

Bioluminescence

What's glowing in the Biology Department

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MONMOUTH
UNIVERSITY

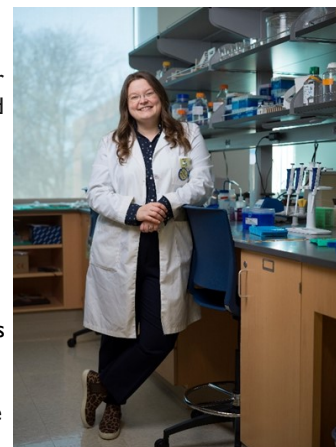
May 2022 • Volume II, Issue II

CAREER Award for Dr. Megan Phifer-Rixey

Dr. Megan Phifer-Rixey, who will be promoted to Associate Professor this summer, was awarded a Faculty Early Development Career Award (CAREER) from the National Science Foundation (NSF). The NSF describes CAREER awards as “the most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization.” The NSF annually funds approximately 500 awards across 10 directorates in their organization, with a funding rate that averages 14 – 24%. The funding is for five years, and will provide support for a postdoctoral associate and a research technician.

The purpose of the grant is to expand Dr. Phifer-Rixey's research on the impact of cities on mice, including their diets and patterns of genetic variation, and

how these city mice may be different from their rural counterparts. This work will increase our knowledge about the ecology and evolution of city wildlife, and will have impacts on human-wildlife interaction, land development and environmental justice. Dr. Phifer-Rixey comments, “This grant will allow us to start building up our knowledge of how house mouse populations in cities differ from those in rural areas. Understanding how cities affect the evolution of wild house mice will hopefully also help us understand how cities might affect other organisms. Studies of evolution and ecology in cities are important. More and more of available habitat is being developed for human use. While many people think of the rain forest or national parks when they think about wildlife, wildlife is all around us. We are missing so much when we ignore cities.”



Dr. Phifer-Rixey in her laboratory in Edison Hall.

Dr. Phifer-Rixey was led to studying biology from a young age. Growing up along the Rappahannock River, which feeds into the Chesapeake Bay, she was fascinated by living things and their connection to the environment. She commented that she
(continued on p. 2)

Anne Marie Lavin wins Stafford Award!



The Biology Department is extremely proud that Anne Marie Lavin, Laboratory Supervisor and Compliance Officer, has won the 2022 Stafford Presidential Award of Excellence. Established in 2003, this annual award was named for President Emerita Rebecca Stafford and is granted to an outstanding member of the University staff or administration for dedication, creativity, and a demonstrated commitment to supporting and enhancing

Monmouth.

Anne Marie was recognized for her continuous and long-term commitment to supporting the Biology Department. She started at Monmouth 26 years ago, when she was searching the Asbury Park Press for a used motorcycle (which she also found), and noticed the advertisement for a Laboratory Supervisor and Compliance Officer. Despite recently
(continued on p. 3)

CAREER Award, continued

originally planned on going into medicine, but “a summer research program my freshman year got me hooked!” She studied biology at Duke University, and went on to receive a Ph.D. from the University of Pennsylvania. She carried out post-doctoral training at the University of Arizona and the University of California, Berkeley before arriving at Monmouth in Fall 2019. Since being at Monmouth, she has taught a variety of courses from freshmen to senior-level, but her favorites are a course she newly developed, Seminar in Urban Evolution, and Evolution. She also teaches Genetics and Introduction to Cell and Molecular Biology, and is energized by the biology majors just starting their career paths. Dr. Phifer-Rixey has become well-established here at Monmouth in her short time with us, commenting, “I love research and teaching. Being at Monmouth

allows me to do both and in a great part of the country (near the beach)! I have excellent colleagues and students. In my previous positions, I was able to build up a research program and gain experience mentoring undergraduates, which has helped me be successful here.” Since her arrival here, she has authored at least 8 journal articles, including one in the prestigious journal *Science*. She has also mentored numerous undergraduate students, three of whom, Jesse Bragger, Tiffany Long, and Summer Shaheed, were able to work with collaborators on a article which was also published in *Science*.

