



Marine Science News

The University of Texas at Austin
Marine Science Institute
Activities and Events (Apr-Jun)



2nd Quarter 2020

DISCOVERY STARTS HERE

Discoveries & News

Corona Virus and UTMSI

Well in advance of the June reopening of MSI campus at 40% capacity, Dr. Dickey had prepared a plan to meet UT Austin and CDC requirements. His plan initiated precautionary measures to include disinfection, personnel density and spacing requirements, face covering regulations, instructional signage, creation of teams to reduce exposure, and provision of disinfectant and PPE supplies for a safe operating environment.

Research is occurring under the guidelines and approval of The University of Texas at Austin. Our formal and informal education programs were moved online and plans are underway for the fall semester starting August 26th. Contractors rebuilding UTMSI are continuing work and in close consultation and

approval from UTMSI and UT-Austin administrations. They are following approved CDC recommendations and their company's Health and Safety Plans are on file with UTMSI.

Dr. Robert Dickey is working closely with the Dean's office to ensure mitigation measures to lessen the forecasted economic impact of the pandemic from reduced revenue and increased emergency needs for students. He has also been issuing frequent updates to faculty, students, and staff on COVID-19 closures and procedures, along with continued reminders of preventative measures including social distancing, controlled access, face covering, and handwashing.

Brett Baker receives 2020 Simons Early Career Investigator Award

When you can change the tree of life with a click of a button, people pay notice. Brett Baker, microbiologist and assistant professor at The University of Texas Marine Science Institute, has attracted the attention of the Simons

Foundation. The foundation selected Baker as a 2020 Simons Early Career Investigator in Marine Microbial Ecology and Evolution. The award recognizes Baker's work in microbial diversity, ecology and evolution.

Baker is at the forefront of a new research field that uses DNA to uncover the diversity of microorganisms, their unique physiology and their roles in ecology. Recently his discoveries have unlocked entirely new branches of the tree of life and he discovered never-before-described microbes that are involved in hydrocarbon (including oil) degradation in the oceans.

The Simons Early Career Investigator program is designed to help launch the careers of outstanding investigators in the field of marine microbial ecology and evolution who will advance our understanding through experiments, modeling or theory. Awardees receive substantial research support of \$222,000 per year for a period of three years, with the possibility of renewal.

The Simons Foundation was

founded by Jim and Marilyn Simons in 1994 to advance the frontiers of research in mathematics and the basic sciences.

If You Built It; Fish Will Come

Anglers know that oil and gas platforms mean fish, but a recent study investigated which types of platforms and water conditions were best for finding specific types of fish. Derek Bolser, a graduate student at the University of Texas Marine Science Institute (UTMSI), led one of the most extensive studies done-to-date, of individual fish species using platforms. Some highly-prized species, like the red snapper, were more likely to be found around platforms with specific water conditions, but the big finding was that common species were found around platforms regardless of water conditions or type of platform.

In their study published by [Marine and Coastal Fisheries](#) they present their findings from sampling 54 different oil platforms throughout the Gulf of Mexico in both nearshore and offshore habitats. The study was unique, because it encompassed such a large area with extensive sampling both at the surface and down along the platform to the bottom of the ocean. “We were able to expand upon the foundational work that described why fish were found on some platforms and not others, and tested those things on a Gulf-wide scale,” Bolser said.

