

THE MORGAN PEARL

Director's Update

With over 20 funded research projects and multiple Morgan State graduate students living on-site, there's always something interesting going on at the PEARL. That said, Spring and Summer is where the action is – when our laboratory truly leverages our amazing location on Maryland's Patuxent River. Building on PEARL's breakthrough success spawning soft shell clams in 2022, our shellfish hatchery team has successfully produced and is currently rearing an estimated 22,000 soft shell clam seed – each one month old and about the size of a sesame seed. We're excited about the potential for soft shell clams, both to support Maryland's growing aquaculture (seafood farming) industry and for possible environmental restoration benefits as well.

Spring is also a time of preparation for our summer internship program. We have a cohort of seven students this year, including 3 Morgan students with diverse areas of study – Biology, Bioenvironmental Science, and Nursing. These students survived an extensive review process that began with 35 complete applications subjected to initial staff review. As these student interns are paid employees working on PEARL grants and contracts with clearly defined deliverables, it's critical to find the right fit, both for the students as well as for the researchers.

While Spring and Summer will be exciting as always, this Fall will be no respite – and that's a great thing! The Morgan PEARL was selected to receive a congressional appropriation of \$1,000,000 for a three-year project kicking off Fall 2023 that will enable the acquisition of key scientific instruments, provide stipend support for three Morgan graduate students annually, as well as six Morgan undergraduate student interns each summer. These students will work on a variety of projects including a blue crab population study, a coastal carbon monitoring project, oyster/soft shell clam genomics research, and coastal wildlife management. A huge thanks for U.S. Senators Ben Cardin and Chris Van Hollen for making this investment in the Morgan PEARL.

Thank you for reading this newsletter and for your support of the Morgan PEARL! I hope you enjoy these biannual updates. Always feel free to reach out to myself or any PEARL staff to learn more about the work we are doing. A great partnership and collaboration might be a phone call (or email) away!

Best,



Scott Knoche



MORGANTM
PATUXENT ENVIRONMENTAL AND
AQUATIC RESEARCH LABORATORY

Morgan PEARL "Our Vision"

An environmental research laboratory that:

- generates scientific knowledge through innovative, interdisciplinary environmental research;
- embraces a public university's role in translating this knowledge to stakeholders for the benefit of the public; and
- inspires the next generation of scientists, policy-makers and environmentally-aware citizens through coastal field experiences, mentored research opportunities, and environmental education



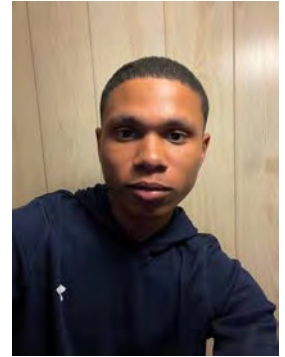
We have seven interns joining the PEARL Team this summer. We are so excited to host another great group of students!



Nayev Pumphrey

Aquaculture Interns (Dr. Ming Liu)

- Paul Jones (Morgan State, Biology Major)
- Kadidja Perou (Morgan State, Nursing Major)
(not pictured)
- Nayev Pumphrey (St. Mary's, Marine Science Major)



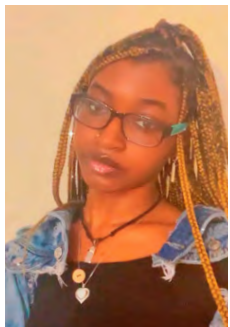
Paul Jones



Kristen Jones

Environmental Economics Interns (Dr. Scott Knoche)

- Kristen Jones (Morgan State, Bioenvironmental Science PhD Student)



Oluwayemisi
Ojolayo

Coastal Ecology Interns (Dr. Chunlei Fan)

- Oluwayemisi Ojolayo (Johns Hopkins, Double Major: Chemistry; Medicine, Science, & Humanities)



Cicely Clark

Visiting Professor Interns (Dr. Elka Porter)

- Cicely Clark (St. Mary's, Double Major: Marine Science and Biology)
- Sophie Panagakos (St. Mary's, Marine Science Major)



Sophie Panagakos

Education News



Elementary students making reef balls. (Photo courtesy of Coastal Conservation Association - Maryland Living Reef Action Campaign)

Reef Balls from Calvert County Public Schools to Baltimore City!

The PEARL has helped the Calvert County efforts to promote oyster education and restoration in the Chesapeake Bay by partnering with CHESPAX, the Coastal Conservation Association of Maryland, Friends of St. Clement's Bay, and the St. Mary's River Watershed Association to build oyster reef balls with Calvert County fifth graders. This year's builds have officially wrapped up for the school year, but we plan on expanding this project to Baltimore City! This year, the PEARL received funds from the Honda Foundation to replicate the Oyster Reef Ball Project at a Baltimore City School. We're excited to work with a new set of students to help restore oyster populations in the Chesapeake Bay!