Dr. Phifer-Rixey has lots of plans for her coming years at Monmouth. She would like to continue building her research programs on urban evolution and adaptation, and she has initiated some collaborative projects in the area of marine genomics as well. She feels that the CAREER award is an enormous asset to her work, “This grant will be transformative, allowing me to start a whole new research program with potential for many student

projects not just for the next four years, but for my whole career. Undergraduates in my lab and classes will get to be a part of cutting-edge, impactful science. I am also hopeful that we can build interdisciplinary collaborations with faculty and students across the University and work with the community.” She is also has plans for her grant work to impact her teaching as well – in addition to the new course Seminar in Urban Evolution, she is interested in developing courses in science communication, genomics, and possibly canine genetics. She has found, “some really fascinating genetics has come from research on wild and domesticated dogs and it is a bit of a pet project”.

Outside of Monmouth University, Dr. Phifer-Rixey still finds time to bake, play tennis, hike and enjoy the beach. She spends time building Legos, drawing and running around with her two kids, two cats, and dog. We look forward to her growing research program, and her inspiration of many young biologists to carry out research and follow in her path.

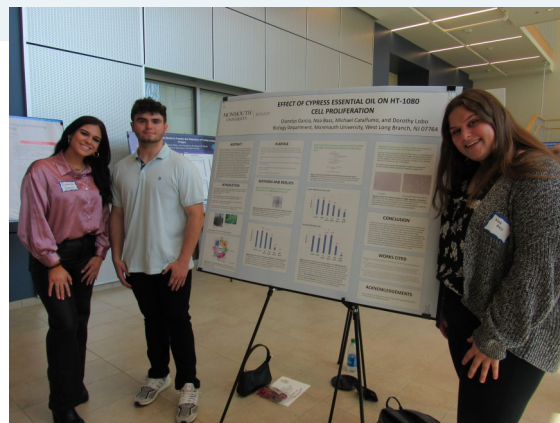


Tiffany Longo '20, Jesse Bragger '20, and Summer Shaheed '19 out in the field collecting clovers for their genetic analysis. Their work was recently published in *Science*.

2022 Dean's Award for Excellence in Undergraduate Research



Marine and Environmental Biology and Policy:
Hannah Craft
Research Mentor: Dr. Keith Dunton



Biology/Molecular Cell Physiology:
Dianelys Garcia, Michael Catalfumo, and Noa Bass
Research Mentor: Dr. Dottie Lobo

Stafford Award, continued

setting up a growing laboratory for a group of physicians, Anne Marie was tempted by the “summers off” and applied to Monmouth. When she began, she was covering the teaching laboratories for Biology, as well as the laboratories for Chemistry and Physics. Over time, part-time help was hired for Chemistry/Physic, and more positions were added. Both Departments kept growing, and now Anne Marie works with two other full-time technicians for Biology, and two full-time technicians in Chemistry (and several student employees as well). Anne Marie was nominated for the award by several faculty colleagues in the Biology Department, all of whom noted her dedication to putting the needs of the students first in all that she does. She is willing to go above and beyond the description of her job duties to help out –there are many examples of this, including making

many trips to HomeDepot, ShopRite, or Petco to get supplies for labs, checking on equipment alarms after hours when the power goes out, and coming in on a Saturday to drive a van full of students on a field trip to the Franklin Institute. In her nomination letter, Dr. Kathryn Lionetti referred to Anne Marie as the “morale officer” for the Department, who always makes sure that the hallways are decorated for holidays and

ment and increase in lab safety protocols placed an enormous amount of extra work on Anne Marie’s shoulders. The safety and successful delivery of labs from in person, labs held outdoors and labs conducted in at home settings would not have been possible if not for the direction of Anne Marie.” Tricia Hicks, the microbial technician for the Biology Department, has worked with Anne Marie for the past nine years, and

believes that Anne Marie has a few more titles in the Department above “Laboratory Supervisor and Compliance Officer”, including purchasing officer, florist, architect/interior decorator, and mentor. Tricia remarked, “I am truly amazed at her knowledge base of each lab that is run in the Biology Department. I still have so much more to learn from her. She makes coming to work a pleasure.”

