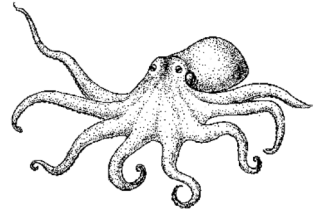


GML LOGBOOK

A Newsletter of the Grice Marine Laboratory
and the Graduate Program in Marine Biology



CORAL PROGRAM BACK IN ACTION

“Bringing nature into the classroom can kindle a fascination and passion for the diversity of life on earth and can motivate a sense of responsibility to safeguard it.” David Attenborough

About 13 years ago, a teacher friend of Marine Operations Manager Pete Meier asked if he could bring a few animals to her classroom and talk about what it’s like to be a marine biologist. Soon, word got out to other teachers and he started receiving more requests. The GML director at the time decided they needed to formalize the GML’s educational outreach and, as a result, the CORAL (Community Outreach Research And Learning) program was born.

The primary focus of the CORAL program is, in the words of Mr. Attenborough, to bring nature into the classroom. In our case, by bringing a mobile touch tank and a variety of local marine animals to local K-12 schools. Or, by hosting groups here at GML. Touch tank organisms can include horseshoe crabs, whelks, blue crabs, sea stars, urchins, hermit crabs, terrapins and other recently caught critters. Pete and his GPMB student assistants then share interesting facts about each animal and allow the students to handle them (if they are brave enough!).



The program also provides our graduate students an opportunity to hone their teaching skills and to talk about their research projects. Recently, educational activities have expanded to include a microscope/plankton workshop where students are able to explore the fascinating life of the tiny flora and fauna that are the base of our marine ecosystem.

In addition to local K-12 students, the CORAL program has hosted other groups ranging from the James Island Senior Center to local homeschool students to visitors from all over the country. When fully operational, the program can reach up to 3000 students per year. It is estimated that over the past 15 years, CORAL has conducted around 500 events reaching over 28,000 students.

Due to the pandemic, the CORAL program experienced a 2 year hiatus but has recently resumed and the requests are starting to pour in. The CORAL program is looking forward to many more seasons and to continuing this amazing opportunity to bring nature into the classroom!

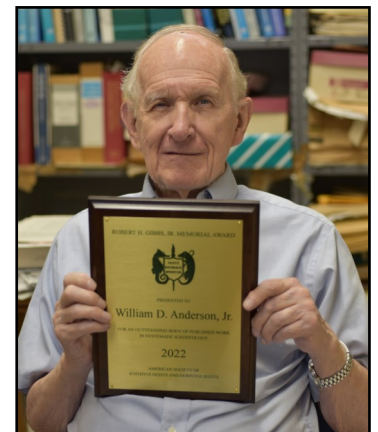
DR. ANDERSON RECEIVES ICHTHYOLOGY AWARD

The American Society of Ichthyologists and Herpetologists has awarded Professor Emeritus Dr. William D. Anderson, Jr. the Robert H. Gibbs, Jr. Memorial Award for Excellence in Systematic Ichthyology for his 54 years (and counting) of contributions to systematic ichthyology. The prize is awarded annually for “an outstanding body of published work in systematic ichthyology to a citizen of a Western Hemisphere nation”.

Dr. Anderson is considered one of the world’s leading taxonomic experts on several major groups of perciform fishes in the families Symphysanodontidae, Callanthiidae, Serranidae, and Lutjanidae. Beginning in 1957, his work on these groups has resulted in over 90 publications and includes dozens of new-species descriptions, synonymies, revisions, taxonomic keys, and chapters in the FAO species identification guides. Dr. Anderson also wrote 20 book reviews while he was the ichthyology book review editor for *Copeia* (2000-2003).

In addition to his impressive body of published work, Dr. Anderson is also responsible for establishing the preserved specimen reference collection located in the Grice Marine Laboratory Collections Room.

Congratulations and well deserved Dr. Anderson!



