

THE MORGAN PEARL

Director's Update

I'll tell anyone who will listen that the Fall season - September, October and November - is the best season weather-wise in Maryland. So I guess it makes sense as I write this note that the sun hasn't made an appearance in seven days, with residual effects of Hurricane Ian and a stalled front making for a very wet and gloomy start to October.

Current weather notwithstanding, things are much brighter on the Morgan PEARL end. Our strong value proposition in the environmental and coastal science realm has resulted in significant investments by the State of Maryland and the Federal Government!

On the State side of things, Maryland Senate Bill 0830 became law in April 2022, which established a wide range of programs, laws, and projects all with the objective of increasing the oyster population in the Maryland portion of the Chesapeake Bay. I'm thrilled to report to you all that through this bill the Morgan PEARL will be receiving a multi-million dollar appropriation for laboratory infrastructure upgrades to support increased oyster production for research and restoration. Plans include expanding the footprint of our hatchery and modernizing our temperamental seawater system. More details will be coming soon on this! While so many worked to make this bill a success, a special shout-out goes to Maryland Senator Sarah Elfreth, for her sponsorship of this bill and her leadership throughout the entire process.

On the Federal side, Morgan State received notification in September 2022 that the U.S. Senate Appropriations Committee selected our Congressionally Directed Spending Request - officially titled "Morgan State University's PEARL Lab Student Research Enhancements" - for funding at the \$1 million level. This will support student engagement at the high school, undergraduate, and graduate levels across 4 core projects which leverage PEARL expertise in the natural and social sciences. Thank you, U.S. Senators Ben Cardin and Chris Van Hollen, for supporting this initiative!

I couldn't be more excited about these State and Federal investments, and I couldn't be more proud of our rapidly growing team who are demonstrating that the Morgan PEARL is a wise investment. The fantastic PEARL team is now 27 people deep on the payroll, with 7 full-time scientists, 3 postdoctoral research associates, 3 research technicians, 6 graduate students, five undergraduate interns, and three support staff.

Thank you so much for your interest in the Morgan PEARL! Please consider dropping me a line (or an email) - I'd love to get your thoughts on our research and educational initiatives or anything related to the PEARL. Maybe we can find a way to work together (if we don't already)!

All the best this Fall season,

Scott Knoche
Scott Knoche



MORGAN
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



Education News

We had 5 wonderful interns join PEARL for our 2022 Summer Internship Program!

Kayla McVey

Kayla is a junior at York College of Pennsylvania studying Environmental Science. This past summer, she worked with Dr. Chunlei Fan, Dr. Ming Liu, and Brittany Wolfe-Bryant on her project, "Evaluation of Larval Survival and Settlement Rate of Low Salinity Tolerant Eastern Oysters" See her [final presentation here!](#)

Mya Sharpe

Mya is a recent graduate of Morgan State University, graduating with a B.S. in Biology in Spring 2022. She worked with Dr. Ming Liu and Brittany Wolfe-Bryant on her project, "Using PCR Assay to Detect Dermo Disease in Eastern Oysters in Maryland Waterways" See [her final presentation here!](#)

Jessica Baniak

Jessica is currently a senior at the University of Maryland - Baltimore County studying Biological Sciences with a minor in Environmental Science. She worked with Dr. Ming Liu and Brittany Wolfe-Bryant this summer on two projects: "Pushing the Limits: Heat Tolerance in Soft Shell Clams" and "The Peaceful Sleep: More Efficient Ways to Sedate Oysters for Sampling." See her final presentation on [soft shell clams here](#) and her presentation on [oysters here!](#)

Katie Delph

After interning at the PEARL in Summer 2021, Katie (a senior Biology major at Morgan State) returned to the PEARL in Summer 2022 to build upon her work from the previous summer. She worked with Dr. Scott Knoche and Kaitlynn Ritchie on her project, "Assessing Hunter Opinion and Economic Aspects of Sika Deer Hunting and Management on Maryland's Eastern Shore." See her [final presentation here!](#)

Aaron Jackson

Aaron is a recent graduate of Frostburg State University who graduated with a B.S. in Geography in Spring 2021. He worked with Dr. Scott Knoche and Kaitlynn Ritchie on his project, "The Levels of Trash Impacting Outdoor Recreation" See [his final presentation here!](#)



From left to right: Kayla McVey, Mya Sharpe, Jessica Baniak, Katie Delph, Aaron Jackson

Education News

Elementary Students Build Reef Balls

The PEARL partnered with Calvert County Public Schools, Coastal Conservation Association of Maryland, St. Mary's River Watershed Association, Friends of St. Clements Bay, Chesapeake Beach Oyster Cultivation Society, and others to help Calvert County fifth graders build oyster reef balls. Students learned about the importance of oysters to the Chesapeake Bay, and the critical need for creating new habitat for these oysters. Students worked in small groups to build reef balls at each elementary school in Calvert County.



