

THE MORGAN PEARL

Fall/Winter 2023

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.

In this edition of *The Morgan PEARL* Newsletter, dive in to the latest and greatest happenings at the PEARL.

- Read about our \$1,000,000 congressional appropriation - courtesy of U.S. Senators Ben Cardin and Chris Van Hollen - which is propelling us into a new era of discovery;
- Learn about our newly established Coastal Chemistry laboratory;
- Discover the future of soft shell clams;
- Dig into our Summer Internship Program;
- and much, much more!

The PEARL is buzzing with activity, and we're thrilled to share the journey with you!



From the Director

Since I last touched base with you in my Director's Update this past Spring, so much has happened at the Morgan PEARL. New grants, new projects, new educational initiatives, and new students!

Perhaps the biggest news is the formal approval of the \$1,000,000 congressional appropriation grant, titled: "*Morgan State University's PEARL Lab Student Research Enhancements*". With a HUGE thanks to U.S. Senators Ben Cardin and Chris Van Hollen, this project has funded the acquisition of laboratory equipment, the hiring of key personnel, and the support of Morgan State interns. This includes supporting research and education in the following key areas.

Microplastics

- Microplastics are emerging as a serious environmental concern with potential human health implications as well. This already well-established PEARL research program has been enhanced through the acquisition of a high resolution digital microscope with the ability to identify microplastics 1/50th the width of a human hair.

Coastal Chemistry

- PEARL has established a new research program in Coastal Chemistry through the acquisition of four new carbon monitoring instruments. This program will examine how the coastal carbon cycle is changing due to human impacts and climate change.

Blue Crabs

- The PEARL has overseen a 56 year-long Chesapeake Bay blue crab survey that provides vital information on blue crab populations. This grant will support equipment, personnel, and a new 25 foot vessel that will enable the continuation of this important research.

Soft Shell Clams

- The PEARL is a leader in research related to spawning and raising soft shell clams in Maryland. Genomics equipment acquired through this grant will support PEARL's soft shell clam selective breeding effort, with the end goal of improving clam heat-tolerance.

Intern Support

- This grant will support 6 paid summer internships each year for 3 years. Students will apply the state-of-the-art equipment described above to explore key research topics, ultimately presenting this research at PEARL's Summer Intern Symposium.

SO much is happening right now - the new research equipment is already arriving - and the upcoming field season promises to be tremendously exciting! Thank you for reading this newsletter and for your support of the Morgan PEARL.

Best,



Scott Knoche



Education News

News from our 2023 Summer Intern Program

PEARL hosted six awesome interns for the 2023 Summer Internship Program working with the Aquaculture, Ecology, Environmental Economics, and STURM teams.



Summer 2023 Interns (Top Row, L-R: Kristen Jones, Paul Jones, Yemisi Ojolayo; Bottom Row, L-R: Sophie Panagakos, Nayev Pumphrey, Cicely Clark)



Top: Dr. Chunlei Fan and his summer intern, Oluwayemisi (Yemisi) Ojolayo

Bottom: Kristen Jones in the field for her Ecology project on Mysids.



Ecology Interns

- Oluwayemisi (Yemisi) Ojolayo is a sophomore at Johns Hopkins University double majoring in Chemistry and in Medicine, Science, & the Humanities. She worked with Dr. Chunlei Fan and Dr. Sulakshana Bhatt on her project, "Development of an In-House FTIR Library for Microplastic Identification."
- Kristen Jones is in her second year of the Morgan State University Bioenvironmental Science PhD program. She worked with Dr. Tom Ihde and Emily Hoyt on her project, "Mysids."

Environmental Economics Intern

Kristen Jones pulled double duty, also working with the PEARL Environmental Economics Team on her project, "Masonville Cove: How Do We Determine Its Value?". In this project, Kristen was mentored by Dr. Scott Knoche, Dr. Kehinde Ojo, and Kaitlynn Ritchie.