GML STAFF**Jack DiTullio**

GML Director &
Professor of Biology

Craig Plante

GPMB Director &
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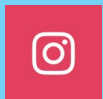
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blogs.cofc.edu/gricemarinelab

UNDERGRADS HOLD DOWN THE FORT**Timara Vereen (Plante Lab)**

During the summer of 2021, I was a student researcher as part of the Research Experience for Undergraduates (REU) program. I was honored to work alongside my mentors, Dr. Craig Plante, Kristina Hill-Spanik, and Josiah Waters and we uncovered some intriguing data from our work. My project was titled: "The Effects of the Eastern Mud Snail (*Ilyanassa obsoleta*) on Community Structure of Benthic Microalgae (BMA)". In other words, how are eastern mud snails impacting BMA communities and what effects does that have on ecosystem function?

Mudflats are important ecosystems that provide food and habitats for organisms. BMA, consisting of photosynthetic microbes, are major contributors to the function of ecosystems as they provide nutrition to fauna in the habitats in which they reside and help stabilize sediments through their glue-like secretions. Eastern mud snails are extremely abundant ecosystem engineers that reside within the same environments as these microalgal communities and tend to deposit feed on the benthic microalgae in the sediment.

With this species interaction in mind, we performed field caging experiments to manipulate snail densities, and collected and analyzed sediment samples for chlorophyll a, organic matter (OM), and DNA in order to determine the effects of the snail on the BMA biomass and community structure. We found that snails reduce BMA biomass and total OM, but the effects of community composition are still pending. It is crucial to know the possible impacts occurring to the community structure of the microalgae as they are key to the functioning of marine ecosystems.

Continuing this study has been a blessing. Over the course of my research, my vision of what I want to pursue in terms of a career has transformed as I have become immersed within the realm of biological research. I have enjoyed working with the GML staff as I continue to gain new experiences. In the fall, I will be developing my bachelor's thesis with Dr. Plante as well as applying to graduate schools to continue my education in the biological science field.

**Jake Kuenzli (Beers Lab)**

I have been fortunate enough in my young career in marine biological research to be a part of two major projects with faculty at the Grice Marine Lab. The first with Dr. Heather Spalding (characterizing new algal species) and the second with Drs. Chris Freeman and Peter Lee via a summer REU award (geochemical interactions between corals and marine sponges). These opportunities provided me with valuable knowledge about the specifics of carrying out scientific research and I developed my skills in research design, collection, bench work, and scientific communication. These skills and more have given me a foundation that I have continued to build on this past year and have aided me greatly with my latest project working with Dr. Jody Beers on sharks and stingrays in Charleston Harbor.



My research in the Beers Lab is an investigation of the physiological effects of temperature stress on the reproductive biology and endocrine systems of coastal elasmobranchs. To do this, I am collecting Atlantic stingrays (*Hypanus sabinus*) in Charleston Harbor using seine nets and then measuring the concentration of sex hormones (testosterone and estradiol) in their blood throughout their reproductive cycles. A small subset of these rays will be brought back to the laboratory and exposed to different temperature regimes to evaluate the effects on blood biochemistry and hormone levels. Bonnethead sharks (*Sphyrna tiburo*) will

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also be used for in-situ comparisons between the species. Elasmobranch conservation is an important area of study and it is vital to understand the effects that warming ocean temperatures may be having on the reproductive capabilities of these organisms. Furthermore, my work in the Beers lab has only solidified my passion for marine biological research as a whole and has enlightened me on the research questions that I plan on investigating in the future. I hope to pursue a PhD in marine biology and continue doing research at either a university or a government agency.

FORT JOHNSON REU PROGRAM CELEBRATES DECADES-LONG RUN

The Fort Johnson Summer Undergraduate Research Program (reu.cofc.edu) hosted its final cohort in summer 2021. The program welcomed its first cohort back in 1992 and was supported as a National Science Foundation (NSF) Research Experiences for Undergraduates (REU) Site starting in 2000. Over the 27 summers it operated, the program supported research and professional development for 241 interns from 163 institutions, supported by 97 research mentors, and contributing to over 40 publications (tinyurl.com/reu-pubs). The program was directed by Lou and Karen Burnett through 2013, supported by 4 NSF grants, and by Bob Podolsky through 2021, supported by two more NSF grants. It was considered a model program by NSF on several counts: it came to exceed its target of >50% participation by URM students and their strong retention in STEM; it provided an integrated set of professional and communication skills to participants through workshops and products; and it exposed students to diverse scientific questions and research cultures among the five Fort Johnson partners.