Reef balls (left) newly built vs. (right) 7 months of oyster growth. (Photo courtesy of Coastal Conservation Association - Maryland Living Reef Action Campaign)

Congratulations

Morgan State University Dissertation Award: Spring 2023

Congratulations to Nikelene Mclean, a PhD student in Morgan State University's Bioenvironmental Sciences program, on her Dissertation Award from the School of Computer, Mathematical & Natural Sciences. After earning her Bachelor of Science degree (Summa Cum Laude) from Morgan State University in 2018, Nikelene Mclean opted to continue her research characterizing the interannual spatiotemporal population dynamics of the *Chrysaora chesapeakei* in the Chesapeake Bay through the pursuit of a doctoral degree at Morgan State University's Patuxent Environmental and Aquatic Research Lab.



While enrolled in the Bioenvironmental Sciences program, Mclean participated in a number of local, regional and international research projects geared towards improving coastal adaptive capacity, strengthening community resilience to anthropogenic and environmental degradation and facilitating the development of traditionally informed and scientifically reinforced strategies to combat the manifestations of climate change on a global scale. In addition to partnering with federal entities and private industry on research ventures, Mclean was selected as the first student in Morgan State University's history to be awarded the prestigious National Sea Grant Knauss Marine Policy Fellowship.

Outstanding Oral Presentation Award in Biology/Chemistry

Carol A. Smith, a Ph.D. student at the PEARL, won first place at the 28th Annual Graduate Research Symposium at Morgan State University for her research on jellyfish entitled "The occurrence of microplastics in *Chrysaora chesapeakei* in the Patuxent River, Maryland" in the outstanding oral presentation in biology/chemistry.



Environmental Economics News

PEARL Presents Research Findings to the MD Department of Natural Resources!

The PEARL Economics team has concluded a two-year project with the MD Department of Natural Resources (DNR) to explore hunter opinions and economic impacts associated with sika deer hunting and management on Maryland's Eastern Shore. PEARL researchers presented the findings of the study to the DNR's Wildlife Advisory Commission in February.

At the Commission meeting, Dr. Scott Knoche gave a presentation to highlight key findings from the study. Detailed findings are available in the final report, which can be found on the DNR website. (<https://dnr.maryland.gov/wildlife/Documents/Hunter-Opinions-And-Economic-Impacts-Associated-With-Sika.pdf>). The study found that Maryland sika deer hunters would prefer moderate changes to two key regulations, 1.) Hunters prefer a minimum 2 point on one side Antler Point Restriction (APR) to no APR and 2.) Hunters prefer a combined weapon season bag limit of 2 stags (relative to 3 stags). The study also explored hunter spending – for the 2020-2021 Season, sika deer hunter trip spending was estimated at \$8.7 million. This finding demonstrates the sizeable economic activity being generated by this outdoor recreational activity in rural areas of Maryland's Eastern Shore. The excellent work on this research will be continued by MSU PhD student Abubakar Ringim as he develops his dissertation - Human Dimensions of Sika Deer Management.



PEARL at the Wildlife Advisory Commission Meeting February 2023

Left to Right; Abubakar Ringim, Dr. Scott Knoche, Kaitlynn Ritchie, Katie Delph, Chairman Carl Wagner, and Dr. Kehinde Ojo

Coastal Ecology News

Former PEARL Crab Survey Interns Accepted into Graduate School!

Two of our former interns have been on very successful and parallel academic paths since starting their aquatic science studies at the PEARL. Mr. Kyle Wood began as a summer intern in 2019, while Ms. Zophia Galvan began as an intern in the fall semester of the same year. Both worked with Dr. Ihde on the Blue Crab Survey, and both continued on at the PEARL as Technicians through the difficult times of the early pandemic. Ms. Galvan and Mr. Wood have both recently completed their Bachelor of Science degrees at Frostburg University, and now both are headed to Alabama to begin exciting graduate studies in physiology!

Kyle, pictured below, has been accepted into the Auburn Master's Program to study with Dr. Ian Butts in the Reproductive Physiology Lab at Auburn University. Kyle will be working on hybrid catfish to better understand the effects of cryopreservation on sperm. Congratulations, Kyle!