Education News

Aquaculture Interns

Paul Jones, a senior Biology major at Morgan State University, and Nayeve Pumphrey, a sophomore Marine Science major at St. Mary's College of Maryland, both worked with the PEARL Aquaculture team this summer.

- Paul's research project focused on softshell clams - "How Hot is Too Hot? Heat Tolerance within Softshell Clams."
- Nayeve's research project focused on algal diets of shellfish - "Algae: It Matters! The Impacts of Algae Diet on the Growth and Survival Rate of Eastern Oyster Larvae."

Both Paul and Nayeve were mentored by Dr. Ming Liu and Brittany Wolfe-Bryant.



Above: Paul Jones uses a microscope in the PEARL Shellfish Hatchery for his research project.



A HUGE thank you to Dr. Tom Ihde who managed the Summer Internship Program while Education Coordinator, Dr. Amanda Knobloch, was on leave.



Right: Nayeve Pumphrey prepares a blue crab for measuring.

STURM Interns

Cicely Clark, a Junior at St. Mary's College of Maryland double majoring in Biology and Marine Science, and Sophie Panagakos, a Junior at St. Mary's College of Maryland majoring in Marine Science, worked with visiting researcher Dr. Elka Porter this summer. Cicely and Sophie worked together on their project, "Particles and Their Effects on Denitrification in the Water Column."

Sophie Panagakos (L) and Cicely Clark (R) prepare an instrument for their research project.



Getting out there! MORGAN PEARL Staff & Students Participate in the 36th Annual Patuxent River Wade-In



PEARL staff at the Patuxent River Wade-In with Charles County Commissioner President Reuben B. Collins II. From L-R: Tameka's son, Abubakar Ringim, Yemisi Ojolayo, Amanda Bevans, Scott Knoche, Nayev Pumphrey, Reuben B. Collins II, Kristen Jones, Tom Ihde, Tameka Taylor.

The Morgan PEARL participated in several events throughout the summer and early fall, including the Patuxent River Wade-In, the Calvert County NAACP Juneteenth Community Celebration, Oysters Blues & Brews, the Southern Maryland Invasives Festival, and Patuxent River Appreciation Day. Look for us at upcoming events, including the Morgan State STEM Expo in Baltimore this November!



A new research laboratory focused on Coastal Chemistry is kicking off at the PEARL!

Dr. Amanda Knobloch, PEARL's Education Coordinator, has formal training in coastal organic chemistry and will be bringing this expertise to a new research initiative at the PEARL. Equipment for the Coastal Chemistry Lab will be purchased through the Congressionally Directed Spending Funds (Earmark) and through a National Science Foundation (NSF) grant recently awarded to Dr. Knobloch through the NSF's Historically Black Colleges and Universities -

Undergraduate Program: Research Initiation Award (HBCU-UP: RIA) Program.

This grant will provide necessary equipment and resources for research efforts in Coastal Chemistry, as well as funds for students to gain valuable field and laboratory experience.

This project, entitled "Comparing Carbon Fluxes of Tidal Marshes and Oyster Aquaculture Farms in the Chesapeake Bay," will lead to a better understanding of the coastal ocean's changing carbon cycle. As sea level rises and human modifications continue to change natural shorelines, many tidal marshes will be lost or significantly altered, and their effect on the coastal carbon cycle will change. In contrast, the number of oyster aquaculture operations in coastal regions are increasing due both to higher demand in seafood and, in some areas, decreases in natural oyster populations. Previous work has focused on carbon cycling in tidal marshes and oyster aquaculture facilities separately. However, this project will compare the two habitats to determine if the effect of the potential loss of tidal marshes could be mitigated by increased oyster aquaculture.