The consistent emphasis of the program was on mentored, independent research and professional skills (research ethics, proposal and manuscript writing, poster and talk presentation). In addition to disseminating results to professional audiences, for many years the program also emphasized communication of science to the public. For example, the Burnetts led interns through creating an exhibit about their work at the Sewee Environmental Education Center. Environmental educator Carolyn Sotka, who led the science communication workshops 2014-2017, led interns through the building blocks of writing a professional press release. In the final years of the REU program, Podolsky led workshops that culminated in a set of public engagement products, including a research blog (blogreu.wordpress.com), science communication videos (tinyurl.com/reu-videos), interviews on a national environmental podcast (tinyurl.com/reu-podcast), and a Science+Art community presentation (tinyurl.com/sci-art). Interns commonly cite the training provided by these workshops and products as an advantage in graduate school and job applications.

The REU program shaped the professional paths of students from around the country, and many associate CofC with the founding of their careers. Tracking surveys for the last six cohorts found that 47% had entered and 40% were considering or intended to enter graduate school, while 93% were still in the pipeline for a STEM career. Melissa Rex of the 2014 cohort wrote, “REU launched the academic and career path that I am on today...I absolutely credit the research experience, communications skills, and exposure to science professionals I gained at Fort Johnson for laying the groundwork for these accomplishments.” Others echoed those sentiments about the experience: “the most valuable and influential one of my career,” “played an important role in my decision to pursue graduate school,” “my professional and scientific development is directly linked to my REU experience,” and “I gained the confidence to see myself as a researcher...and laid the groundwork for my desire to continue in academia.” At the same time, these students enriched our campus with new perspectives and were a vibrant part of our summer community.

We are extremely grateful to NSF for many years of financial support, to ORGA director Susan Anderson for supporting our efforts in science communication, to mentors from across the Fort Johnson partner institutions whose hosting made the program possible, and to GML staff who helped to support interns, mentors, and program events.



The Final Cohort: Fort Johnson REU summer 2021

FACULTY NOTES

Beers Lab: There was major turnover in the Beers Lab this past year. GPMB student **Jess Daly** completed her degree the end of last summer and moved on to a high school teaching position in Boston. Jess was the first official graduate from the Beers Lab! This past spring, GPMB students **Jake Cashour** and **Gus Snyder** defended their theses and have since transitioned to their respective new paths. Jake also has taken the K-12 route and will be teaching students and coaching soccer in Columbia this coming fall, while Gus begins a PhD program at the University of Alaska in Fairbanks in August. While some have departed the lab, new members have arrived. We welcomed GPMB student **Kerryanne Litzenberg** last fall and she has hit the ground running investigating the effects of age and temperature on the energetics and blood chemistry of horseshoe crabs. This work is being funded by a South Carolina Sea Grant award that was secured in the spring with SCDNR colleagues, Drs. **Daniel Sasson** and **Fabio Casu**. Early this summer, GPMB student **Hayden Bessette** joined the group and will be working on a project assessing the post-release mortality and blood biochemistry of Atlantic sharpnose sharks, along with SCDNR colleague **Bryan Frazier**. Sticking with the elasmobranch theme, undergraduate marine biology students, **Rylie Talmadge** and **Jake Kuenzli** (new lab member), are researching the effects of temperature on the energetics and reproductive biology of Atlantic stingrays and bonnethead sharks. Last but not least, marine biology undergrad **Emily Dombrowski** has also been doing work with horseshoe crabs and has been assessing everything from heart rate (via cool infrared sensors!) to parameters of hemolymph quality. And, of special note, Emily was awarded a prestigious Goldwater scholarship this past spring! We are also happy to report that the lab moved back to HML in March, and we are finally adjusting to our new space, which includes holding facilities and an environmental chamber room for the horseshoe crab and stingray work. It has been a super productive year and there are many manuscripts and conferences on the docket to highlight the fruits of our labor – stay tuned!