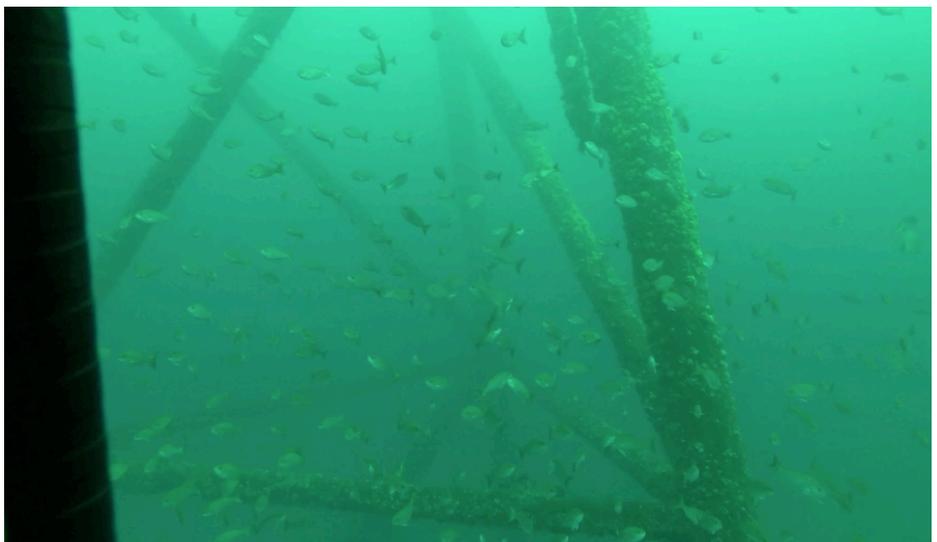
The study used a technologically-advanced approach to collect data, combining specialized underwater cameras with instruments to measure water quality parameters to identify fish and water condition every 10-meters. In their research, the scientists identified 17 of the most common species found on oil platforms and looked at how temperature, salinity, dissolved oxygen, and platform characteristics (like age, how many other platforms were nearby, and how

many legs the platform had) affected the presence and depth location of fish. While some patterns emerged that explained the distribution of a few species, many were likely to be found on platforms regardless of water conditions or platform characteristics

Researchers were able to explain, with confidence, why five of the identified species on the platforms congregated at different depths. With this set of fish, including greater amberjack, depth matters and their relationship with the platform varies with changing temperature. Patterns related to distance from shore or how many other platforms were within five kilometers were also found in six species, which may be related to their lifecycle or abundance of prey around platforms. This detailed information about species distribution patterns could be very important to fishery managers to help them understand and sustain fish populations as oil platforms and water conditions change and in establishing catch quotas.

Bolser and colleagues point out that despite the relatively recent appearance of oil platforms in the Gulf, just over the last 100-years, the fish species in the Gulf of Mexico were predisposed to take advantage of the structure. “The Gulf is a system of constant disturbance – hurricanes, hypoxic ‘Dead Zones’, and high heat. The fish here have evolved to handle changes in the water conditions, and they are programmed to congregate around structure,” says Bolser in explaining why many of the 17 species were found around platforms regardless of water conditions or platform type. Reef habitat and structure is a limiting factor

Researchers used a submersible-rotating drop-camera to capture fish images, such as these vermilion and red snapper, and identify fish distribution and abundance patterns. They conduct 114 surveys at 54 platforms throughout the GOM. Credit: Derek Bolser.



in the Gulf of Mexico. “The platforms are where the food is and life happens. They aren’t willing to leave that despite how tough their living conditions get.”

This study was part of a larger project led by professor Brad Erisman and the Coastal Fisheries Research Program at UTMSI. Other coauthors include Tyler Loughran and Jack P. Egerton from CFRP/MSI; Arnaud Grüss at University of Washington, Seattle; and Taylor Beyea and Kyle McCain at L.G.L. Ecological Research Associates Inc., Bryan, Texas.

This study was supported by the Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement, Harrington Dissertation Fellowship, Harry Tennison Scholarship, and the Coastal Conservation Association of Texas’s Allen Jacoby Memorial Scholarship.