An **“The safety and successful delivery of labs from in person, labs held outdoors and labs conducted in at home settings would not have been possible if not for the direction of** ne

graduation. Through her years at Monmouth, Anne Marie witnessed three different renovations of Edison Science Hall, and was instrumental in organizing and leading the Department through the

moving process. Her job became harder during the COVID pandemic, when laboratories were being held in many modalities: in-person, hybrid, on-line, or some combination of these formats. Dr. Lionetti commented, “Anne Marie adjusted to the changing needs of the department’s laboratory offerings. This caused an increase in prepping of labs since they were delivered in many different and new ways. The increase in workload for not only prepping labs but the develop-

When off-campus, Anne Marie still enjoys traveling around the country on her Harley with her husband of 29 years, Jim. She is a ‘second Mom’ to 1 nephew, 3 nieces, and 6 great-nephews and 1 great niece, and loves to do a lot of outdoor activities including hiking, kayaking, biking, and walking on the boardwalk, and recently picked up golfing. Last year, she was even brave enough to try a stand up paddle board! In her brief time off this summer, she is planning a “sisters” trip to Canyonlands and hopefully she will get to try a few new restaurants. Anne Marie also helps the community through her involvement with fundraising for “Extended Arms” to help the Harbor House and Contact organizations. Anne Marie has been described as the “glue” that keeps the Biology Department together, and we are so happy that her hard work and dedication to our students and faculty has been recognized.



Anne Marie Lavin (left) and Tricia Hicks enjoying Graduation Day for the School of Science on May 12, 2022.

2022 Biology Department Awards



Antonella Henson-Vendrell

Biology Service Award:
Briana O. Beverley

Research Achievement in Marine and Environmental Biology:
Hannah E. Craft
Kerry L. McFeeters
Ariel D. Zavala

Research Achievement in Molecular Cell Physiology:
Mruga Y. Parekh

Outstanding Biology Transfer Award:
Caroline A. Reverendo

Biology Honor Society - Chi Eta Excellence Award
Gabiella B. Clevn
Antonella M. Henson-Vendrell

Academic Achievement Award - Molecular Cell Physiology
Antonella M. Henson-Vendrell
Bruno T. Pillari
Samantha E. Ragenklint

Academic Achievement Award – Biology
Gabiella K. Herbert

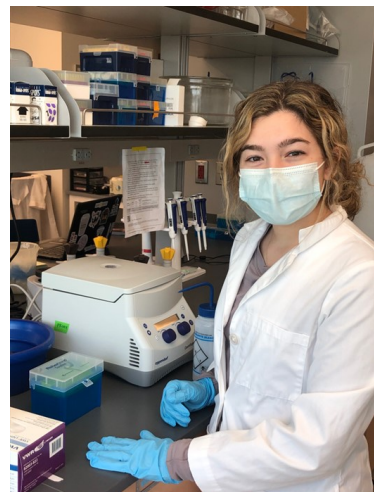
Academic Achievement Award - Marine and Environmental Biology and Policy
Hannah E. Craft



