the Southern Miss community to thrive through dynamic support, advocacy, and inclusivity now and into the future.

Academic Affairs: Empowering Futures



connect students to key campus resources to meet the unique needs of each student on their academic journey.

Academic Success Center

The Academic Success Center (ASC) was created by integrating the services previously offered as stand-alone services, including the Writing Center, Speaking Center, Math Zone and Think Center. The ASC expanded to deliver collateral services, including educational workshops, academic coaching, tutoring, independent study, technology access and IVN proctoring. Services are free for all USM students, regardless of location and offered both face-to-face and virtual formats. The ASC employs approximately 20 students each semester. Additionally, in collaboration with Student Affairs, the Center and has developed a professional development plan for student employees. This professional development service is free for any student employee housed in any unit on the Gulf Park campus.

In 2022, the Gulf Coast Proctoring Center joined the ASC to coordinate proctoring efforts at Gulf Park. Testing services are offered to any enrolled USM student regardless of campus affiliation. It also serves as a testing location for the community and can accommodate up to 18 test takers at one time.

Executive Education

Executive education is expanding into a focused enhancement of the advanced workforce beyond academic degrees through offering industry-recognized credentials. Programming

emphasis will be focused on those working in coastal and maritime settings for both development opportunities for leaders and technical training to support the tooling and retooling of workers in those areas. Approaches to learning will be application-based to develop the expertise and skills necessary for a knowledge-based economy to prosper. The university is investing resources to expand the reach of education, develop and manage a talent ecosystem, re-imagine career pathways and associated credentials, and better position coastal labor forces with an eye toward economic development. Recently, the university approved the hiring of a director of executive education and senior instructional designer positions, and the searches for these positions are underway.

Event Services

The Gulf Park Event Services team is dedicated to ensuring access and success for our community as they host meetings or special events on our one-of-a-kind campus. Clients include internal partners such as schools, colleges, student organizations and external groups such as local, state and federal agencies, non-profit associations, local community members and religious organizations. We have the capacity to accommodate 5 to 500+ attendees in both indoor and outdoor spaces, including our signature event spaces on the Front Lawn, Hardy Hall Ballroom and Fleming Education Center Auditorium. Our team serves as the point of convergence for all necessary activities and units that coordinate for any successful event, including IT and audiovisual needs, Parking Management, Physical Plant, Southern Miss Catering, University Police, and all third-party vendor requirements.

Our team has recently finalized much-anticipated upgrades to event furniture and equipment throughout Hardy Hall. These upgrades include all new tables and chairs throughout all first-floor event spaces, as well as new projectors in the Hardy Hall Ballroom and University Club. These upgrades, while necessary to support a variety of high-quality events, also promote accessibility for our clients in terms of seating, tables that are easier for employees to reposition, and vibrant, high-quality projectors to maximize visual impact. These upgrades allow us to host a wider range of events and accommodate various setup needs and requirements, and we plan to continue improving our product base to increase the level of services offered to all clients.

Recruitment

The Gulf Park Recruitment office creates, facilitates and manages the overall enrollment and undergraduate recruitment efforts for Coastal USM. Our goal is to ensure potential students have a well-defined pathway to enrollment, and we engage in a high level of public contact via face-





to-face, phone and digital formats to share those plans and opportunities.

In addition to prospective students, we actively foster relationships with parents, teachers, local schools and community colleges, and community leaders at the local and state levels. We conduct daily tours, routinely visit sites across the Mississippi Gulf Coast and neighboring states, and work closely with Coastal USM leaders, University Communications, and our strategic marketing colleagues to ensure our efforts are in sync. Working at an R1 University provides our students and communities with distinctive experiences, and we strive to ensure all are aware of the possibilities at Southern Miss.

Student Affairs

Student Affairs houses the Student Government Association (SGA), other student organizations, the Gulf Park Pantry and Career Closet, and supports student success through integrated programming, development opportunities, and orientation functions centered around the co-curricular student experience. In July of 2022, we reorganized to incorporate colleagues from Career Services and Student Counseling Services into our office. In the fall semester, our work focused on coordinating our efforts in support of an improved student experience, and we were very excited to expand our experiential learning pathways program with a new Pathways coordinator position.

In the spring 2023 semester, we will focus on expanding wellness and recreation activities. With invaluable input from students and the SGA, we are excited to re-envision recreation on our campus and create spaces for students to relax, engage their peers, foster connections, and build community. New initiatives on the horizon include creating a space for gaming and starting a student organization focused on holistic wellness.

Student Services One Stop

The Student Services One Stop (One Stop) was established in March 2018 on the Gulf Park campus and serves as the university's only comprehensive student services hub. We operate

as a singular point of contact for helping students manage the sometimes complex business of being a student at the university, and our passion is to do this with compassion, expertise and positive engagement. Our One Stop team is cross-trained to assist with a wide variety of questions from various student service areas, including Admissions, Financial Aid, Business Services, and the Registrar's Office, and we also provide the official Southern Miss ID card for students and employees. On many occasions, the One Stop staff assists with questions and directs students to the appropriate office for further assistance.

The success of the One Stop has provided concrete evidence that co-locating services in close physical proximity is a recipe for promoting student success, and we are using lessons learned to inform and maximize the larger co-location effort of Academic Affairs to the Gulf Coast Library.

Student Support

Student Support at Gulf Park ultimately assists students who have unique and often complex needs that impact their academic and personal success at the University, and this is done through proactively working to advance policies and procedures that can improve degree progress, timely graduation, and the overall student experience. Student Support is responsible for campus behavioral health through the management of the Campus Action Referral and Evaluation System (CARES) team, provides ombuds services, and coordinates the Academic Concerns Reporting Team and student withdrawals. Student Support also serves as the campus liaison for Student Accessibility Services and the Dean of Students office. Additionally, Student Support collaborates with academic advising to implement retention initiatives throughout the semester.

Student Support has been instrumental in supporting the campus through the COVID-19 pandemic and transition back to in-person learning. As higher education and the Gulf Park campus continue to evolve, Student Support will continue to assist faculty and staff with best practices for supporting students and promoting a student-centric university.

School of Coastal Resilience



The School of Coastal Resilience (SoCR) connects the human experience of living on coastlines to the ideas, policies and disciplines that shape that experience. Through research and instruction, we explore the dynamic communities and the coastal environment.

DR. WESTLEY FOLLETT, Interim Director

The School of Coastal Resilience is the interdisciplinary, academic home of 31 research and teaching faculty in the sciences, social sciences, mathematics, and liberal arts. Our research and teaching interests encompass coastal processes, ecology, and geography; environmental history, literature, film, policy and ethics; environmental protection and social justice; sustainability studies and education – in short, all matters that impact human well-being and ecosystem vitality in coastal regions.

Part of the School's mandate upon its formation in 2021 was the creation of distinctive academic programs that will position Coastal USM as a hub for academic instruction relevant to the blue economy, resilience, and others fields vital to the region. Pursuant to this, in its first year the School of Coastal Resilience developed two exciting new interdisciplinary degrees: a Bachelor of Arts in Sustainability Studies, and a Bachelor of Science in Sustainability Sciences (Coastal System Dynamics). Both of these leverage USM's location at the Gulf Park campus to educate students about the issues critical to the human habitation of coastal zones and prepare them for environmental- and sustainability-based careers in education, government, non-governmental organizations, the corporate world, and more. Formally approved in 2022, both programs are now live and accepting new majors. Development of a new sustainability minor is underway.

Thanks to the hard work of Dr. Rebecca Powell, earlier this year, the Gulf Research Program of the National Academies of Sciences, Engineering, Medicine selected USM for inclusion in the 2022 cohort of the Gulf Scholars Program, in the company of other regional institutions such as Rice University, LSU, Tulane University, Florida State University, and the University of Central Florida. The centerpiece of the

Gulf Scholars Program at USM will be an undergraduate certificate program that aims to inspire and prepare students to create a more equitable, just, and resilient Gulf of Mexico region, through developing inquiry and service-learning projects built on the foundations of sustainability and interdisciplinary thinking. Under the direction of Dr. Powell, the new Gulf Scholars Certificate Program will be housed in the School of Coastal Resilience.

In fall 2022, the Film Program in the School of Coastal Resilience relocated to its newly remodeled home in the Fleming Education Center. Located along the east hall of the first floor, the Film Program wing includes a new studio space that is almost three times the size of the old studio, a production room with editing and animation equipment, and a new, state-of-the-art sound recording booth, a new computer editing lab, dedicated classroom space, and faculty offices. This renovation confirms Coastal USM as the premier location for undergraduate film studies and production in the state of Mississippi.

Highlights

- **Dr. Rebecca Powell** (English) received a \$450,000, five-year grant from the Gulf Research Program of the National Academies of Sciences, Engineering, Medicine to develop a Gulf Scholars Program at The University of Southern Mississippi. This will include the creation of a new undergraduate certificate program.

Dr. David Holt (Geography), with colleagues from the School of Biological, Environmental and Earth Sciences and the School of Ocean Science and Engineering, received a grant (initial amount \$975,000) through the U.S. Army Corps of Engineers to study "Sediment Management for Compound Flood Hazards in Fluvial Systems."