Invited Paper contributes to Food Chain Understanding

Fatty acids are essential to life, and almost every animal needs to get many of them from their diet. As such, they are great biomarkers to figure out who is eating whom in animal populations. In a new thematic issue recently released “The next horizons for lipids as ‘trophic biomarkers’: evidence and significance of consumer modification of dietary fatty acids” by the journal *Philosophical Transactions of the Royal Society B*, specialists in this field present new research findings in a series of reports about the use of fatty acids as biomarkers. This will help refine our understanding of food chains. One of those invited reports was from UTMSI researchers Zhenxin Hou, Ph.D. candidate; Cynthia Faulk, Research Associate; and Dr. Lee Fuiman, Professor.

Hou and her colleagues’ research contributes to a greater understanding of how fatty acids flow through marine food chains by focusing on fish eggs, specifically those of red drum. When red drum spawn at Port Aransas every autumn, they produce hundreds of millions of eggs, which are loaded with fatty acids. The vast majority of those eggs are eaten by a variety of marine animals. Many of the fatty acids in those eggs came from the red drum’s diet. In their paper, the researchers figured out which fatty acids came from the food that adult red drum ate within the past 30 days and which did not.

Determining which fatty acids in eggs come from the diet and how quickly that happens is essential for tracing

the steps in the marine food chain. For example, a jellyfish or mullet that consumes red drum eggs might be getting fatty acids from the shrimp or crabs that adult red drum ate over the past month. Knowing these connections becomes especially important when major events, such as droughts and tropical storms, dramatically change food webs. By altering abundance of different animals, these events can reduce or increase the amount certain fatty acids in animal diets, which can affect the health and well-being of animals in the food chain.

This research was supported by the Perry R. Bass Chair in Fisheries and Mariculture.

New Review updates knowledge on biodiversity of Archaea

Archaea are quite possibly the most abundant and diverse life on planet, but why haven’t you heard about them? The little-known world of archaea gets a big spotlight with a review in *Nature Microbiology*, released in May by



Zhenxin Hou, Ph.D. candidate at UTMSI, is the lead author for an invited paper in the journal *Philosophical Transactions of the Royal Society B*. Hou and her colleagues contributed to the journal’s issue that focused on the use of fatty acids as biomarkers.

lead author, Dr. Brett Baker, assistant professor at the University of Texas Marine Science Institute. Archaea are small single-celled microbes that, up until recently, little was known about how many different types there are and how they are involved in ecological processes. New laboratory techniques to look at their DNA, have unlocked a treasure trove of information about these organisms.

In the review article, the authors review how this information explosion came about and what impacts it has on how we understand biology and our own evolution. Archaea are difficult to grow in the lab, but new technologies that allow scientists to read the genomes of uncultured Archaea are now available. This new-found ability to understand Archaea is important because they are among the most abundant organisms on the planet and are found in almost every environment, even the most extreme ones. In the review, authors also discuss the metabolic capabilities of Archaea and how this new information will dramatically increase our understanding of how the world works, including global nutrient cycles. The expanded world of Archaea has also shaped how we understand the tree of life and evolution.

“Our accelerating ability to obtain genomes and an ever-advancing toolkit for tracking activity of natural communities will continue to enlighten archaeal ecology and evolution,” cited the review. “Given how much our view has advanced in the last few years, there are certainly new frontiers to be charted among new branches in the Archaea.”

Co-authors include Valerie De Anda, Kiley W. Seitz, and Nina Dombrowski from the UTMSI; Alyson E. Santoro from the University of California, Santa Barbara; and Karen Lloyd from University of Tennessee, Knoxville. This review was supported by the National Science Foundation and the Simons Foundation.

Extinction Risk to World’s Groupers Reassessed and Not Improved

Groupers are among the highest valued reef fish, and a reassessment of all the grouper species around the world demonstrated that as much as 26% are threatened. In a recent paper published in [Marine Policy](#), authors, including

fisheries professor Dr. Brad Erisman from UTMSI, reviewed their process for reevaluating grouper and the threats they face.