DiTullio Lab: During the 2021-2022 academic year, our research activities in the Hollings Marine Laboratory (HML) were markedly curtailed until April, 2022, due to the ongoing pandemic. Current laboratory members include research associate **Dr. Peter Lee**, research assistant **Nicole Schanke**, recent CofC graduate **Emmy Sheahan**, new graduate student **Ethan Johnson**, and undergraduate students **Abby Stephens** and **Claire Brown**. Ethan's project will investigate the interactive effects of elevated temperature and phosphate limitation on the lipid composition of the marine cyanobacterium, *Synechococcus WH7803*. Abby and Claire are investigating the ecolo-

gy and biogeochemistry of Charleston coastal waters for their Bachelor's Essays in Biology. During the past year, we have partnered with the Citizen Science group, *Charleston Waterkeeper* to understand the importance of various water quality parameters, including nutrient fluxes, on phytoplankton community composition in local waters. In addition, two proposals were submitted and are now pending at NASA and DOE to provide funding to support our ongoing coastal research. During this academic year, two manuscripts were published in the journals, *Nature Communications* and *Global Biogeochemical Cycles* (see CofC Biology Dept. faculty website for links). The GBC manuscript represents our 3rd publication from the 2018 Antarctic CICLOPS project. The *Nature* publication, as well as another manuscript recently submitted to *Nature*, both highlight the importance of zinc in limiting diatom production in the open South Pacific Ocean as well as in Antarctic coastal waters of the Ross Sea. Laboratory analyses and manuscript preparations are still ongoing from samples collected during our 2018 "Pole to Pole" expeditions to the North Pole and Antarctica.

Freeman Lab: My lab took two trips to the Florida Keys last summer to finish up field work studying how sponges impact organic matter and nutrient cycling on coral reefs. We spent hours underwater sampling seawater before and after passing through sponges. While there, GPMB student **Hunt Jones** also completed three experiments to measure the roles that sponge cells and microbial symbionts play in the assimilation and recycling/retention of nutrients. GPMB student **Alex Parry** is finishing up his work studying sponge heterotrophic feeding, and CofC undergraduate **Kate Davis** completed her Bachelor's Essay research on macroinvertebrates living within sponge canals. Kate found more than 1600 polychaete worms in one species of rope sponge. Undergraduate student **Josie Shostak** continues her work surveying freshwater sponges in South Carolina and has now found over ten species, including some at sites as close as Moncks Corner. Alex, Hunt, and Josie accompanied me to the Benthic Ecology Meeting in Portsmouth, NH and all gave poster presentations on their research. **Bailey Fallon** (a previous CofC Biology student) published a paper on microplastics in Caribbean seawater and sponge tissue, and my colleagues and I published a review paper on sponge-microbe interactions and papers on bivalve feeding on algal blooms and soft sediment communities (all three in *Frontiers in Marine Science*). In collaboration with **Dr. Peter Lee** (HML), we have also started pilot studies to determine how climate change-induced shifts from coral reefs to sponge reefs might impact the release of volatile organic compounds.



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FACULTY NOTES

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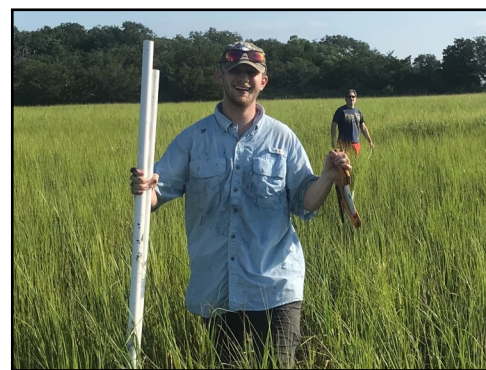
Harold Lab: Research continues on diversity and abundance of early life history stages of fishes living in association with benthic algal beds dominated by the invasive species *Agarophyton vermiculophyllum*. **Carly Lynn Strange** is working on her Master's degree (Graduate Program in Marine Biology) research in this area. A special shout-out to undergraduate **Mallory Rosenfeld** who is providing significant assistance to Carly Lynn as a volunteer. **Marley Garrard** is pursuing her Bachelor's Essay (BIOL 499) on a related project involving microhabitat utilization of larval and post-metamorphic juvenile fishes. She has been assisted in the field by undergraduate volunteer **Eric Wehmeyer**. I gave a departmental seminar in April in which I reported on research conducted during my 2021 sabbatical. The project was mainly a systematic and taxonomic investigation of pelagic cod-like fishes of the family Bregmacerotidae. I will be presenting some of this research at the annual meeting of the American Society of Ichthyologists and Herpetologists in Spokane, WA, in July. Carly Lynn will also be attending and presenting in Spokane. **David Richardson** (NOAA, Rhode Island) visited the lab in May and worked on identification of larval Bluefin and other *Thunnus* species housed in the GML collection. These updated records will contribute to an improved understanding of the distribution of tuna larvae in the western North Atlantic.