The **School of Coastal Resilience** connects the experience of living on coastlines to the ideas, policies, and natural processes that shape that experience, exploring the dynamics between communities and the coastal environment.

- **Dr. Jennifer Walker** (Biological Sciences), **Dr. David Holt** (Geography), **Dr. Chris Foley** (English), with Dr. Rachel Gisewhite (Center for STEM Education), in partnership with the STEPS Coalition and the Boys and Girls Clubs of the Gulf Coast, received a \$970,000, five-year grant from the National Academies of Sciences, Engineering, Medicine to develop an Environmental Justice STEMM Leadership Development program at Boys and Girls Clubs along the Mississippi Gulf Coast.
- **Dr. Chris Foley** (English), **Dr. David Holt** (Geography), and **Dr. Jennifer Walker** (Biological Sciences) received a Coastal Operations Faculty Developmental Award to design and implement an environmental justice heat-mapping study focused on the three Mississippi coastal counties.
- **Dr. Katrin Pesch** (Film) and **Professor Vincenzo Mistretta** (Film) received a Coastal Operations Faculty Developmental Award to explore the video communication of research on ecosystem changes to coastal wetlands.
- **Dr. Douglas Bristol** (History) received a Coastal Operations Faculty Developmental Award to assess the environmental impact of naval warfare in the Gulf of Mexico during the Second World War.
- **Dr. Damon Franke** (English) received a Coastal Operations Faculty Developmental Award for the “Mississippi Everyday Heroisms Project,” which entailed a film screening and a student writing contest. This project garnered state-wide media attention.
- **Dr. Deanne Stephens** (History) received a Coastal Operations Faculty Developmental Award to study boat builders in Mississippi, 1540-1940.
- **Dr. Katrin Pesch** (Film), with Dr. Candice Salyers in the School of Performing and Visual Arts, received funding to work with the Land Trust for the Mississippi Coastal Plain as part of the 2022-24 Interdisciplinary Investigations Series.
- The Mississippi Association of Spatial Technologies hosted the 10th annual Mississippi Geospatial Conference at the Gulf Park campus, organized by **Dr. David Holt**.



School of Leadership



The mission of the School of Leadership (SoL) is to develop and advance organizational leaders at the local, national, and international levels. The SoL provides distinctive and competitive educational programs delivered through experiential and responsive methods to address emerging social, economic, and environmental challenges. Additionally, the SoL's faculty research focuses on expanding knowledge in business and technology. The SoL's vision is to provide multi-disciplinary educational experiences that create transformational leaders.

DR. HEATHER ANNULIS, Director

The School of Leadership is home to specialized centers that bring together faculty, students, and community partners. From providing applied research for the transportation and supply chain industries through the *Center for Logistics, Trade and Transportation*, to researching and disseminating best practices in workplace performance through the *Workplace Learning and Performance Institute*, these centers offer services and develop partnerships through their unique offerings.

The *Work Hard, Have Fun, Make a Difference Scholarship* was established to honor human capital development profes-

sor emeritus, Dr. Cyndi Gaudet. It is awarded annually to one human capital development student who nurtures student development, supports their peers, serves as a positive role model, and stands out as a leader among classmates.

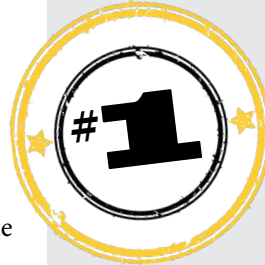
School of Leadership Programs

- Applied Technology B.A.S.
- Business Management Undergraduate Certificate
- Human Capital Development M.S.
- Human Capital Development (Instructional Technology and Design) M.S.





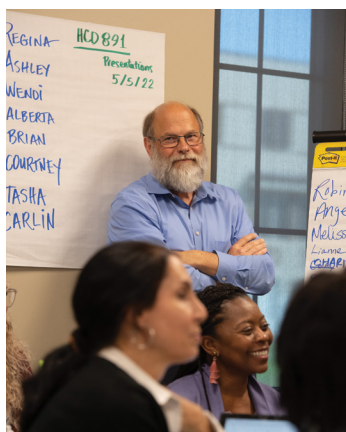
- Human Capital Development Ph.D.
- Human Capital Development (Instructional Technology and Design) Ph.D.
- Industrial Engineering Technology B.S.
- Industrial Engineering Technology (Logistics) B.S.
- Instructional Technology and Design Graduate Certificate
- Logistics, Trade and Transportation M.S.



HUMAN CAPITAL DEVELOPMENT PROGRAM
 Designated as the **#1 Online Masters Degree** in Human Resources by OnlineMastersDegrees.org, 2022

Activities in 2022

The spring semester started at the School of Leadership with a **Welcome Back** event, a meet-and-greet where students interacted with faculty outside of a classroom setting. In



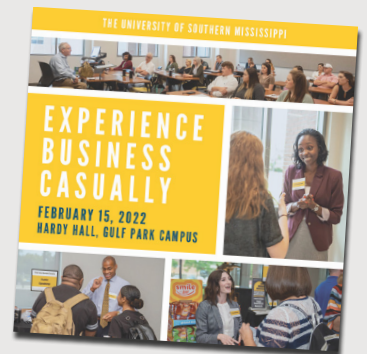
February, the school held its inaugural **Experience Business Casually** event (see sidebar). In late spring, the School of Leadership honored its outstanding students with the **School of Leadership Awards** and crawfish boil, held in conjunction with its **Dissertation or Bust** in-person session for doctoral candidates. Led by Dr. Quincy Brown, graduate programs coordinator,

Dissertation or Bust helps doctoral candidates progress in the completion of their doctoral research.

The Human Capital Development Ph.D. program **executive-format** sessions resumed this year with in-person classes,

Experience Business Casually

In February, the School of Leadership hosted its inaugural Experience Business Casually event for all students on the Gulf Coast campus and other locations. Volunteer business professionals from across the coast coached students to review essential career skills, such as interviewing strategies, the 60-second elevator pitch, the art of small talk, and more. The event was well-attended, with excellent feedback from students who participated.



social networking events, and synchronous online classes. The format allows students from all over the country who

(continued)

are also working professionals to engage in a think-tank environment and share best practices across industries.

The fall semester began with the **School of Leadership's annual retreat**. Held at the beautiful Marine Education Center in Ocean Springs, faculty and staff participated in team-building exercises and strategized ways to increase enrollment and student engagement.

In October, the School of Leadership hosted a **Southern Miss Cruisin'** event on the beachfront Gulf Park campus. Held to coincide with Cruisin' the Coast, "America's Largest Block Party," the event featured classic and custom cars, games, snacks, and fun.



The School of Leadership's service project for the fall semester was a food collection for the **Gulf Park Food Pantry**. Donations from faculty, staff, alumni and friends of the School of Leadership totaled over \$1,000 and will help feed needy families throughout the region.

Southern Miss Management Students Excel at Business Simulation

Students completing management capstone courses in The University of Southern Mississippi's School of Leadership consistently rank in the top 100 worldwide in the Business Strategy Game. In fact, they often rank in the top 20.

In The Business Strategy Game, teams of students collaborate to manage a fictional international company in competition with other class members. Decisions that these "managers" make affect the company's success.

Nearly 50,000 students used the Business Strategy Game at over 500 college/university campus locations this year alone.

Faculty Research

- **Dr. Marco Wolf**, associate professor of marketing, and Dr. Wendy Ritz presented at the Society for Marketing Advances (SMA) conference in Charlotte, NC.
- **Dr. Shuyan Wang**, professor of instructional technology and design, gave two presentations at the 33rd International Conference for the Society for Information Technology and Teacher Education in San Diego.
- **Dr. Bradley Winton**, assistant professor of management, presented at the Southwest Academy of Management's 2022 annual conference in New Orleans.
- **Dr. Yuanyuan Zhang** with other colleagues published "A Market Accessibility of Inland Waterway Ports – A Case Study of the State of Mississippi" in the *Transportation Research Record*, 2022.
- **Dr. John Lambert**, associate professor of international business, participated in the U.S. Department of Commerce event, Building Bridges to Global Markets, at Jackson State University. Dr. Lambert served on a panel led by the Assistant Secretary and Director General of the U.S. Department of Commerce, Arun Venkataraman.

The SoL Faculty Is Growing

The School of Leadership welcomes three new members to its faculty this year.

- **Dr. Abubaker (Abu) Haddud**
Associate Professor and Program Coordinator, Industrial Engineering Technology
- **Dr. Carsten Schmidtke**
Assistant Teaching Professor and Program Coordinator, Applied Technology
- **Dr. Bhagyashree (Bee) Barhate**
Assistant Professor, Human Capital Development

Awards and Achievements

- **Dr. Heather Annulis** was named the **2022 Educational Administrator of the Year** by the USM Association of Office Professionals.
- **Dr. Gregory Bradley**, associate teaching professor and Distinguished Teaching Scholar, received the **Business Advisory Council Research Award**.
- **Drs. John Kmiec, Jennifer O'Sullivan and Sharon Rouse** recently completed all the requirements to become **ACUE Distinguished Teaching Scholars**.
- **Joyce Powell** received the **Staff Service Award** for Coastal Operations from the USM Staff Council.