The results of the study found that nearly half of all grouper species changed in their threat status (e.g. endangered vs. least concern), which highlights the importance and value of the re-assessment process, particularly for harvested species. For the most part, species changed their status due to existence of more biological and fisheries information that permitted a more detailed and systematic assessment compared to the original one that was completed nearly a decade prior. Perhaps the most important change, however, was the marked increase in the number of species that are being harvested by recreational and commercial fisheries, including many small-bodied species that were not targeted previously. Conversely, what has changed very little are monitoring, management, trade controls or other actions to address the threats facing grouper populations. With few exceptions, species identified as threatened a decade ago are not receiving better management.

In the case of local groupers, for which species such as the Red Grouper, Warsaw Grouper, and Yellowedge Grouper are well-known representatives, revisiting their condition is particularly significant because of the growing fishing pressure on this group of fishes. While the Western Gulf of Mexico and areas in the Indo Pacific region do not have



A recent reassessment of groupers, including species such as these Leopard Groupers from Cabo Palo National Park in Mexico, indicated that all of the species throughout the world, as much as 26% are threatened. Credit: Octavio Aburto.

grouper species of elevated concern, the majority of the coastlines and reef systems around the world do.

“Coastlines throughout the world have seen a decrease in grouper abundance, species richness, and shift in size from larger to smaller fish, which is primarily caused by growing demand and increased fishing pressure,” said Erisman. The authors cite some encouraging and positive examples of species recovery that were associated with research activities, strong policies, and enforcement. Along with the status reports, the paper describes several steps that could be taken to reduce grouper extinction risk such as monitoring trade, aquaculture practices and focused efforts on areas in which groupers are most at risk.

This research was supported by Ocean Park Conservation Fund – Hong Kong, Mohamed bin Zayed Species Conservation Fund, The University of Hong Kong, Governo dos Açores, and the United States Voluntary funds through IUCN.

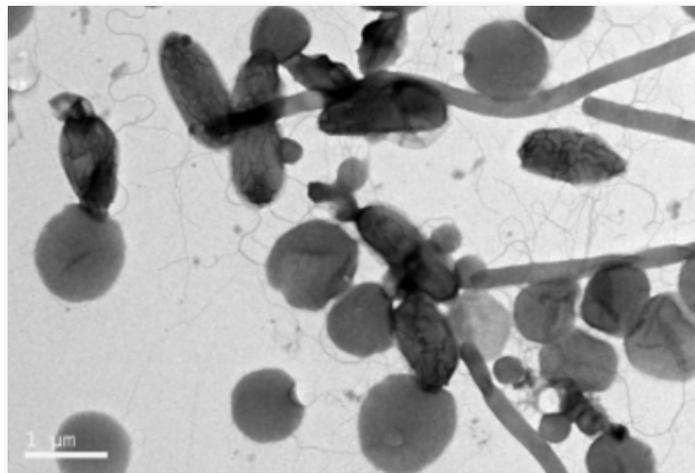
Changing the Code: New Naming System for Microbes

The long-standing rules for assigning scientific names to bacteria and archaea are overdue for an update, according to a new consensus statement backed by 119 microbiologists from around the globe.

Bacteria and archaea (single-celled organisms that lack cell nuclei) make up two of the three domains of life on Earth, and are named according to the International Code of Nomenclature of Prokaryotes (ICNP; the Code). At present, the Code only recognizes species that can be grown from cultures in laboratories – a requirement that has long been problematic for microbiologists who study bacteria and archaea in the wild.

Since the 1980s, microbiologists have used genetic sequencing techniques to sample and study DNA of microorganisms directly from the environment, across diverse habitats ranging from Earth’s icy oceans to deep underground mines to the surface of human skin. For a vast majority of these species, no method yet exists for cultivating them in a laboratory, and thus, according to the Code, they cannot be officially named.

In an article published in the journal *Nature Microbiology*, microbiologists, including Dr. Brett Baker, assistant



A proposed update to the international Code of Nomenclature of Prokaryotes would allow scientists to assign official names to uncultivated species of Bacteria and Archaea, such as the specimens shown in this enriched culture of heat-loving Bacteria and Archaea from a hot spring. Credit: Anna-Louise Reysenbach.

professor at The University of Texas at Austin’s Marine Science Institute, present the rationale for updating the existing regulations for naming new species of bacteria and archaea.