Hughes Lab: In our lab, it's been a year of simultaneously expanding horizons and digging into the vaults. GPMB student **Rachel Prostko** is continuing work on nonconsumptive predator effects ("ecology of fear") on behavior in snapping shrimp, running trials with individuals, pairs, and small groups. Her experiments will help us clarify the role of predators in contributing to the stability of monogamous pairs in this species. Meanwhile, I've been learning new (to me) analytical tools, and applying them to two previously mothballed projects, both examining the roles of sexually selected weapons in antipredator defense - does weapon size affect antipredator "personality"? In addition, former GPMB student **Whitney Heuring** and I finished work on a manuscript (now in press in *Behavioral Ecology and Sociobiology*) that examines sexual conflict in the formation of these monogamous pairs - both sexes benefit if their partner is larger, but obviously both males and females cannot simultaneously pair with a larger individual, so who "wins"? Turns out, the answer depends on the time of year. We'll be turning our attention to the role of female aggression in maintaining monogamy when she returns from field work in the Pacific. I also wrote Commentary for *Animal Behaviour* on how student "mental models" of sex and sexual behavior impact student learning about topics such as sexual selection, using observations from my animal behavior classes. I've been on sabbatical this year, and as the pandemic limited my ability to safely travel, I focused both on older data and learning new tricks. In addition to the analyses described above, I completed the Lowcountry Master Naturalist training and took several writing courses, both of which I hope to apply in future outreach. I'm looking forward to returning to teaching in the fall! I'll also be returning to my side-job of Associate Chair in Biology, and

will be co-chairing (with **Dan Greenberg**, Department of Psychology) the undergraduate Neuroscience Program.

Janech Lab: Over the last year our lab has continued work to advance proteomic analysis of cerebral spinal fluid from California sea lions admitted to the Marine Mammal Center in Sausalito, CA. First year international graduate student, **Gautam Ghosh** (India), finally joined the laboratory in August 2021 after delaying entrance to the Graduate Program due to Covid restrictions. Hopefully by next year, Gautam will be able to forward a list of candidate protein biomarkers for domoic acid toxicosis in sea lions that will assist wildlife veterinarians in monitoring for domoic acid toxicosis in their stranding population. On the other side of the size spectrum, **Ms. Alison Bland** and Janech have been collaborating with Charleston Waterkeeper to survey the microbial content of Charleston Harbor using metagenomics. In addition to finding an array of human pathogens, the investigators were able to translate all the gene sequences into proteins to build a Charleston Harbor metaproteomics database that will permit functional characterization of the microbes floating in the harbor. The study of the Charleston Harbor microbes was assisted by a grant to the Grice Marine Lab from the Spaulding-Paolozzi Foundation to enable the purchase of a portable ultracold freezer that can be transported to field sites. The portable freezer is a wonderful addition to the Grice Marine Lab inventory.

Plante Lab: We continue to explore the ecology and biogeography of marine microorganisms, currently focused on benthic diatoms and bacteria. In the past year, several publications resulted from work in the lab with former CofC students. A biogeographic



analysis of Sargasso Sea bacterioplankton was published in *PeerJ* by former CofC undergraduate **Geoffrey Gill**, along with co-authors including **Kristina Hill-Spanik**. A report on a new method to measure sediment erosion and deposition was published in the *Journal of Coastal Research* with undergrad **Caroline Cooper**. Former GPMB student **Whitney Hook** published a second manuscript from her master's thesis on antagonistic interactions among marine sedimentary bacteria in multispecies microcosms in the *Journal of the Marine Biological Association (UK)* (in press). Recent CofC graduate **Rowan Emerson**, whose project examined the microbiome of the gut of the eastern mud snail (*Tritia obsoleta*), presented a virtual poster of his research at the 2021 SSM poster session, and we submitted his first manuscript for publication (in review). Current CofC undergraduate, **Timara Vereen**, is following up Rowan's work with field caging experiments to determine the in situ effects of mud

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FACULTY NOTES

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snail feeding on benthic diatoms and bacteria. She presented her initial results at CofC's Research EXPO, and will next focus on bioinformatics analysis of the DNA sequencing results. GPMB student **Josiah Waters**, studying drivers of microalgal community structure in saltmarshes over various temporal scales, likewise has focused on bioinformatics over the past year.