Calvert County fifth grade students build reef balls



Finished reef balls

300 Middle School STEM Students visit the PEARL

This summer, 300 middle school students from the Anne Arundel County Public School System's Summer STEM Program visited the PEARL. PEARL staff helped lead a variety of stations, including Sink or Float (plastics activity), Filter Frenzy (oyster filtration), beach seining, and Life at the Dock (oyster reef organisms). Students also got a chance to tour the Maryland Archaeological Conservation Lab (MAC Lab), our neighbors in the park.

Morgan State Second Year Experience Students visit PEARL

The Morgan State Second Year Experience is designed to engage all students returning to Morgan State for the second year in out-of-classroom (experiential) learning opportunities to enhance their career readiness skills. This spring, through this program, Morgan students came to the PEARL to learn about marine science and the research being done at the PEARL. Students were able to go seining at the beach, tour the PEARL Shellfish Hatchery, and go oyster tonging off the dock.



Hatchery Manager, Brittany Wolfe-Bryant, talking with the Second Year Experience students.

Morgan PEARL in the News!



Chunlei Fan, a professor and director of the bioenvironmental science doctoral program at Maryland's Morgan State University, stands in the university's hatchery. The hatchery hosts research on oysters and soft-shell clam propagation.

Microplastic research gears up at Morgan State University

B Bay Journal

Photo courtesy of Dave Harp/
Chesapeake Bay Journal

Morgan State University PhD candidate Carol Smith is among five graduate students in the microplastics program.

Smith points to a microscopic view of a tentacle of the *Chrysaora chesapeakeis* with an abundance of polyethylene plastic visible through RhB staining which show up as pinkish dots.



Morgan State looks to solve a diversity 'pipeline problem' in environmental sciences

Morgan State University is tackling diversity in science with its microplastics in the Chesapeake Bay program and new degree track.

Photo courtesy of Dave Harp/
Chesapeake Bay Journal

 WYPR / Sep 23

Environmental Economics News

PEARL's Environmental Economics Team Welcomes Dr. Kehinde Ojo!

Dr. Kehinde Ojo is PEARL's newest Postdoctoral Research Associate. She obtained her Ph.D. in Agricultural and Applied Economics from the University of Georgia. She holds an M.S. in Food and Resource Economics from the University of Florida and a BSc. in Agricultural and Resource Economics from the Federal University of Technology, Akure, Nigeria (a joint degree with Florida Agricultural and Mechanical University, Tallahassee, Florida). In her research, Kehinde uses different economic methods to study a range of environmental, tourism, international development, and agricultural issues. Her doctoral dissertation incorporates behavioral economics, psychology, environmental economics, and tourism models to understand behaviors and attitudes toward travel and recreation during the COVID-19 pandemic. Kehinde's research outputs have been published in the journal *Tourism Economics* and have been presented at several conferences, including the Travel and Tourism Research Association Conference and the Southern Agricultural and Economics Association Conference. Her research work in international development has taken her to Rwanda and Nepal.

Outside of work, Kehinde enjoys watching travel-related vlogs on YouTube. She loves exploring other countries' cultures, food, and language through the lens of video content creators on YouTube.



New Projects at PEARL being lead by Dr. Kehinde Ojo

The PEARL economics team has kicked off two new projects funded by the Maryland Department of Natural Resources (MD DNR) and the Maryland Port Administration (MPA). These new projects will be led by PEARL's new post-doctoral researcher, Dr. Kehinde Ojo.

The new project with the MD DNR will examine the impact of Maryland offshore wind farms on fisheries stakeholders such as commercial, recreation, for-hire, and tournament fisheries. With the MPA, Dr. Ojo is working on understanding stakeholder preferences for urban outdoor recreation amenities such as urban coastal green spaces. Related to this effort, she is beginning to develop a survey instrument to evaluate the economic benefits of urban coastal green spaces.

Environmental Economics News

Collaborative Project Between Morgan PEARL and Virginia Tech

PEARL economists Dr. Scott Knoche and Kaitlynn Ritchie are collaborating with researchers at Virginia Tech as part of the Sustainable Aquaculture Systems Supporting Atlantic Salmon (SAS²) project. This research will be conducted in collaboration with Dr. Jonathan van Senten, an Assistant Professor in Applied and Resource Economics at Virginia Tech's Virginia Seafood Agriculture and Experiment Station. The project also supports a graduate student, Issac Wu, who has just started his M.S degree in Agricultural and Applied Economics at Virginia Tech. Early next year, the research team will be implementing a survey to explore consumer preferences for Atlantic salmon grown in recirculating aquaculture systems (RAS). Currently, there is limited consumer preference literature specific to RAS salmon. With numerous planned RAS facilities coming to the U.S., this research will shed light on how consumers perceive this emerging farmed seafood product. Currently, there are RAS farms in planning stages in the Mid-Atlantic including both Maryland and Virginia.