Dr. Amanda Knobloch - Coastal Chemistry Program Lead

Ongoing Project by PEARL Economists: Economic Valuation of Urban Green Spaces in Baltimore with a Specific Focus on Masonville Cove

The PEARL Environmental Economics team is working on a project in collaboration with the Maryland Port Administration (MPA) that focuses on the economic valuation of urban green spaces in Baltimore, with a specific emphasis on the Masonville Cove Urban Wildlife Refuge Partnership. Urban green spaces can provide a number of community and environmental benefits, such as physical and mental well-being, heat mitigation, recreational opportunities, and wildlife habitat. The team has designed a comprehensive survey to measure the value and importance of urban green spaces and publicly accessible coastal spaces in general, including Masonville Cove. With the survey's launch scheduled for early 2024, the project's results are poised to offer valuable insights to MPA for the improved management of Masonville Cove Wildlife Refuge Partnership and the continued enhancement of urban green spaces in Baltimore.



Economics Team attends Salmon Farming Conference!

PEARL Environmental Economists attended the Sustainable Aquaculture Systems Supporting Atlantic Salmon (SAS2) Conference in Baltimore, MD at the Institute for Marine and Environmental Technology. This was the annual research meeting for a \$10 million U.S. Dept. of Agriculture grant, a portion of which funds seafood consumer preference research at PEARL.

PEARL Director Dr. Scott Knoche and PEARL Economist Kaitlynn Ritchie co-moderated a panel of industry, academics, and government representatives to discuss opportunities and challenges for the land-based salmon farming industry. Rising costs and innovative marketing were hot topics. Information obtained from panelists and the audience will help guide research to provide actionable information for this industry.



Above: Dr. Scott Knoche introduces panelists from industry, academia, and government.

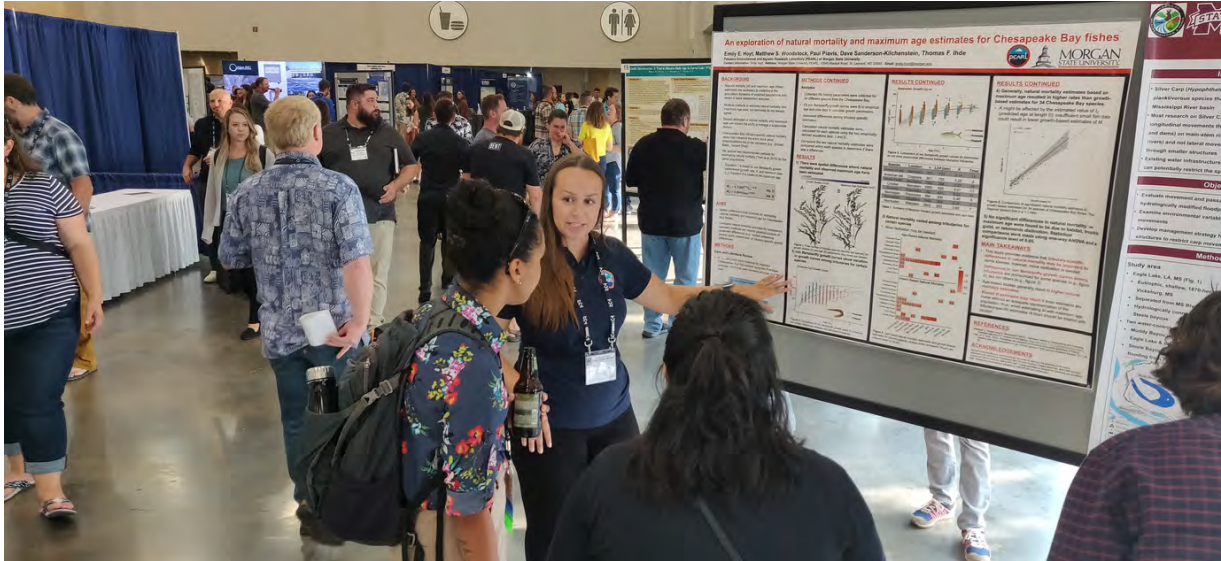


Bottom Left - Left to Right: Jonathan van Senten (Virginia Tech), Kaitlynn Ritchie, Scott Knoche, Yonathan Zohar (UMBC)

Coastal Ecology News

PEARL Presents Research at the American Fisheries Society Conference

Staff and students in the Ihde Lab have been busy finalizing project results and presenting at conferences. The team had a strong presence at the 153rd annual conference of the American Fisheries Society (AFS), held in Grand Rapids, Michigan this past August.