Podolsky Lab: This year we addressed questions about four major anthropogenic impacts on the ocean—warming, acidification, species invasion, and microplastic contamination—involving crustaceans, anemones, urchins, and invertebrate assemblages. Although undergrad **Hails Tanaka** did earlier work on barnacle parasites, his attention turned to modeling while in the Woods Hole REU last summer. That work grew into a Bachelor's Essay, modeling predicted changes in the phenology of barnacle and lobster larvae in the northwest Atlantic in response to ocean warming. Hails will be starting a PhD program at Rutgers in the fall. In the REU program last summer, undergrad **Zoe Munson** studied how chela pinch forces by juvenile ornate crabs (*Callinectes ornatus*) were influenced by CO₂ conditions during recovery from molt, predicting that low pH would reduce calcification of the exoskeleton and weaken pinching. Also during summer on an SSM Dean's grant, undergrad **Sierra Thomas-Frazier** studied effects of light on movement of symbiotic and bleached sea anemones (*Exaiptasia pallida*), predicting that those with symbionts would move toward higher light environments. Grad student **Ray Radick** is just beginning work (co-advised by **Heather Spalding**) on invertebrate assemblages in the mat-forming alga *Chondria tumulosa*, which has become a nuisance alga in parts of the Papahānaumokuākea Marine National Monument of Hawai'i, with the goal of comparing assemblages in invasive and

native algae to better understand the invasion process. Undergrad **Layne Leggett** also recently joined our lab and will be starting a new direction for us, looking at microplastic consumption by planktonic larval stages of benthic marine invertebrates.

Sancho Lab: The Sancho fish ecology lab kept busy in the not-quite post-COVID year of 21-22. Gorka developed and taught for the first time a marine biology undergraduate course on Marine Resources and Conservation, which adds to the growing diversity of marine biology undergraduate course offerings. Three graduate students, **Mathew Young** (GPMB), **Courtney Bayles** (GPMB) and **Samuel Burke** (EVSS) continue to make progress in their research thesis that were slowed down by the pandemic and are hoping to finish soon! Since no undergraduate students worked in the laboratory last year, it was time to complete unfinished projects and papers. **Nick Weber** (GPMB '19) was the lead author on two publications on the physiology and survival of catch and release fisheries of blacktip sharks. **Brittney Parker** (EVSS '19) published her work on microplastic ingestion by fishes in Charleston Harbor, which is quickly being cited everywhere since it includes the highest concentrations of microplastics ever found in marine fishes. The long-lasting collaboration into the plant ecology world with **Courtney Murren** resulted in a publication on the root variation of Arabidopsis plants grown in gardens in Charleston and Spain. In collaboration with multiple marine ecologists around the US, Gorka published a review article on the present status of Marine Protected Areas in the US. Lastly, **Morgan Lattomus** (Marine Biology undergraduate) was finally able to present in person at the Southern Division of the American Fisheries Society Meeting her work on microplastic ingestion by juvenile sharks.

MARINE BIOLOGY GRADUATE STUDENT ASSOCIATION

After a year of adjustments, the MBGSA was able to take some steps toward normalcy as we were able to host a variety of volunteer and social events around Fort Johnson. In the fall, many of the students in our program volunteered for the South Carolina Sea Grant's Beach Sweep to pick up litter around Charleston. We also worked on improving the two GML gardens, participated in the Folly Beach Christmas Parade (where Octo-Claus was a hit!), and hosted some of the first socials within the GML community since the start of COVID.



In the spring, we continued our work cleaning up Fort Johnson and the gardens at GML. Students were able to assist in outreach events through the CORAL program, and we hosted social events for students and faculty alike to celebrate the start and end of the semester. Several students received funding from the MBGSA to attend scientific conferences in the spring, and we celebrated several GPMB students who had successful thesis defenses throughout the year.



The support from the Fort Johnson/GML community during our fundraisers was greatly appreciated, and we are grateful that we were able to host in-person events this year. We are looking forward to the upcoming year to see how we will continue to connect with the community within Fort Johnson and beyond!