Human Capital Development Ph.D. Dissertation Research Spotlight



DR. TUNDRA GATEWOOD

Retired Air Force Veteran,
Chief Master Sergeant, Director
of Medical Enlisted Forces and
Chief Medical Enlisted Force
Development to the Air Force
Surgeon General

Dissertation Title: *Psychological Capital and Perceived Employability: Exploring Women Veterans' Military-to-Civilian Career Transition*

Dr. Gatewood's research focuses on the sustainment of the U.S. workforce and its competitive advantage by utilizing veteran human capital. Each year, an estimated 30,000 ex-servicewomen enter the labor force. Research suggests that important subgroups (e.g., women, minorities, and younger adults) consistently struggle with the military-to-civilian transition process. Gatewood's study explores women veterans' military-to-civilian career transition experiences and the influence of psychological capital and perceived employability. Servicemembers turned veterans must successfully navigate the military-civilian divide and negotiate economic worth in current workforce systems.

The study highlights the subjective dimension of the military-to-civilian career transition underscoring the salience of intrapersonal resources. Findings reaffirm that human capital acquisition and employability support perceived employability and confidence. Further, adopting a protean career attitude is critical in effectively managing military-to-civilian career transitions, establishing value-based career pathways, and navigating the military-civilian divide.

- **Dr. Shuyan Wang**, professor of instructional technology and design, was recently awarded the **International Contribution Award** from the Association for Educational Communications and Technology (AECT).

Internships Prepare Students for Meaningful Work

The School of Leadership welcomes partnerships with local businesses to provide meaningful internships for coastal USM students. Two recent student success stories include the following:

Alexander Gray, who is studying for his accounting BSBA degree, accepted a position with Hy Stor Energy as an intern. Hy Stor Energy, a company which operates large-scale green hydrogen hubs, is helping address the challenge facing today's energy industry – long-duration storage of renewable energy at scale to provide reliable alternative energy.

Patrice Washington, a senior in the Industrial Engineering Technology program in the SoL, has been working as an intern for SeaAhead. SeaAhead unites blue technology entrepreneurs with investors, industry leaders, technical experts and stakeholders to create scalable businesses.

Graduate Student Hall of Fame

Dr. Cory Wicker, a recent graduate of the School of Leadership's Human Capital Development Ph.D. program, was named to the Graduate Student Hall of Fame for 2022. His canvas portrait is displayed in J.B. George Hall on the Hattiesburg campus, the home of the Graduate School. Dr.

Wicker was recently elected to the Board of Directors at the Academy of Human Resource Development (AHRD) for a three-year term.



Alumni Spotlight



Dr. Rich Ayers, who graduated from USM with a Ph.D. in human capital development, is a senior lead human performance engineer with Booz Allen Hamilton, a consulting firm with expertise in analytics, digital, engineering, and cyber. Recently, two papers authored by Dr. Ayers were selected by the Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC) for presentation and publication. This is the largest modeling, simulation and training event in the world.

University Research Vessels

USM has a fleet of five research vessels. The use of large vessels at USM enhances and expands the high-quality education and research opportunities the university is able to provide as a leading marine science institution, while providing valuable benefits to our students, community, and associated marine economy.



Miss Peetsy B

The *Miss Peetsy B* is a 34-foot passenger vessel with a capacity of 34. The boat was originally donated to The University of Southern Mississippi by Jimmy Buffett and his sisters in honor of their mother. The vessel is used primarily by GCRL's Marine Education Center for outreach programs.

Sea Days: 40

Passengers: 1,250



R/V Jim Franks

The *R/V Jim Franks* is a 60-foot aluminum catamaran designed specifically to meet the needs of USM research and educational platforms. The vessel has a maximum capacity of 40 passengers and is equipped for both day cruises and overnight trips.

Sea Days: 80

Passengers: 989



R/V *Ken Barbor*

This year the R/V *Ken Barbor* became USM's first optimally crewed, fully autonomous vessel, equipped with a state-of-the-art computer vision and autonomous navigation system to facilitate research into vessel autonomy in congested coastal regions. The vessel is an Endeavor 48-foot aluminum passenger vessel with a capacity of six passengers, updated and refitted to serve as an offshore research vessel to support USM's School of Ocean Science and Engineering's deep ocean underwater surveys using various uncrewed maritime systems (UMS).

Sea Days: 42



R/V *Tommy Munro*

GCRL took delivery of the 97-foot R/V *Tommy Munro* in 1981. The vessel is used primarily for offshore research in the Gulf of Mexico and has been a platform for the Southeast Area Monitoring and Assessment Program (SEAMAP) for decades.

Sea Days: 60

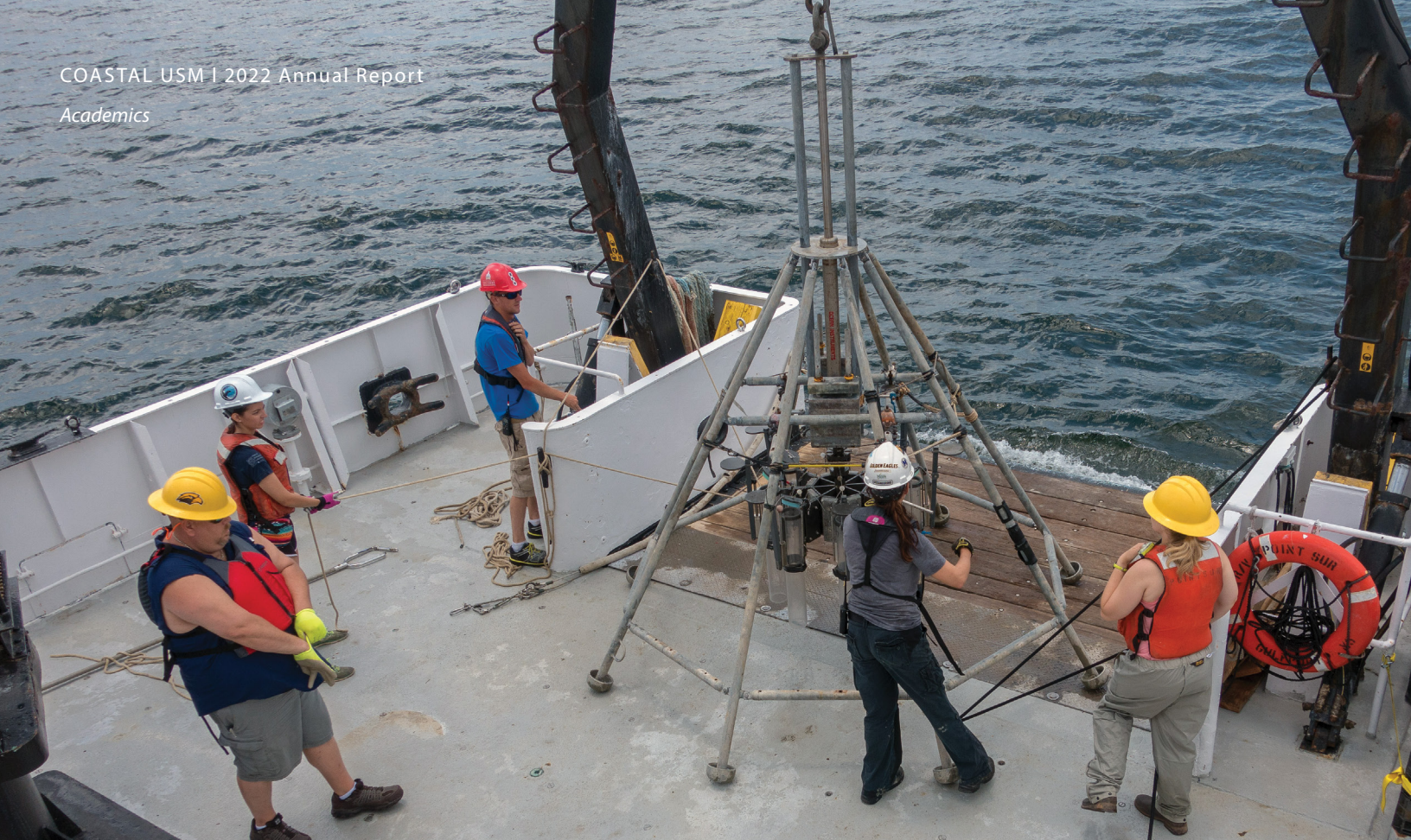
Passengers: 62



R/V *Point Sur*

Built in 1980, the R/V *Point Sur* is a 135-foot-long vessel accommodating 16 researchers and technicians and a crew of eight, while housing a 1,110-square-foot deck that includes a primary and wet laboratory.

Sea Days: 180



DR. LEILA HAMDAN
Director

School of Ocean Science and Engineering

The School of Ocean Science and Engineering harnesses elements from key areas of The University of Southern Mississippi, including the Division of Coastal Sciences at the Gulf Coast Research Laboratory (GCRL) in Ocean Springs, the Division of Marine Science at the John C. Stennis Space Center in Hancock County, and the Gulf Park campus, to create a regionally, nationally and internationally recognized leader in marine and coastal science.