“The old conventions of naming are outdated and need to be updated to account for the rapid rates of discovery using genomics,” said Dr. Brett Baker.

The field of microbiology seems to move at a lightening pace. Trying to keep pace with that speed, while this article was in revision, there was a vote from the International Code of Nomenclature of Prokaryotes to reject the proposal to formally revise the Code to include uncultivated bacteria and archaea represented by DNA sequence information. This means that an entirely separate naming system for uncultivated organisms will likely be created that could be merged with the Code at some point in the future.

This research effort was supported by the National Science Foundation.

External Affairs

Patton Donates \$1 Million to Flounder Research

In Texas and throughout the South, Southern Flounder are a favorite among anglers and seafood enthusiasts. The bad news is Southern Flounder populations across the South and Southeastern U.S. have been in decline since the 1970s.

One man has taken on the challenge to reverse the downward trend through science and education. Bobby Patton, a Fort Worth businessman on the University of Texas Marine Science Institute Advisory Council, donated \$1 million to the Institute in support of flounder research. An avid angler and member of the Texas Parks and Wildlife Commission, Mr. Patton is well aware of the perils that flounder face.

"I'm passionate about fishing and committed to making decisions with the best facts available. As a commissioner on Texas Parks and Wildlife Commission, I want to do what is right for flounder and what is right for Texas. I think there is universal agreement that flounder populations are in trouble not only in Texas but nationwide," said Patton.

Bobby Patton is also intimately familiar with the benefits that scientific research can bring to fisheries management. The Institute has a long history of revealing the mysteries of fish reproduction and life-cycles necessary for robust and sustainable populations. Institute scientists will now focus their efforts on Southern Flounder.

"There is agreement amongst recreational and commercial fishermen supporting sound management to reverse that decline. The research goal is to couple what is already known about flounder with new findings, educate the public on best practices and provide the best information to inform decision-makers," Patton said.

The timing of this donation couldn't be better. Just last week, the Texas Parks and Wildlife Commission moved to adopt new flounder regulations but delayed their implementation for a year. This new donation will dramatically increase understanding of flounder reproductive capacity and the critical times in their life



Bobby Patton, a Fort Worth businessman on the University of Texas Marine Science Advisory Council recently donated \$1 million to the institute in support of flounder research. Courtesy photo.

cycle that require special attention from fishery managers and anglers to reverse the decline in Southern Flounder populations.

Around Campus

Hurricane Recovery

We are continuing the construction supporting research infrastructure while complying with CDC guidelines and Health and Safety Plans for the contractors.

- The marina and pier are making great progress. The pier pilings have been installed and the marina bulkheads are being installed.
- The window casings in the Estuarine Research Center have been painted.
- New railings were installed on the Main Laboratory ramps.
- The Administration Building exterior has been renovated to address drainage issues.
- Renovation of the wet laboratories in the Main Laboratory, both first and second floor, are almost complete with new flooring, paneling, doors and paint.
- The design for the new Center for Coastal Ocean Science is almost complete.
- At the Amos Rehabilitation Keep, the Animal Hospital is in design with Bath Engineering and WKMC Architects.
- The Patton Marine Science Education Center ceiling and kitchen have been completed. The floor and audio are in design to complement the new aquaria space. Turner Ramirez Architects and Tenji are working on the aquaria and exhibit design.
- Displays for the Estuary Explorium have been installed.
- The trails at the Wetlands Education Center and Waterwise Wildlife Garden are complete.
- The permanent exhibits at the Bay Education Center in Rockport are in design with an anticipated installation this fall.

The repair on the marina is well underway with anticipated completion this fall. Photo credit: Katie Swanson.