RECENT GPMB DEGREES

Courtney Bayles - Assessment of strand-feeding in common bottlenose dolphins (*Tursiops truncatus*) in the waters surrounding captain Sam's Inlet, South Carolina (Advisor: Gorka Sancho)

Brooke Blosser - Microplastic content in oysters (*Crassostrea virginica*) from South Carolina, USA (Advisor: John Weinstein)

Jake Cashour - Physiological stress response and post-release mortality of the bonnethead, *Sphyrna tiburo* (Advisor: Jody Beers)

Jessica Daly - Physiological effects of muscle parasite load in the spotted seatrout, *Cynoscion nebulosus* (Advisor: Jody Beers)

Delaney Drake - U.S. Caribbean hogfish *Lachnolaimus maximus* conservation and management: filling critical life history gaps (Advisor: Virginia Shervette)

Jeff Good - Investigating the life history of the Atlantic brief squid, *Lolliguncula brevis* (Blainville, 1823), from the Charleston Harbor-Ashley River estuary, South Carolina, USA (Advisor: Peter Kingsley-Smith)

Gabrielle Kuba - Macroalgal-microbial relationships are influenced by phylogenetic and environmental characteristics in the Hawaiian archipelago (Advisor: Heather Fullerton)

Edwina Mathis - Investigation of retinoid X receptor isoform expression in eastern mud snails (*Tritia obsoleta*) exposed to endocrine disrupting chemicals (Advisor: Demetri Spyropoulos)

Alex Parry - Assessing heterotrophic feeding in ecologically dominant Caribbean sponge species (Advisor: Chris Freeman)

Ellen Reiber - Population genetic and stock enhancement tools for conservation of the overfished white seabass, *Atractoscion nobilis* (Advisor: Tanya Darden)

Gus Snyder - Physiological mechanisms underlying increased swimming performance in the spotted seatrout (*Cynoscion nebulosus*) associated with infection by a myxozoan parasite (*Kudoa inornata*) (Advisor: Jody Beers)

Lindsey Transue - The Biological and Anthropogenic Soundscape of an Urbanized Port – The Charleston Harbor Estuary, South Carolina (Advisor: Eric Montie)

Taylor Williams - The reproductive system of *Chondria tumulosa*, the Papahānaumokuākea Marine National Monument's first known nuisance alga (Advisor: Heather Spalding)

2021-2022 GPMB Students

Leah DiMaggio
University of Wisconsin - Madison

Raven Ferguson
University of Southern Mississippi

Gautam Ghosh
Florida Institute of Technology

Maria Granquist
Lehigh University

Ethan Johnson
University of New Haven

Kassidy Lange
St. Cloud University

Kerryanne Litzenberg
University of N. Carolina- Wilmington

Kelsey Martin
University of Illinois

Alexandra Mitchell
Colgate University

Colin Perkins-Taylor
Swarthmore College

Anna Quintrell
University of Tennessee - Chattanooga

Rachel Radick
Clemson University

Ian Rolfe
Texas Christian University

Annabelle Tierney
Millersville University

Gabrielle Tutelo
College of Charleston

Catlyn Wells
University of Georgia

Adam Ziegler
Stonehill College

GRADUATE STUDENT AWARDS

Courtney Saldaña was awarded a Marine Genomics Fellowship (2021-2022) and won the People's Choice award at the 16th annual Graduate Research Poster Session.

Michael Thienes was awarded 1st place for Best Oral Presentations at the 2021 Marine Research Student Colloquium.

Caroline Tribble received a Joanna Endowment and a Vembu Subramanian Ocean Scholars Award.

Josiah Waters received an A,B, Communication Award.

Shannon Bley won First Place at the Three Minute Thesis Competition.

Delaney Drake received the People's Choice Award at the Three Minute Thesis Competition.

Gautam Ghosh was awarded a Marine Genomics Fellowship for the 2021-2022 academic year.

Jessica Wenclawiak was awarded 1st place for Best Poster Presentation at the 2021 Marine Research Student Colloquium.

Josiah Waters was awarded 2nd place for Best Oral Presentations at the 2021 Marine Research Student Colloquium.

Carly Lynn Strange was awarded 2nd place for Best Poster Presentations at the 2021 Marine Research Student Colloquium.