Faculty, staff and students in USM's School of Ocean Science and Engineering (SOSE) engage in cutting-edge coastal and marine science and education at the nexus of research, innovation, resource management and policy. SOSE is home to two academic divisions with long histories and staff and resources spanning the Mississippi Gulf Coast. These include the Division of Coastal Sciences at the Gulf Coast Research Laboratory (GCRL) in Ocean Springs, the Division of Marine Science at the John C. Stennis Space Center in Hancock County, and innovative undergraduate education programs in marine biology, marine science, ocean engineering, and hydrographic science at USM's Gulf Park campus in Long Beach. SOSE has an established regional, national and

international reputation for marine and coastal science.

During 2022, SOSE continued to strengthen the three pillars for USM Coastal Operations, contributing deep expertise toward understanding of the ocean and coasts through oceanographic studies spanning biological, chemical and physical sciences, deep sea exploration research, fisheries research and seafloor mapping. Coastal resilience research in SOSE connects climate change, marine aquaculture and marine education to the communities who benefit from it. SOSE's newest program in ocean engineering and certificate program in uncrewed maritime systems directly train the future workforce in applied skills to support the blue economy.

Academic Achievement

- The Marine Biology undergraduate program was offered through SOSE for the first time in fall 2022.
- The Ocean Engineering undergraduate program underwent the process for approval from the Accreditation Board for Engineering and Technology (ABET), leading to an internationally recognized certification of quality and standards in engineering education. SOSE is poised to be one of 14 accredited ocean engineering programs in the world.
- Dr. Alan Shiller retired from SOSE after 35 years of distinguished service.
- SOSE welcomed two new assistant professors, Dr. Md Mamunur Rashid (Watershed Hydrology) and Dr. Chelsea Pederson (Geological Oceanography).
- The Ocean Engineering Laboratory, designed to support experiential curriculum in SOSE, opened in fall 2022 in Lloyd Hall. Current students, program alumni and faculty met together to celebrate the opening (pictured).

Outreach

- Drs. Kelly Darnell and Zach Darnell co-hosted the Gulf Estuarine Research Society's fall 2022 conference with the support of 12 graduate students and post-doctoral researchers (Shannan McAskill, Adam Murray, Abiola Obafemi, David May, James Klein, Margaret Waldron, Elizabeth Greenheck, Hailee Nigro, Jessica Woodall, Molly Spencer, Samantha Smith, Helen Olmi-Graham) at GCRL in fall 2022.



- A research study by SOSE graduate and staff member, Ms. Rachel Moseley, on deep sea shipwrecks made the national news cycle for discovering how they impact biodiversity on the seabed.
- SOSE students hosted the 2022 Gulf of Mexico Graduate Student Symposium at GCRL in spring 2022.
- Assistant professors, Drs. Kemal Cambazoglu and Gero Nootz, engaged a group of 30 undergraduate students and instructors from the Mississippi Gulf Coast Community College during a research expedition onboard Research Vessel (R/V) *Jim Franks* as part of an effort to introduce science students to undergraduate majors that will prepare them for advanced technology careers in Mississippi's blue economy.
- SOSE's Diversity, Equity and Inclusion (DEI) Committee led an effort to engage the school in a climate assessment to devise a long-term plan to increase DEI, belonging in ocean and coastal sciences broadly, and to support participation in ocean science education at USM.
- Assistant professor, Dr. Diana Bernstein, was interviewed and quoted about climate science in an article called "Building a Better World" for the April issue of *Scholastic Science World* magazine.
- NOAA OECI intern Elijah Logan, who was mentored by research faculty member Dr. Leonardo Macelloni, facilitated live ship-to-shore interactions with K-12 students at the MEC from the Exploration Vessel *Nautilus* from the Pacific Ocean.
- Staff and students participated in celebrations of World Oceans Day on June 8 at the Mississippi Aquarium.

Research

- During 2022, 28 new projects were initiated, most supporting one or more students in graduate and undergraduate programs. New and continuing funded research projects resulted in approximately \$10 million in funding to projects lead by SOSE. As a research-intensive unit, the School places a great emphasis on disseminating the results of the public investment in science, and used these funds to publish 45 scientific papers in peer-reviewed journals. Some highlights of research include the following:
- Dr. Stephan Howden, SOSE professor received funding from a \$5.4 million award from the Gulf Research Program of the National Academies of Science, Engineering and Medicine. The funds will establish the Gulf Consortium for Offshore Risk Reduction Engaging Stakeholders (GulfCORES), with collaborators at Texas A&M.



SOSE scientists received over \$2 million in new funding from NOAA's Ocean Exploration Cooperative Institute to support mapping and habitat assessments of areas of the Gulf of Mexico impacted by the *Deepwater Horizon* spill. This project sent numerous SOSE faculty, staff and students to sea during summer of 2022.

- Associate professor, Dr. Maarten Buijsman, was funded by the National Oceanographic Partnership Program for research to more accurately simulate internal waves in the ocean, with colleagues from the Naval Research Laboratory, the University of Michigan, Florida State University and NOAA.
- Four presentations by SOSE faculty and students were given at the prestigious 2022 Goldschmidt Conference.
- Assistant professor, Dr. Kim de Mutsert, received funding from the Mississippi-Alabama Sea Grant Consortium to evaluate potential effects of the Mid-Breton Diversion on living marine resources in the Mississippi Sound.

Awards

- Assistant research faculty member Dr. Kelly Darnell, was appointed interim director of USM's Gulf Coast Research Laboratory.
- Assistant professor, Dr. Kristina Mojica, was selected as a recipient for a grant from the STEM Mentoring and Equity for Women Program within the College of Arts and Sciences.
- Student Adam Murry was the recipient of the Gulf Estuarine Research Society Sea Level Rise Workshop Grant and participated in a workshop on developing future scenarios for Gulf of Mexico sea level rise.
- Student Anna Millender was honored as Graduate Assistant of the Year.
- Student Matthew Byrnes won first place for oral presentations at the Gulf of Mexico Graduate Student Symposium.

Uncrewed Maritime Systems (UMS)

Certificate Program Tier 1

The 2022 Tier 1 Program was conducted from March 21 through April 22. This was the sixth time the Tier 1 Program was offered. The class of nine students included eight Naval Oceanographic Office employees and one Fleet Survey Team employee. Instructors were Carl Szczechowski and Kevin Martin. Students received hands-on experience with uncrewed systems and individually built a small buoyancy glider.

Certificate Program Tier 2

The 2022 Tier 2 Program, with emphasis on buoyancy gliders, was conducted from October 17 through November 18. This was the second time the Tier 2 Program was offered. All five students were Naval Oceanographic Office employees. Instructors were Carl Szczechowski and Kevin Martin. Students were exposed to all aspects of oceanographic buoyancy glider operations for the different types of buoyancy gliders. The students experience some hands on piloting and ballasting of buoyancy gliders.

Summer Field Program



During its 75th year, the Summer Field Program (SFP) hosted 91 students from 18 different universities in 13 states. Students attending one of the eight classes onsite at the Gulf Coast Research Laboratory explored sturgeon habitat in the Pascagoula River, studied beach shorelines on Dauphin Island, and collected shark data aboard a research vessel in the Mississippi Sound. The program is open to students from any university pursuing any major. Interested students can find more information at usm.edu/SFP.

SFP admissions specialist Margaret Firth, who had previously worked in USM's School of Music, retired June 30. Fifteen summers of students benefited from the dedication and no-nonsense kindness of Ms. Firth.

2022 COURSE OFFERINGS

FIRST TERM

- Marine Science I — Oceanography
- Coastal Restoration
- Barrier Island Ecology
- Cetacean Behavior
- Elasmobranch Biology
- Research Study Program

ONLINE

- Marine Mammals
- Marine Animal Behavior

SECOND TERM

- Marine Science II — Marine Biology
- Marine Ichthyology
- Marine Invertebrate Zoology
- Research Study Program

ONLINE

- Marine Conservation





Center for Fisheries Research and Development



Scientists at the Center for Fisheries Research and Development (CFRD) develop and conduct research that informs resource management. We work with state, federal and community partners to ensure that we understand scientific fishery needs and focus our research efforts on how we can promote sustainable fisheries and habitats. Our staff not only conduct the research, but also sit on local, regional and federal assessment panels to ensure our data is efficiently transferred to management entities.