Repairs To Come

- The wet laboratories at the Fisheries and Mariculture Laboratory will all be repaired.
- The second floor wet laboratories in the main laboratory will be repaired for spalling.
- Floating docks will be installed when the marina construction is complete (estimated completion in November).
- New Housing - Turner Ramirez Architects designed several new housing projects that include additional units at the Wilson Cottage Complex, Lund House and a new Estuarine Research Center Dormitory. We anticipate construction of the Lund House this fall, followed by the new Dormitory, and Wilson Cottage Complex.
- An air handling unit will be replaced in the cafeteria.
- A new garage for our research vehicles is planned.
- Signs will be replaced at the Wetlands Education Center. Invasive vegetation species will be removed and the area will be replanted.
- Bidding for renovation of the Center for Coastal Ocean Science is anticipated in the fall.
- The monument sign at the Cotter Avenue entrance will be completed this summer.



Mission-Aransas Reserve and Education

MissionAransas.org



Moving Education Online

We are offering a variety of virtual engagements airing most days at 1 p.m. for our teachers, students and families. Please connect with us through our Facebook Page (@utmsi or @manerr) to view.

- **Monday: Beachcombing & Beach Walks**
- **Wednesday: Behind the Scenes at the ARK**
- **Friday: Free Your Mind**
- **Saturday: Science and the Sea**



The ARK recently rescued a 600 pound leatherback sea turtle. Photo credit: Jace Tunnell.

Upcoming Coastal Training Events

September 23, 2020

Fostering Behavior Change for Coastal Management: An Introduction to Community-Based Social Marketing

Email sarah.cunningham@austin.utexas.edu to register

September 24, 2020

How to Make a Data Sonde

[Register here](#)

SAVE THE DATE & JOIN US

LANDSCAPING WEB SERIES

Second Friday of the month LIVE at 2:30PM:
Port Aransas Nature Preserve Facebook

- 6/12/20: Tree care for urban landscapes
- 7/10/20: Waterwise strategies for healthy landscapes
- 8/14/20: Palm maintenance for coastal landscapes
- 9/11/20: Turfgrass maintenance in coastal landscapes
- 10/9/20: Plant disease control for urban landscapes
- 11/13/20: Insect Pests and Integrated Pest Management
- 12/11/20: Beneficial insects



Spotlight on Students

Fellowships

- Angelina Dichiera received the Stengl-Wyer graduate fellowship and the Company of Biologists Travelling Fellowship.
- Sarah Douglas will receive an Office of Graduate School continuing Fellowship for Fall 2020 and Spring 2021.
- Derek Bolser will receive a Fall 2020 and Spring 2021 Marine Science Research Fellowship (supported by CCA-AJM, CCA-Schwarzlose, Lund, Port Aransas Rod and Reel)
- Zhenxin Hou will receive a Fall 2020 and Spring 2021 Marine Science Research Fellowship (supported by Barton, Stuckey, Farley Endowments)
- Charles Tang will receive a Fall 2020 Marine Science Research Fellowship (supported by Lund)
- Aquanette Sanders will receive the Graduate School Mentoring Dean’s Strategic Fellowship for Fall 2020 and Spring 2021.

Welcome

New Employees

Welcome! Sunny Sneed, Madison Schumm (Research Scientist assistants in Andrew Esbaugh’s lab), and Lisa Smykla (Research Scientist assistants in Ken Dunton’s lab).

Would you like to be added to our newsletter mailing list? E-mail Sally Palmer at sally.palmer@utexas.edu

Students throughout the country have had to change the way they learn, including Semester by the Sea undergraduates at the Marine Science Institute. This year’s 2020 cohort of 16 students were forced to halt their research and finish their lessons by the ‘virtual’ sea. The semester culminated in May with a virtual symposium, hosted by students Izzy Willner and Zane Ortega. Throughout the symposium students were judged on their presentation and the award for best presentation was given to JD Carlton. Courtesy images.