Kerry McFeeters



Briana Beverley



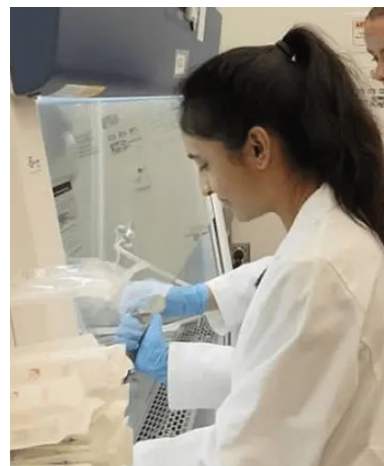
Caroline Reverendo



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Gabriella Herbert

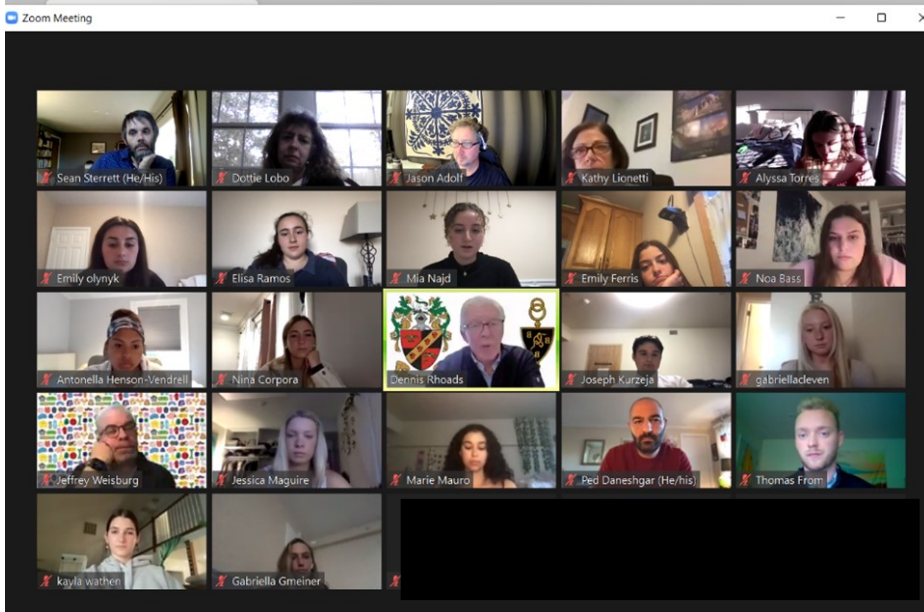
TriBeta Honor Society Induction

Beta Beta Beta, the Biology Honor Society, held a virtual induction ceremony for 13 new members on April 20, 2022. Membership in TriBeta requires a minimum 3.2 GPA in Biology courses only, with a minimum of 3 Biology courses completed.

Chapter Advisor: Dr. Dennis Rhoads

Newly Inducted Members:

- | | |
|--------------------------|---------------------------|
| Noa Bass | Joseph Thomas Kurzeja III |
| Nina Corpora | Jessica B. Maguire |
| Emily Ferris | Marie Mauro |
| Thomas Svane From | Mia F. Najd |
| Dianelys Garcia | Emily R. Olynyk |
| Gabriella Nicole Gmeiner | Elisa C. Ramos |
| | Kayla Wathen |



Adjunct Spotlight: Professor Chris Kerr

Meet Professor Chris Kerr! Professor Kerr joined Monmouth University as an adjunct instructor in Fall 2018. Prior to working at Monmouth, Professor Kerr had diverse experience, ranging from teaching high school biology for seven years, working in sales for an IT company, and serving in the US Army & NJ Army National Guard. He has primarily taught BY 110 Introduction to Cell and Molecular Biology labs and BY 495 Senior Seminar. Outside of Monmouth University, he spends time with his wife and two sons (Shane, 21, and Ethan, 20), and comments that he is an “avid sailor, scuba diver, and lacrosse fanatic!”

In his own words:

Why did you decide to pursue teaching?

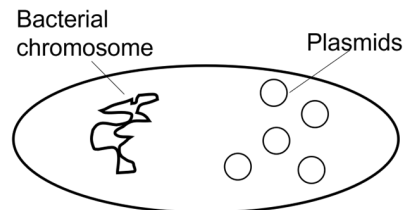
I was in Public Health right out of undergrad (Environmental Sci/Marine Science, Cook College, '95) as a local Health Inspector and was inspired by my wife (a teacher) to pursue education. I used the Alternate Route and taught NJ High School Biology, Environmental Science, AP/IB Environmental Science for almost 10 years in Morris County. During this time I returned to Rutgers in the evenings to earn my Masters Degree in Microbiology and Molecular Genetics (Rutgers, GSNB, '08)

What influenced you to take this path? What other types of jobs do you do?