In September, Dr. Kehinde Ojo and Kaitlynn Ritchie attended the Recirculating Aquaculture Salmon Network Conference in Bangor, Maine. Kaitlynn Ritchie and Issac Wu gave a presentation and served on a panel to discuss a range of topics related to consumer education and marketing. The conference enabled researchers to network with RAS industry professionals and to learn more about their research needs in order to co-generate content for the upcoming consumer preference survey work.

More information about this interdisciplinary research consortium can be found here, (<https://salmononland.org>).



Dr. Kehinde Ojo, Kaitlynn Ritchie, Isaac Wu

Coastal Ecology News

It has been a busy summer and fall for Dr. Ihde's Coastal Ecology Lab!

Congratulations to Dr. Matt Woodstock, who successfully defended his dissertation this month at Florida International University! PEARL staff turned up in droves (by Zoom of course - no travel to Florida) to support Matt and learn more about his dissertation research.

Dr. Ihde and Ph.D. student Amanda Bevans traveled to Hampton Virginia to represent PEARL at the Chesapeake Bay Stock Assessment Committee's Fall 2022 Blue Crab Workshop. Crabs have been scarce for the last two years. The Chesapeake subpopulation is currently at its lowest level since the early 2000's when the fishery was declared a 'federal disaster' by the National Oceanic & Atmospheric Administration. This critical meeting was held to identify the likely problems for the current population, in preparation for an upcoming benchmark stock assessment. Dr. Ihde and Ms. Bevans attended to share insights provided by PEARL's 50+ year George Abbe Blue Crab Survey – the longest running scientific survey of Chesapeake Blue Crabs. Amanda began working on novel analyses of the crab survey data during her internship in summer of 2021, and that work led her to apply to Morgan's Ph.D. program in Bioenvironmental Science. A big thanks (!) to the Rotary Club of Prince Frederick, which provided the travel funds for Amanda and Dr. Ihde to attend this important meeting!



Amanda Bevans - PhD Student

Amanda also presented her Ph.D. project examining the ecological and economic impacts of oyster restoration at the recent Chesapeake Oyster Science Symposium, held in Irvington, VA. The meeting convened over 60 oyster experts in a one-day meeting hosted by the Chesapeake Bay Foundation.

Dr. Ihde's students (Mr. Muhammad Sulyman, Ms. Amanda Bevans) and staff (Ms. Emily Hoyt, and Dr. Matt Woodstock) will all be presenting at two upcoming scientific meetings. First, in early November, Dr. Ihde's team will be presenting their work at the Chesapeake Watershed Forum with two posters: "Virginia's Middle Peninsula Habitat Focus Area: the Economic Impact of Resource Restoration and Habitat Change" and "A case for tributary-specific age/growth estimates for fishes in the Chesapeake Bay." In December, presentations will be given at the Southern Maryland Marine Science Symposium to be held at St. Mary's College of Maryland.

Meet Our Newest Research Technician

Emily Hoyt is the newest Research Technician to join the PEARL team. Her previous work experience involves aquatic entomology, acid mine drainage, and environmental restoration.

Emily received her bachelor's degree at Frostburg State University in Environmental Analysis and Planning and is currently working to complete her master's degree in Natural Resources at Virginia Tech. She is assisting Dr. Ihde, Dr. Knoche, and Kaitlynn Ritchie on a variety of ecological modeling and economic projects.



Emily Hoyt - Research Technician

Aquaculture News

A Large-Scale Soft-shell Clam Spawning Success!

Building off a successful pilot soft-shell clam spawning effort in October 2021, the PEARL Aquaculture Team conducted another successful but larger-scale soft-shell clam spawn using Maine wild stock and Maryland native stock in Spring 2022. The team has grown the larvae to >2 mm seed (about 1/16 of an inch), with an estimated 360,000 reaching this size! Beyond the spawning success, the team has developed several subtidal farming methods and is exploring the efficacy of each method through the support of Maryland Sea Grant and MSU Office of Technology Transfer. As heat tolerance is a known issue with this cooler water species, Dr. Ming Liu is also developing genetic breeding methods to improve survivability in Maryland's warm Chesapeake waters.



Hatchery Manager Brittany Wolfe-Bryant (right) and Morgan alumnus Mya Sharpe (left) are measuring soft-shell clam seed.

Continued Progress on Oyster Genomic Selection

Dr. Ming Liu and the PEARL Aquaculture Team continue to use the genomic selection approach to improve wild oyster low-salinity growth and survival. Genomic selection is a selective breeding method that relies on the associations between genetic variations on the genome and desirable oyster traits to predict which oyster broodstock are most likely to generate offspring with desirable traits. At the current stage of this multi-year research, Dr. Liu has developed a genomic selection model using a PEARL-produced oyster line with origin from the Patuxent River. Dr. Liu and the Aquaculture Team will be conducting field tests to evaluate model effectiveness in 2023. Provided the effectiveness is validated, this work could benefit oyster restoration and aquaculture as these activities typically require seed produced from wild stock to protect genetic diversity of local wild populations. Stay tuned to upcoming newsletters for updates on this work!



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