PEARL Technician Emily Hoyt explains her work at the Poster Session in Grand Rapids.



Left to Right: PEARL Technician Emily Hoyt, Dr. Tom Ihde, and Morgan Bioenvironmental Science doctoral student Amanda Bevans at the 153rd Annual AFS Conference in Grand Rapids, Michigan.



Postdoctoral Fellow Matt Woodstock presents project results in Grand Rapids.

We will miss Postdoctoral Fellow Matt Woodstock, who has skillfully guided the successful development of two new ecosystem models at PEARL over the past 2 years. Matt has now begun a new Fellowship at Woods Hole Oceanographic Institution! Smooth sailing, Matt!



Former PEARL Intern earns Fulbright Scholarship

Former PEARL intern, Ms. Caroline Troy, received a Fulbright Scholarship to study in Bengaluru, India! Her research focuses on how urbanization affects the diversity of bat species in southern India, many of which are threatened or endangered. For more information on her work click [here](#).

The first market-size soft-shell clam raised in aquaculture settings in Maryland!

PEARL's aquaculture team is actively working on a soft-shell clam program funded by the Morgan State University Office of Technology Transfer and Maryland Sea Grant. The goal is to make soft-shell clams the second aquacultured species in Maryland (after Eastern Oysters). The team has successfully spawned soft-shell clams since the Fall 2021. In June 2023, the first batch of PEARL soft-shell clam seed raised in aquaculture settings crossed the market size threshold of 2 inches. To our knowledge, these are the first hatchery-bred soft-shell clams raised to market-size in aquaculture settings in Maryland as well as in the Chesapeake Region.



Soft-shell clams that PEARL spawned in October 2021 and raised in aquaculture settings reached an average shell length of 2.2 inches by June 2023.

The aquaculture team is also working on another project focusing on the development of a subtidal culture method that enables the fast soft-shell clam growth and effective protection away from predators. The aquaculture team performed a field test with various methods from October 2022 to May 2023. Among these methods, a floating-sand-tray-based method and a polyculture-with-oyster method raised the clams up to 1.8 inches and 1.6 inches respectively with 100% survival during a 7.5 months culture.

A marvelous algae diet for oyster breeding!

PEARL's aquaculture team completed an industry-driven project funded by Maryland Industrial Partnerships, Maryland Department of Natural Resources and Mark Street Venture Company. The goal was to test the effectiveness of a patented, high-density microalgae diet named AVESPA algae (Algafeed Co., FL) for feeding oysters. In the Summer 2023 study, oyster larvae were fed three different types of algae (AVESPA, Shellfish Diet and PEARL-cultured live algae). The result showed AVESPA algae had some advantages in oyster larvae growth and survival when they are in stressful environments, such as when faced with vibrio infection or low salinity waters.



Nayeve Pumphrey adds algae to tanks of oyster larvae for her algal diet experiment.

The AVESPA algae has shown advantages in oyster broodstock fecundity and the growth and survival of larvae and spat, especially within stressful environments. The results suggest this algae could be a promising alternative algae diet that could improve the productivity of oyster breeding.

Upgraded Genetic and Breeding Laboratory

The PEARL Aquaculture Team recently upgraded their laboratory with two critical instruments; QuantStudio3 and SeqStudio Analyzer for genetic assays. With this equipment, the team now is able to perform a fast disease diagnosis using qPCR technology, conduct studies in gene expression and population genetics, and use the identified genetic markers to assist with selective breeding. These upgrades further enhance the team's capability in research and education.



New equipment for the Aquaculture Lab!



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