Adam Ziegler was awarded a Marine Genomics Fellowship for the 2021-2022 academic year.

Nicole Principe - received a Barans Marine Biology Fellowship.

Luke Troha, Jessica Wenclawiak and Courtney Saldaña were nominated and elected to the Sigma Xi Scientific Research Society.

2020/2021 ALUMNI UPDATES

Alejandra Enriquez '20 finished her Knauss Marine Fellowship in Washington DC and is now employed by NOAA NOS (Silver Spring, MD) as a science communicator technical writer.

David Klett '20 is a Wildlife Biologist with the SCDNR section (Charleston) where he works on feed studies and stock enhancement programs for cobia, red drum and southern flounder.

Kyra Reisenfeld '20 is a Biology Product Specialist at Hawkes Learning in Charleston, where she is helping to produce their biology textbook and courseware.

Jessica Ramirez '21 is currently serving in AmeriCorps with the Montana Conservation Corps leading outdoor education events in the community involving watershed management, nonpoint source pollution, and water quality.

Sarah Kell '20 is an EPA contractor in Long Beach, CA working on a Superfund Technical Assessment and Response Team (START) contract for Region 9 .



FACILITY UPDATES



Just in time for bug season, GML had both front porches on the annex screened in. Combined with the ceiling fans, the porches now make for a nice place to relax, study or have a meeting!

Educational equipment funding helped GML purchase both a compound microscope and dissecting microscope - each with a high resolution camera to be used for CORAL outreach events as well as for class and lab lectures.

Thanks to funding from the Spaulding-Paolozzi Foundation, GML purchased a portable ultracold freezer to support remote field work for environmental projects. The freezer is the size of a 48qt cooler and has an adaptor that plugs into an automobile auxiliary power outlet. It maintains temperatures between minus 20C and minus 80C.

For more information on the future of GML and the Fort Johnson complex as a whole (see Director's Log below), visit the Fort Johnson Master Plan virtual reality meeting room by scanning the QR code on the left, or by visiting: tinyurl.com/fjplan



DIRECTOR'S LOG

Winds of Change:

The winds of change are swirling again at Fort Johnson. But unlike the turbulent times surrounding the Revolutionary and Civil War periods, the present times are focused on reshaping Fort Johnson to accommodate research and educational facilities while developing a public park. Recently, the State purchased the adjacent 23-acre May Forest plot and the 1-acre MUSC property "on the point". The South Carolina Dept of Parks and Recreation is planning to expand public areas for "special events" at Fort Johnson. A Fort Johnson Master Plan to reshape all of Fort Johnson is currently in development and will be released soon. While conservation and development of new public parks is an admirable goal, we must be diligent and ensure that the changes do not diminish the prominent tasks of fostering marine research and expanding educational opportunities at Fort Johnson both now and in the foreseeable future. As College administrators weigh the potential advantages of trading our current GML location for the construction of a new marine lab at the former CCEBHR site, training the next generation of marine scientists should remain at the forefront of all decision-making concerning the future of the College's marine biology programs. Certainly, a modern marine laboratory is far overdue and new facilities could potentially vault our program to be more competitive with other regional graduate and undergraduate marine programs. But at the same time, is the value of obtaining a new marine laboratory worth sacrificing a prime location with direct water access to the

Harbor that has been ideal in fostering our marine research and teaching efforts for the past 50 years? Certainly, there are trade-offs to consider. Hopefully, the College's vision for expanding our marine program in the future will remain at the forefront of these deliberations.

Academic changes to our marine program will also soon usher in a new era in training undergraduate marine biology students. For the past 30 yrs, the NSF-funded REU program at GML provided a platform for some of our nation's top undergraduate marine biology students an opportunity to perform summer research at Fort Johnson (see page 3). Next summer, the MARine Internship Experience (MARINE) program will start providing CofC undergraduate marine biology students a unique opportunity to continue their summer research projects into the academic year. The MARINE program will provide CofC students a valuable summer internship in marine biology and the opportunity to enroll in independent research during the academic year, culminating in the completion of a Bachelor's Essay in Biology.

Will these new changes lift the College's marine program to soaring new heights for the next 50 years? Stay-tuned as - *The answer, my friend, is blowin' in the wind* (Dylan, 1963).

-Jack DiTullio, August 2022