JILL HENDON, Director

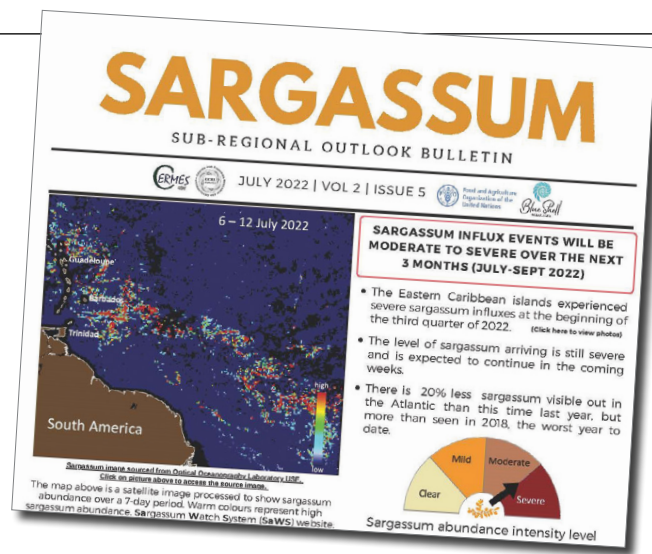
Striped Marlin Tagging Expedition

CFRD has partnered with Costa Sunglasses, the Billfish Foundation and the International Game Fish Association to conduct a striped marlin tagging expedition off Magdalena Bay, Mexico. During the trip, striped marlin were fished for using flyfishing gear, and 15 were tagged with satellite tags. The tagged marlin will be tracked over the next 12 months to help elucidate their movements and behavior patterns.

#CostaMarlinFly

Predicting *Sargassum* Presence

CFRD scientists have been working with the University of the West Indies in Barbados to better understand the ongoing threat of pelagic *Sargassum* to the Caribbean islands. Although an important habitat to offshore juvenile species, the vast volumes of this algae that is washing ashore in the



Caribbean Sea is overwhelming and has impacted not only the tourism and fisheries industries, but also the air quality of the region. The team has developed the *Sargassum Subregional Outlook Bulletin*, which provides bi-monthly forecasts of

Sargassum influxes to the region. Predicting when the *Sargassum* will arrive on various Caribbean shorelines is critical for the fisheries and tourism sectors and vital to the response planning processes undertaken by island authorities.



Movements of Mississippi Sound Fishes

CFRD continues to monitor fish movements in the Mississippi Sound by means of a broad scale acoustic telemetry array. Acoustic receivers are deployed throughout the Sound from the coast to the islands all along the state coastline. Current species of interest are Southern flounder, Atlantic tarpon, Atlantic tripletail, red drum, and gulf sturgeon. In 2022 over 150 fish were tagged and monitored in the system.



CFRD staff participated in a wide range of public outreach and service activities including a cohosted Shark Weekend effort at the Mississippi Aquarium, the Mississippi Inland Cleanup Program’s Tricky Trash Halloween Bash, the Harrison County Library’s Presentations Series, the Mississippi’s Pathways to Possibilities, various high school Interview a Scientist programs, and a multitude of guest speaking events.

Honoring the Crab Lady

Recognized as a “fishery giant” and affectionately known as the “crab lady,” CFRD scientist and researcher **Harriet MacGill Perry** received the Gulf States Marine Fisheries Commission’s 2020 Lyles-Simpson Award, in a ceremony that was delayed due to the COVID-19 pandemic. This prestigious award is presented to an individual who has contributed to the betterment of the fisheries of the Gulf of Mexico through significant biological, industrial, legislative, enforcement or administrative activities. Over the past 50-plus years, she has been an educator, researcher and collaborator in the disciplines of environmental science and aquatic biology. Her research has provided integral data on the dynamics and sustainability of Mississippi’s marine resources.



Gulf Coast Geospatial Center



DR. GREG CARTER
Director

The Gulf Coast Geospatial Center (GCGC) works with federal, state, commercial and academic partners in research, development and applications of precise geospatial data, remote sensing, and computational tools and models to enhance the understanding of relative sea level rise and its impacts, coastal change over time, and nature-human dynamics in the coastal system.

2022 Highlights

In 2022, the Gulf Coast Geospatial Center continued to work with NOAA / NGS to grow and develop research investigating topics in the coastal zone, while maintaining the critical infrastructure needed to enhance the National Spatial Reference System (NSRS) and provide precise geospatial positioning across the state of Mississippi. The center also expanded research and outreach collaborations with other USM research and academic units. Additionally, the center welcomed Michael Amelunke as a full-time staff member.



1 FACULTY (SUMMER)



7 FULL-TIME STAFF



2 GRADUATE STUDENTS

Research

The GCGC conducted a variety of new research projects in 2022, in addition to continuing projects from 2021.

- Co-located topographic surveys, salinity monitoring, bathymetric data collection and image analysis are in progress to characterize estuarine elevation thresholds and quantify estuarine habitat change over time in three Mississippi estuaries.
 - 12 topographic field surveys conducted
 - 9 salinity logging stations deployed
 - 4 bathymetric surveys conducted
- Uncrewed Aerial Systems (UAS) LiDAR and multispectral data were collected at five coastal marsh preserves along with a terrestrial control site to quantify the influence of marsh vegetation on measurements derived from Uncrewed Aerial Systems (UAS) LiDAR, as well as assess sensor characteristics.
 - 73 total UAS flights were conducted, totaling over 30 total flight hours, along with co-located ground-based GNSS, vegetation and spectral surveys.
- In an effort to improve understanding of sedimentation rates associated with seasonal flooding in levee-controlled areas, GCGC researchers collaborated with USM School of Biological, Environmental and Earth Sciences faculty and the United States Army Corps of Engineers Engineer Research and Development Center to provide controlled geodetic data and analysis (static GNSS, terrestrial LiDAR and leveling surveys) in the inter-levee area of the Mississippi River in the Shipland Management Area.
- GCGC researchers provided geodetic control and remote sensing support for projects and monitoring programs led by USM School of Ocean Science and Engineering Marine Science and Coastal Sciences faculty members, the Mississippi Department of Marine Resources and the Grand Bay National Estuarine Research Reserve. Collaborative efforts included the collection of UAS imagery, acquisition of precise GNSS measurements for Surface Elevation Tables and survey benchmarks, assistance with image analysis for habitat monitoring in managed areas, and GNSS and leveling surveys to augment research efforts.

Infrastructure

The GCGC continues to maintain the statewide network of Global Navigation Satellite Systems (GNSS) Continuously Operating Reference Stations (CORS) allowing for real-time position corrections and the downloading of historical static CORS data from *rtn.usm.edu*. In 2022, the GCGC upgraded CORS receivers to allow static logging of additional satellite constellations, and began planning future installations to support the NSRS, NOAA PORTS and USM operations at the Port of Gulfport.

CORS

Registered user accounts for the USM GCGC CORS network continued to grow, with 306 new users registered in 2022 for a total of 2,369.

- Over 60,000 hours of fixed GNSS positions were provided to end-users in the field.
- Two new CORS installations were completed in Greenville, MS, and Foxworth, MS.
- Approximately one-half of all stations in the USM GCGC CORS network are now equipped with BeiDou and Galileo static logging capabilities.

Student Training and Mentorships

The GCGC provided graduate research assistantships for two master's students, as well as summer / fall internships for five students throughout 2022. Graduate student research included investigating height estimation error derived from UAS LiDAR in coastal marshes and quantifying the effects of bathymetric change on storm surge modeling. Additionally, GCGC interns participated in the GPS on Benchmarks program and UAS and GNSS topographic surveying. All student projects have contributed to our understanding of data collection and analysis and the physical drivers controlling our coast.

Student interns participated in the NOAA / NGS GPS on Benchmarks Program.

- Over 58 NGS priority benchmarks were visited, recovered and/or occupied across Hancock, Harrison, Jackson, Pearl River, Stone, George, Forrest and Lamar Counties.
- Data were disseminated to the NGS Online User Positioning Service (OPUS) as shared solutions.

Hydrographic Science Research Center



The Hydrographic Science Research Center (HSRC) was established in 2001 to assess emerging trends in hydrography and implement the most promising trends into operational use. The HSRC has provided innovative solutions for hydrographic surveying, precise positioning, water level measurements, sensor development, and novel uses for hydrographic data.

DR. STEPHAN HOWDEN, DIRECTOR

The Hydrographic Science Research Center (HSRC) is comprised of an incredible team of staff and affiliated members. This year the HSRC was involved in a range of hydrography and ocean mapping research projects, research in tides and geodesy, and a return to an emphasis in Marine Spatial Data Infrastructure/Information (MSDI), which is a critical competency of the hydrographic surveyor of the future and key to interoperability of marine and freshwater data. Partnerships enabled much of this research.

The HSRC follows a philosophy of teaching through research and research through teaching. The center works closely with SOSE and other schools at USM, providing graduate research assistantships and undergraduate research and work-study opportunities. Sixteen graduate research assistants were supported in 2022. Additionally, the HSRC survey fleet and hydrographic equipment were employed by hydrographic teams during practical exercises and final field projects. Twenty graduate M.S. and seven undergraduate B.S. in hydrography students received first-hand experience utilizing these resources during hydrographic surveys. The Marine Education Center (MEC) is also an important educational HSRC partner. The center is committed to the mission of the MEC and to providing relevant information and expertise for its endeavors.

The HSRC is committed to diversity, equity, and inclusion (DEI) in hydrographic and marine sciences. Through the Ocean Exploration Cooperative Institute (OECI), the HSRC hosted Elijah Logan, an undergraduate summer intern from Tuskegee University, as part of a program run by the MEC. Mr. Jones was trained on seafloor mapping methods and hydrography charting and was able to participate in an offshore engineering cruise.