Zophia, pictured above, has been accepted into the Master's Program at Auburn also, but will be working 250 miles southeast of the main campus at the Dauphin Island Sea Lab. Zophia will be working on the reproductive physiology and hatchery science of the Eastern Oyster, studying with Dr. Andrea Tarnecki. Way to go, Zophia!

Former PEARL Intern presented at the Patuxent River Conference 2023

Another former PEARL intern, Ms. Caroline Troy, recently presented a poster at the Patuxent River Conference 2023 (held at the Smithsonian Environmental Research Center in Edgewater, MD), to share some of the research she did while at the PEARL. Ms. Troy's poster was about doing science with citizen scientists and how her project has begun to document which of our coastal habitats are most important for the forage fish and invertebrates that all our targeted fish depend on for food. Her work suggests that riprap and Phragmites marsh habitats provide the most diverse variety of forage species, compared to woody debris, grass marsh, submerged aquatic vegetation, and sand bottoms. Her work lays the foundation for future studies of forage associations with different habitats – studies needed to inform conservation efforts in Chesapeake Bay, the nation's largest estuary.

We're very proud of all these young scientists who first got their feet wet in research at the PEARL!

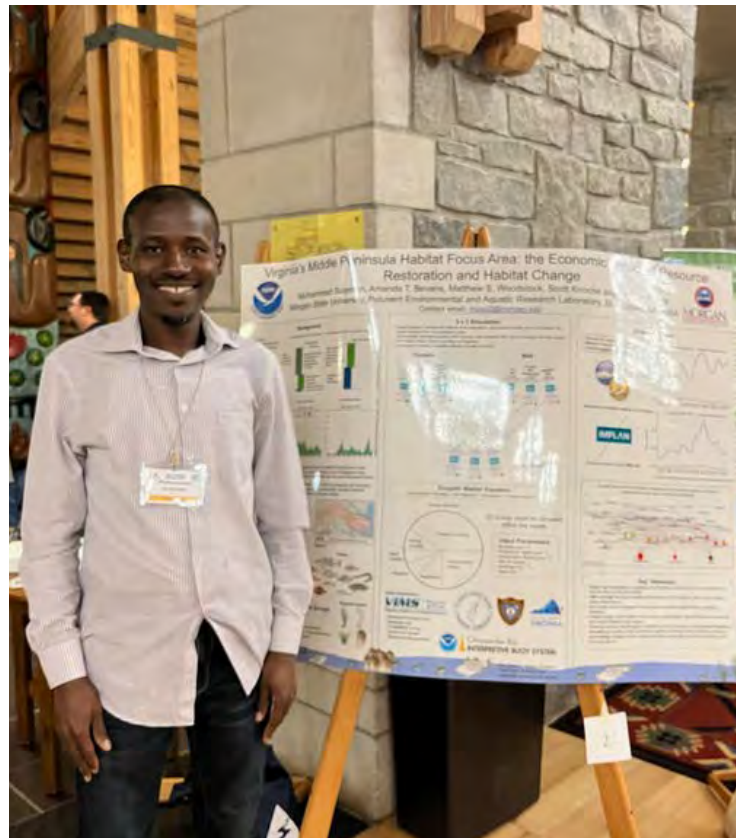
Graduate Students and Staff of the Ihde Lab Make Research Presentations

- ▶ Mr. Muhammad Sulyman and Ms. Amanda Bevans (PhD students), along with Ms. Emily Hoyt (Technician) made presentations in a wide variety of recent research forums.
- ▶ Muhammad and Emily presented posters at the Chesapeake Watershed Forum in November.
- ▶ Amanda and Emily made presentations at both the Southern Maryland Science Symposium (held at St. Mary's College) and the Tidewater Chapter Meeting of the American Fisheries Society (Chesapeake Biological Laboratory), where **Amanda placed 3rd in the best poster competition**. Congratulations, Amanda!
- ▶ The entire Ihde lab is currently working on results to share at the national meeting of American Fisheries Society in August, where we will be contributing six presentations.

Great work, all!



Emily Hoyt, Research Technician



Muhammad Sulyman, PhD Student

Welcome to our new Spring Intern!

The Aquaculture Team is very excited to have Dwight Stephens Jr. as a spring semester part-time intern.

Dwight is a freshman student who plans on studying aerospace engineering and is currently taking classes at the College of Southern Maryland (CSM). He was funded by the S-STEM intern program at CSM. He has been working with the Aquaculture Team on the soft-shell clam breeding program since January.