Marine Spatial Data Infrastructure

The HSRC and the hydrographic academic programs embraces framework of MSDI and endeavor to ensure our data collection and data management adheres to best practices. USM has signed a Memorandum of Understanding with the Nippon Foundation, General Bathymetric Chart of the Oceans (GEBCO), Seabed 2030 Project. USM will contribute data to the project, which will help enable a comprehensive digital representation of the ocean. USM will benefit from the project's outreach.

Integrated Coastal and Ocean Mapping

In a joint project between USM and the United States Army Corps of Engineers



(USACE) on oyster reefs, the HSRC has collected and processed bathymetric and seafloor classification data for benthic habitat mapping at sites offshore of Bay St. Louis and Pascagoula. Yearly repetitive surveys of leased areas starting in 2023 are planned to monitor the seafloor during experimental oyster cultch deployment and recruitment experiments conducted by other groups at USM.

Uncrewed Maritime Systems (UMS) and Uncrewed Aerial Systems (UAS)

Continuing its efforts to develop operational use of UMS for conducting Baseline Environmental Surveys for offshore aquaculture, Thad Cochran Marine Aquaculture Center (TCMAC) partnered with the HSRC to assist the National Oceanic and Atmospheric Administration (NOAA) with surveying two locations within the Mississippi-Alabama barrier islands system for aquaculture installation. An innovative survey approach was adopted combining the *Sea Eagle* and the R/V *Point Sur*, with the two vessels operated simultaneously to maximize the data collection and minimize the time at sea.

The HSRC continued its OEI mission conducting at sea testing cruises of the upgraded Autonomous Underwater Vehicles (AUVs) *Eagle Ray* and *Mola Mola*. The HSRC is the lead on seafloor mapping missions, precise positioning for sampling collection, and developing and deploying seafloor landers to monitor environmental parameters for a program funded by the *Deepwater Horizon* Natural Resource Damage Assessment

and Restoration to study and monitor the long-term effects of the oil spill on the mesophotic and deep benthic communities using the AUVs.

The USM Roger F. Wicker Center for Ocean Enterprise led an effort to demonstrate seafloor hypoxia monitoring and seafloor mapping with the Ocean Aero Triton hybrid Autonomous Surface Vehicle (ASV)/AUV. HSRC partnered in this effort providing expertise in hydrography and hypoxia monitoring. In July 2022, multibeam and hypoxia surveys at three different locations were successfully conducted.

The HSRC is leading a project with L3Harris/ASV, Integral Consulting and the Gulf of Mexico Coastal Ocean Observing System (GCOOS) to develop a capability to monitor hypoxia in the northern Gulf of Mexico using the *Sea Eagle*, with a controlled winch for taking water column profile measurements of dissolved oxygen and other water quality parameters to within one m. of the seafloor. A two-day offshore cruise in early October successfully demonstrated this capability at a set of offshore stations.

A WingtraOne fixed-wing UAS was used for shallow water depth mapping and coastline delineation using photogrammetry in coastal Mississippi, the west coast of Florida, St. Croix in the U.S. Virgin Islands, Palmyra Atoll, and the Dominican Republic. Different methods for deriving bathymetry from the data were tested: photogrammetry coupled with correcting the derived point cloud using models based on optical refraction principles, and empirically

modeling the relationship between the attenuation by water of different bands of reflected visible light.

Tides and Geodesy

Bismark Jigena-Antelo, a visiting professor from the University of Cadiz, Spain, led a study of sea level rise along the Peruvian Coast, which was published in *Science of the Total Environment* (Jigena-Antelo, et al., 2022).

Progress was made on plans for installing a tide gauge, the initial element of a revived Physical Oceanographic Real-Time Systems (PORTS), at the Port of Gulfport, MS, with a collocated Continuous Operating Reference Station that will be installed and operated by USM's Gulf Coast Geospatial Center, enhancing precise navigation and improving the port as a testbed for maritime precise navigation.

Results from VDatum validation using an innovated approach of combining 30-day seafloor pressure sensors with short-term simultaneous water levels using a Global Navigation Satellite System (GNSS) buoy or ASV to tie the pressure levels to the ellipsoid was presented at the Canadian Hydrographic Conference in Ottawa, Canada, in June. A second deployment of the system was also done.

The GNSS plus Bathymetry Lab conducted research in using tactical-grade GNSS+Inertial Navigation System and mass-market GNSS for vessel positioning and orientation, waves and tides. Additionally, ASV multi-beam ray-tracing using water column profiling results from a paired UUV was developed.

Marine Education Center



The Marine Education Center works across The University of Southern Mississippi's Coastal Operations to engage members of diverse communities in ocean sciences, promoting careers and fostering community involvement through formal and informal education programs that provide participants with a better understanding of the Gulf of Mexico.

DR. JESSICA KASTLER, Director

A total of 7,994 people engaged in MEC activities from experiential learning programs and outreach to presentations and special events (e.g., the National Ocean Sciences Bowl Regional Hurricane Bowl). There was a large increase in onsite visitors to 3,080 as face-to-face activities returned in greater number.

Outreach

Educators introduced the MEC and USM's Coastal Operations to 3,848 individuals through offsite outreach at 20 events. Half of these events targeted specific audiences (career fairs, keynote speeches at community organizations). The other half were public events like the Peter Anderson Festival, Celebrate the Gulf and the Biloxi Seafood Festival.

Experiential Learning Programs

- Onsite programs lasting from half-day (Coastal Explorer) to multiple days (Coastal Science Camps), emphasize active learning in field and classroom settings. Several classroom activities have been adapted for instruction offsite (Marine Biologist in My Classroom). Two thousand, seven hundred and ninety-seven students, teachers and chaperones visited the MEC in 66 groups representing 47 K-12 schools and three universities from Mississippi, Alabama, Arkansas, Illinois, Louisiana, Minnesota and Tennessee.
- Week-long summer camps engaged 244 children in STEM adventures, including Sea Camp Ultimate Sea-vivor (grades 1-7), Island Adventures (grades 4-12), Shark Fest (grades 7-12), and Angler Camp (grades 7-12).



Highlights

- A Gulf Guardian Award (1st Place, Youth Environmental Education) was awarded to A Classroom Course in Community Resilience. Since 2016, this educational module has reached over 1,000 middle and high school students with a team project leading to the Stewardship Summit competition, where teams present original solutions to problems communities face with climate change.
- Ocean Explorers Internships engaged 302 students through the Ocean Exploration Cooperative Institute. The MEC and Tuskegee University partnered to mentor students from the Historically Black College in ocean exploration careers. Five students completed 10-week internships with an OECI member institution.
- The MEC facilitated STEM in the Sound aboard the R/V *Jim Franks* to introduce students from the Mississippi Gulf Coast Community College to degree opportunities at USM Gulf Park that support blue tech careers.
- The Marine Education Center facility design continues to receive architectural acclaim. It was awarded a 2022 Architecture Award from the American Institute of Architects. It was voted **Series Winner, Season 1** in *America By Design: Architecture*, which CBS streamed in November.
- The MEC facilitated online broadcast of the 10 sessions of GCRL Science Café hosted by Gunter Library. In addition, the Gunter Library partnered with the MEC to produce bibliographies on ocean science topics for young readers.



Fifty-eight classroom teachers participated in one of five onsite workshops to learn marine science content or prepare for a team competition.

- Changing Coastlines
- A Classroom Course in Community Resilience
- Bayous to Beaches
- Regional Science Fair
- SeaPerch
- Teacher Happy Hour (online)

Grants

The MEC is grateful to acknowledge support for its experiential learning programs from the Mississippi-Alabama Sea Grant Consortium (NOAA), the Ocean Exploration Cooperative Institute (NOAA), Bayous to Beaches (EPA Gulf of Mexico Program), the Louie and Terry Ehrlich STEM Education Endowment, and the Joe W. and Dorothy Dorsett Brown Foundation, Shaggy's, Sharkheads, and anonymous individuals through the USM Foundation.



Roger F. Wicker Center for Ocean Enterprise

The Roger F. Wicker Center for Ocean Enterprise is a global hub for Uncrewed Maritime Systems (UMS), ocean data science, maritime cyber research, and training for Mississippi's emerging blue tech workforce. The Center consists of multiple facilities bringing together federal, industry and academic partners, creating a collaborative environment to accelerate the development and launch of new technology in the fast-growing ocean economy.

Facilities

The 18,000-square-foot Marine Research Center (MRC) and the 62,500-square-foot Roger F. Wicker Center for Ocean Enterprise (OE) facility (opening 2023), located at the Port of Gulfport, were designed to provide maritime-related industries and federal partners access to premier blue technology-appointed workspaces, a specialized fabrication shop, marine test sites, and vessels to accelerate the advancement of blue technology innovations. Our shoreside location supports year-round access to deep and shallow water for large oceanographic research vessels, UMS, and optionally crewed vessels.

The Prototype Fabrication Shop in the MRC opened for business. The shop features \$1.8 million in RESTORE Act-funded machining and fabrication equipment, including a CNC 5-axis mill and a CNC lathe, a plasma table, a hybrid laser/router table, and a variety of manual equipment. The shop team works with internal USM customers, external partners, and the blue tech community. Our experts quickly respond to requests to build, modify or repair equipment so that users can get back on the water with minimal delay.

Test and Evaluation

Supporting on-water testing and evaluation remains a core function of the Center for Ocean Enterprise. In 2022, we either performed or supported on-water testing for federal partners, as well as over a dozen UMS, buoy, aquaculture and industry partners. The recent hiring of three talented data scientists allows OE to provide highly technical data exploration, analysis and modeling for our partners, providing data-driven decisions and insights around platforms, sensors and environmental information.



Marine Research Center



Roger F. Wicker Center for Ocean Enterprise



Partnerships

As an externally facing coastal research center, the Center for Ocean Enterprise was built for, and is sustained by, industry and governmental partnerships (as well as academic ones). This year, we began developing formal Cooperative Research and Development Agreements with multiple federal agencies, as well as executed service agreements with multiple industry partners to use the MRC for rapid integration, testing/evaluation, training and data analysis. In 2022, we supported over 25 visits from interested industry partners seeking access to an instrumented test area, office and integration space, as well as at-sea support.

Workforce Training

The Center for Ocean Enterprise added three additional training programs to our existing Uncrewed Maritime Systems Operational Seminar. Through USM's Center for Higher Learning, we now offer operational seminars in Maritime Autonomy, Uncrewed Maritime Systems Data Analysis Operational Training, and Maritime Cyber to our federal partners. In late 2022, OE received a grant from AccelerateMS to offer open enrollment in all four of our operational seminars. These new training programs allow active and transitioning military, traditional blue economy workforce, and students cross-training and re-training opportunities to help position them for new jobs in blue technology.

Innovation

In addition to our industry support activities, the Center for Ocean Enterprise continues to execute research centered

around trusted autonomy ocean data science, and advanced sensor development. OE attracted over \$2 million worth of new grant funds, as well as continued over \$10 million in ongoing grant activities. Major activities included retrofitting the R/V *Ken Barbor* with a state-of-the-art computer vision and autonomous navigation system to facilitate research into vessel autonomy in congested coastal regions, development and integration of a RF detection/classification system, maturation, and testing of a solid-state, platform agnostic vector magnetic sensing system. The OE team developed and is testing a new ambient noise measurement system capable of subsurface tracking of multiple UMS, as well as creating on-the-fly signature libraries to train embedded CUBenet machine learning algorithms.

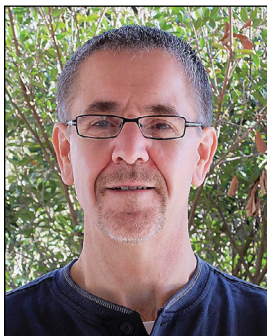
Look Ahead

As we look to 2023, OE is well-positioned to continue to lead the way in recruiting, support and partnering for blue technology on the Mississippi Gulf Coast and the nation. Recent trips to Belgium and Canada, as well as the launch of the Gulf Blue Navigator program and its international cohort, has provided OE an international audience seeking to use our capabilities to grow their understanding of how their technology can better solve critical maritime problems.

As the Roger F. Wicker Center for Ocean Enterprise facility and the waterfront construction become finalized in 2023, and with our full spectrum prototyping/repair capability at the MRC Prototype Fabrication Shop, the Center for Ocean Enterprise staff is ready to tackle more, faster and better in 2023.

STAFF - 35 | GRADUATE STUDENTS - 7 | GRANT PROPOSALS - 19 | ACTIVE GRANTS - 7

Thad Cochran Marine Aquaculture Center



The Thad Cochran Marine Aquaculture Center (TCMAC) is an advanced research unit centrally located in the northern Gulf of Mexico in Ocean Springs, Mississippi, at the Gulf Coast Research Laboratory's Cedar Point research site. Our research focuses on alleviating the bottlenecks that constrain the production of marine species. We work with industry, government and non-profit organizations to advance sustainable aquaculture on land and in coastal and marine environments.

REGINALD BLAYLOCK, Interim Director

Production and Research Highlights

Spotted Sea Trout (*Cynoscion nebulosus*)

Over 121 million fertile sea trout eggs were produced, but none were reared for release. The Center produced 2,000 juvenile fish to transfer to Ocean Springs and Moss Point High Schools for rearing and release. A small cohort of fish was produced to assess growth and cost of production to market size. TCMAC continued partnerships with Mississippi Department of Marine Resources (MDMR) and conservation organizations for stock enhancement of spotted sea trout. Approximately 7,500 of the fish for rearing to market size were transferred to MDMR for further growout and release. TCMAC and MDMR hosted a stakeholder engagement workshop to engage the fishing community on the future of sea trout enhancement.

Red Drum (*Sciaenops ocellatus*)

More than 36 million fertile eggs were produced. A tank of broodstock animals that did not spawn volitionally was experimentally treated with LHRH implants resulting in three spawns (900,000 fertilized eggs) over a five-day period. A co-

hort of 35,725 larvae was reared to test the larval rearing protocol in recirculating systems resulting in 47% survival at 32 days post-hatch. Zootechnical performance improvements for year-round commercial production of juveniles in recirculating systems were sought. Private partnerships for commercial scale grow-out of red drum were sought.

Oysters (*Crassostrea virginica*)

Over 263 million eyed diploid larvae, almost 10 million triploid larvae, and more than 6 million single seed oysters were produced. Over 5.7 million single set oysters and 25.8 million eyed larvae were sold to industry. Thirty-nine million eyed larvae and over 180,000 seed were transferred to the MDMR to support spat-on-shell oyster reef restoration and off-bottom aquaculture. Projects included increasing hatchery production of oysters through optimization of carbonate chemistry in source water (NOAA), and Selection of Aquaculture Lines with improved Traits (SALT), a Gulf Research Consortium project to produce improved gulf oyster genetic lines. TCMAC was represented on the Nature Conservancy's Technical Advisory

Team for Oyster Shell Recycling Workshops, the Advisory Committee for Oyster Robotics S3AM project with University of Maryland, and on a Mississippi State University senior design project. Collaboration continued with the University of Tamaulipas (Tamaulipas, Mexico) for training and transfer of operating procedures and hatchery management practices. Service agreements and extension efforts with industry to support off-bottom oyster culture, including Mississippi, Texas, Florida, Louisiana and Alabama industry businesses continued.

Algae (*multiple species*)

An average of 4.6 trillion cells a day of live microalgal feedstock (71 g per day estimated relative biomass yield) was maintained for oyster larvae production and other research purposes. Microalgal feedstock consisted predominantly of *Chaetoceros calcitrans*, *Chaetoceros muelleri*, *Pavlova lutheri*, *Tetraselmis* sp. and *Tisochrysis lutea* produced using both batch cultivation and semi-continuous (photobioreactors) methods. Antibiotic treatment was applied to reduce bacterial load in *Oocystis* sp. stock culture. Successful initial batch production trials for *Oocystis* sp. were completed. Initial optimization of *Chaetoceros calcitrans* in 25 L PureBiomass photobioreactors was completed to establish baseline productivity and reduce nutrient carry over. TCMAC began efforts to develop culture methods for Graceful Red Weed (*Gracilaria* spp.) to supply the macroalgal component of the IMTA project to be deployed in 2023.

Tripletail (*Lobotes surinamensis*)

This research focused on improved reproduction and spawning in resident adults and assessment of protocols and zootechnical performance improvements for year-round pilot-scale production of juveniles in recirculating aquaculture systems.

Gray Snapper (*Lutjanus griseus*)

Sampling of the wild population to describe the genetic structure of gray snapper in the U.S. concluded. Data analysis continued.

Nearshore and Offshore Aquaculture

The full permit application for the offshore netpen farm project with Manna Fish Farms, LLC, University of New Hampshire, University of Mississippi, and NOAA, NCOOS Coastal Aquaculture Siting and Sustainability was completed and submitted. A nearshore Integrated Multitrophic Aquaculture demonstration, research, training, and outreach project with Dauphin Island Sea Lab, University of New Hampshire, Mississippi-Alabama Sea Grant, and NOAA/NCOOS Coastal Aquaculture Siting and Sustainability Office was initiated. Potential sites in state waters of Mississippi and Alabama were analyzed. A site near Dauphin Island was selected and subjected to bathymetric analyses.

Amyloodinium ocellatum

The thesis project to assess the sensitivity of the LAMP assay

Gulf Shellfish Farmers Association (GSFA)

Through a Nature Conservancy Grant, TCMAC brought together stakeholders in the Gulf oyster industry and facilitated the founding of the Gulf Shellfish Farmers Association, a non-profit industry trade group to advocate for the technical, environmental, social, and regulatory issues that will advance shellfish farming in the Gulf of Mexico.

in comparison to microscopic examination of gill tissue and freeze tolerance of the parasite was completed. LAMP assay was significantly better at detecting the parasite than microscopy at most doses. There was a 90% probability of detection at the 1,000 dinospore dose. Assays of 10 samples would lead to a 95% probability of a positive detection in water at a dinospore concentration of 50 per L or higher compared to 500 per L or higher on gill tissue. An increase in freeze duration slowed initial division of tomons, decreased the number of dinospores produced per tomont, and decreased survival of trophonts. Extrapolation of the relationship between time frozen and viable trophonts suggests that approximately 237 hours of freezing would be required to inactivate all parasites. The live-culture of *Amyloodinium* was re-established to supply parasite material for experiments with Live Bait Advantage, LLC to develop an antigen-based, rapid diagnostic test for the parasite.