The Second Soft-shell Clam Milestone: Gear Testing

In the spring and summer of 2022, the PEARL Aquaculture Team successfully demonstrated large-scale breeding of Maryland wild soft-shell clams within a shellfish hatchery setting. The large-scale breeding establishes the first major milestone toward developing this species as a potential aquaculture product. The Bay Journal reported on our current soft-shell clam research and the article has also been shared by several other journals. We received lots of positive feedback from growers, researchers and local residents.



Ming Liu, a researcher at Morgan State's Patuxent Environmental and Aquatic Research Lab (PEARL), holds a handful of soft-shell clam seed produced by the lab in the spring of 2022.

Aquaculture News

The Aquaculture Team continues to make great progress with the soft-shell clam research. In October of 2022, the clam seed was deployed between two test sites, PEARL's pier and Johnny Oysterseed's lease in the Patuxent River, testing nine different gear types to explore which method enables the fastest growth of soft-shell clams in the subtidal area of Maryland. This work is funded by Maryland Sea Grant and MSU Office of Technology Transfer. In January of 2023, a preliminary investigation of the clam growth among the nine different gear types was performed and the result showed quite different growth rates. The average shell length under one type of gear, designed by Jon Farrington, grew over 2.5-fold after a 3.5-month deployment. The biggest clam has reached 33.38mm (1.33 inch). The team will do a thorough survey on all methods at both sites at the end of May. This will give the final evaluation on the effectiveness of each culture method. The results will be posted through PEARL's website and newsletter. Please stay tuned!



Growth rate of the clams from different culture methods (left) and the large clams from the most successful method (Method 6 clams shown on right)

If you are interested in reading the full Bay Journal article "**Breeding a soft-shell clam option for Maryland aquaculture**", written by Whitney Pipkin, it is linked below.

Click the MORE INFO button below to read the entire article.

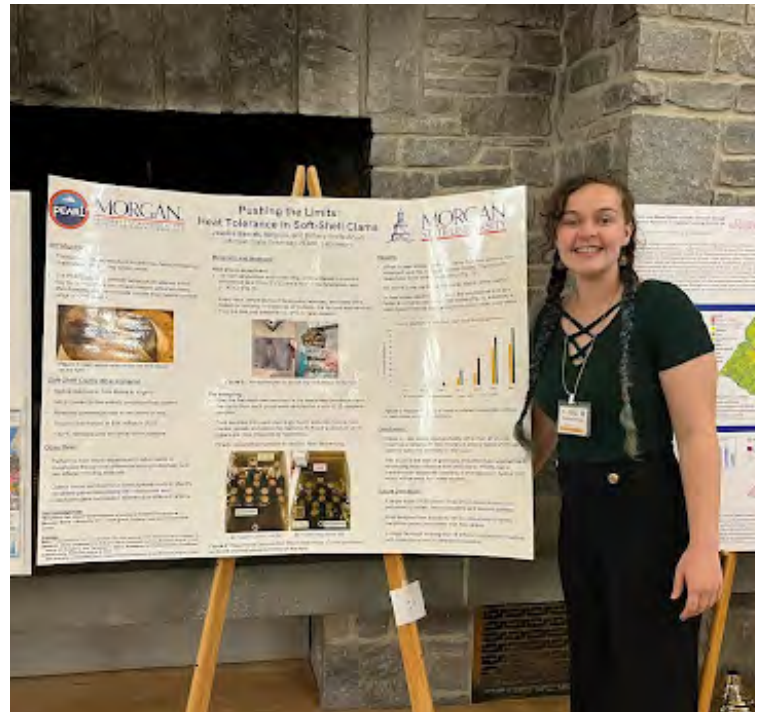
MORE INFO



Aquaculture News

Sharing Our Research

- The PEARL's Hatchery Manager, Brittany Wolfe-Bryant, moderated The Hatchery Happenings: Year In Review session and gave a talk at the 2022 Maryland Aquaculture Conference in November. She gave a talk about our soft-shell clam research at PEARL at the East Coast Commercial Fishermen's & Aquaculture Trade Exposition that was held in Ocean City in January of 2023 as well as assisted in running the Extension booth.
- Dr. Ming Liu presented the progress of oyster genomic selection on the shellfish genetics section at the National Shellfisheries Association annual meeting that was held in Baltimore from March 27-30, 2023. He reported the optimal genomic selection models for growth trait and acute-low-salinity-survival trait of an Eastern oyster population derived from Maryland wild stock.
- The summer intern students Mya Sharpe and Jessica Baniak presented posters about their summer studies, a PCR-based oyster diagnosis method and heat shock challenge on soft-shell clams, at the 2022 Chesapeake Watershed Forum in November of 2022.



Mya Sharp (left), Jessica Baniak (right) at the Chesapeake Watershed Forum.



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