Student Support and Mentorship

- Seven Graduate Assistantships (SOSE, COA)
- Ten Career Technical Education (CTE) students from Ocean Springs High School received on-site mentorship and hands-on experience in aquaculture production.
- Six GenSea-sponsored high school interns received mentorship and hands-on training in aquaculture production.

Outreach and Service Activities

Community Events

- Biloxi Boat Show
- Pathways to Possibilities
- Peter Anderson Festival
- RESTORE Summit

On-site Events

- Visits from Leadership Jackson County
- Groups of college and high school counselors
- CTE classes from multiple high schools and STEM educators from around the state

TCMAC was also visited by several industry members seeking collaborations and technology transfer. The TCMAC team conducted several site visits with industry collaborators both in and out-of-state. Outreach events in 2022 also included job shadowing from middle school students from coast schools.



Gulf Coast Research Laboratory



The Gulf Coast Research Laboratory (GCRL) is a research and teaching unit of The University of Southern Mississippi dedicated to the advancement of scientific discovery and promotion of academic growth in the fields of marine biology and coastal sciences. The GCRL was established by the Mississippi Legislature in 1948 as the state's designated marine laboratory and was incorporated into The University of Southern Mississippi four decades later.

DR.KELLY DARNELL, Interim Director

Dr. Kelly Darnell Named Interim Director of GCRL

In May 2022, Dr. Kelly Darnell was appointed interim director of GCRL. She also serves as an assistant research professor in the Division of Coastal Sciences and is director of the Mississippi Based RESTORE Act Center of Excellence, a \$25 million research grants program. Dr. Darnell has been with USM since 2017. She is a coastal and benthic ecologist whose research focuses on nearshore habitats, with a primary focus on seagrass ecosystems. She uses a combination of laboratory and field experiments and surveys to address hypothesis-driven questions to inform coastal management, conservation and restoration, and works regularly with managers to inform decision-making for coastal natural resources. Dr. Darnell earned her Ph.D. at the University of Texas at Austin (2014), her M.S. at the University of South Alabama (2008) and her B.A. at Wittenberg University (2005).

GCRL Hosts the Gulf Estuarine Research Society Meeting

GCRL is a great meeting location for discussion and dissemination of new knowledge and information. In 2022, more than 70 conferences and meetings were held at GCRL, bringing more than 4,000 people to the Halstead and Cedar Point locations.

One of these events, the Gulf Estuarine Research Society (GERS) Biennial Meeting, was attended by more than 120

GERS Newsletter with minutes from the first GERS meeting in October 1974. From the archives of GCRL Librarian Joyce Shaw



students, researchers, and natural resource managers from across the Gulf of Mexico to share research on coastal and estuarine topics. GERS is an educational organization for people interested in estuarine and coastal issues centering on the Gulf of Mexico and is a regionally based Affiliate Society of the international Coastal and Estuarine Research Federation (CERF), which advances understanding and wise stewardship of estuarine and coastal ecosystems. The three-day 2022 GERS Biennial Meeting was chaired by Kelly Darnell, elected president of GERS and interim director of GCRL, and included over 100 oral and poster presentations from students, early career and established researchers on topics of great interest to coastal communities such as water quality, fish and fisheries, and the use of nearshore seagrass and marsh as habitat. GCRL has a long history with GERS. GCRL hosted the first GERS Meeting in 1974, and Dr. Gordon Gunter, GCRL director from 1955-71, was named the first honorary member of GERS. The 2022 Biennial Meeting is the third time this scientific conference has been held at GCRL, following the inaugural meeting in 1974 and the 1997 Biennial Meeting, which was chaired by then GERS president and USM professor (current professor emeritus) Dr. Mark Peterson. Its central location in the northern Gulf of Mexico, proximity to a variety of coastal natural resources, and world-class facilities make GCRL an ideal location for bringing people together.



A Remembrance of the Distinguished Dr. Robin Overstreet

Robin (Bob) Miles Overstreet died May 21, 2022. After high school, Bob followed a path that relatively few academics follow today, enlisting in the U.S. Navy. His time in the Navy ended up being formative as he was an assistant to an oceanographer



onboard an Antarctic icebreaker. During this period, he was tasked with helping collect water samples and biological specimens using a variety of collection techniques. Many of the specimens he helped collect are still vouchered in the Smithsonian Institution in Washington, D.C.

In 1969, Bob was hired as head of the Parasitology Section at the Gulf Coast Research Laboratory, where he quickly developed a highly influential Marine Parasitology course. While Bob held academic positions at many universities in the U.S. and abroad, he remained at GCRL for his entire career. He saw GCRL transition from a state marine lab to part of The University of Southern Mississippi. During his career at USM, he helped develop toxicology and aquaculture programs. As a result of all his work, he became the first recipient of USM's Innovation Lifetime Achievement Award in 2008.

During his prolific career, he served as an editor or associate editor for 12 journals, produced 22 graduate students, produced nearly 400 publications, and received many international and national awards. Furthermore, more than 30 species have been named after him as a testament to his contributions to helminth taxonomy. Bob always held academic societies and their journals in special reverence, especially the American Fisheries Society and the American Society of Parasitologists, which he served in many capacities, most notably as president in 2003. He also was awarded the Society's Eminent Parasitologist Lectureship Award in 2014.

Bob retired from USM in 2014 and was awarded professor emeritus status.



Gulf BlueSM

The Innovation Gateway to the Gulf of Mexico

The vision for the Gulf Blue Initiative is to be recognized globally as a transformational driver of economic growth through innovation in the knowledge-based blue economy of the northern Gulf of Mexico region. To advance this vision, the University of Southern Mississippi Research Foundation in collaboration with SeaAhead Inc. have launched Gulf Blue Navigator (gulfbluenavigator.org), an accelerator program for late-stage startups to advance this vision.

Impactful Economic Development

The Organization for Economic Cooperation and Development (OECD) has projected that by 2030 the global blue economy will generate \$3 trillion in revenue. To best capture that vast potential, the Gulf Blue Initiative unlocks the talent of the community, aligns the region’s innovation and research capabilities, and promotes entrepreneurship to grow the region’s economic sustainability and resiliency. With the arrival of the first six Gulf Blue Navigator cohort member companies in November

5 of 6 STARTUPS ACCEPTED TO THE PROGRAM ARE DIVERSE OWNED **3** ARE FEMALE-OWNED AND LED

2022, the Gulf Blue Initiative is demonstrating to area businesses and communities the potential of blue economy innovation to advance local knowledge-based economic development leading to a more diverse economy and higher wage jobs.

Gulf & Ship Island Building

The Gulf & Ship Island Building is a collaborative workspace for blue tech innovation located in the Gulfport Blue Economy Innovation District. Entrepreneurs and startups developing solutions to global challenges come here to capitalize on existing, world-class ocean research capabilities and connect to research scientists, prototyping, fabrication, laboratories, evaluation services, and proximity to the Port of Gulfport, rail, interstates and the Gulfport-Biloxi International Airport.

Membership in the Gulf & Ship Island Building also includes proximity to small businesses and industry and an extensive mentor network, as well as local, state and federal partners—all within steps of the Gulf of Mexico, which includes year-round shallow and deepwater testing. This represents a model to be replicated in other communities in the Mississippi Gulf Coast region.

Cohort Members’ Potential Economic Impact

\$17M+ in investment
excluding R&D contracts and grants

350 jobs
projected over the next 3-5 years as startups reach economies of scale

Inaugural Cohort’s Global Reach

12 countries represented in the 48 applicants applying:



Selected Companies and Descriptions



Safety Net Technologies (SNTech)
ENGLAND

Develop and scale trusted and valued solutions that enable sustainable practices in the fishing industry for a world where oceans and people thrive together.



Seatrec
CALIFORNIA

Manufactures intelligent tracking buoys for commercial fishing fleets, aquaculture farms and ocean observers; and helps fleets save time and money while gaining critical operational insights and increasing sustainability in the fishing industry.



Marauder Robotics
GEORGIA

Is building a remote work platform that collects data in near real-time and automates underwater tasks done by divers.



Blue Ocean Gear
CALIFORNIA

Manufactures intelligent tracking buoys for commercial fishing fleets, aquaculture farms and ocean observers, helping them save time and money while gaining critical operational insights.



Seatrac Systems Inc.
MASSACHUSETTS

Manufactures, sells, and rents persistent, multi-purpose solar-powered Uncrewed Surface Vehicles to efficiently, safely and cost-effectively perform real-time data collection and communications for research, commercial and defense applications.



BeeX
SINGAPORE

Is Building the most advanced underwater vehicles and software tools to help reduce the costs and risks of underwater work at scale.

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The University of Southern Mississippi
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