I changed careers abruptly in 2006 for an opportunity to get into the IT field. Since then my "day job" is providing Information Technology solutions to federal agencies. I have supported agencies such as US Dept of Labor, General Services Administration, Dept of Commerce, and the US Army. But I missed teaching! In 2017 I applied, unrequested, to MU as an adjunct and was awarded a position for the Fall 2018 semester.

What is your favorite lab to teach at MU & why?

As a molecular microbiologist, I would have to confess my favorite lab to teach is pGLO! I love that we can put theoretical concepts into students minds about transcription/translation, and via a lab exercise, put theory into practice and modify organisms. I think its very powerful for them.



Guiding Students through the Peer-Assisted Learning (PAL) Program

Peer-assisted learning is a series of free group tutoring sessions and office hours offered to students in difficult courses in several departments across campus (Accounting, Biology, Chemistry, Economics and Finance, Psychology and Social Work). In Biology, PAL sessions were available for BY 110, BY 211/212 Anatomy and Physiology, BY 214 Botany, and BY 216 Introduction to Genetics. Weekly study sessions are held, which are designed to be active learning exercises, and review of difficult concepts in an informal setting. Students get the opportunity to have questions answered and topics presented to them in an alternative way from their coverage in lecture. Bea Rogers, director of peer-assisted learning, notes that, "PAL sessions are free and *all* students are encouraged to attend to review content weekly and truly master the material." PAL leaders are students who have successfully completed the coursework and feel that they have a "knack" for explaining it to others.

In the Spring 2022 session, BY 110 had two PAL leaders, Carrington Leone and Marie Mauro, who ran review sessions for nine sections of BY 110, which was taught by 11 different lecture and laboratory instructors. Carrington joined as a PAL leader after being recruited by Dr. Lionetti, who she had previously for class, and she enjoyed brushing up on the topics that were covered. She felt that the best part of the job was being able to help the students, and the joy of students reporting back that they were improving in the course. For Carrington, the hardest part was discovering how to accommodate the varying learning styles of the students. For example, she indicated that some students preferred studying lists, while others needed diagrams. For students wanting to be successful in BY 110, Carrington advises, "...Study frequently. Try to make flashcards for each chapter as the course progresses rather than waiting for the approaching exam to look through the information. The topics can be quite lengthy and require a lot of memorization so the sooner you commit it to memory the better." The organization and leadership skills gained by her position will help Carrington pre-



pare for the next stage of her training. After graduation, she is intending to work briefly as a pharmacy technician prior to entering a Physician Assistant program. Carrington comments, "PAL has been helpful to me in showing me how to take a leading position and showing me how to help guide others through a difficult line of work. It has definitely boosted my confidence and helped me step outside of my comfort zone." If you are enthusiastic about helping fellow students and feel that you are well-prepared for the challenges of being a PAL, anyone with a B+ or better in a PAL-supported course can apply for a position. Bea Rogers further noted, "We strongly encourage professor nomination and approval. PAL Leaders should be prepared to sit in on class lectures at least once each week, have a minimum GPA of 3.2, excellent communication and interpersonal skills, excellent time management and organizational skills, and a positive, supportive mindset. Interested students can learn about how to apply on the PAL [website](#)."



BY 110 PAL review session for the final exam. Photos courtesy of Marie Mauro.

Spring 2022 PAL Leaders:

BY 110: Marie Mauro and Carrington Leone

BY 212: Gabriella Clevon

BY 214: Ashley Pastore

BY 216: Chelsea Dee and Jeremy Sanchez

Experiential Education (ExEd) Spotlight: Martha Acosta

Martha Acosta, a Biology/Molecular Cell Physiology major who graduated in May 2022, recently completed an Experiential Education (ExEd) experience with the Hoboken Volunteer Ambulance Corps. Martha chose this experience because she wanted to serve her community, and rose to the need for first-responders in late 2020, during the COVID pandemic. From this experience, Martha commented, “I learned how important it is to offer your help to people during moments of crisis. It is important to show compassion and be kind to everyone because you

know what they are going through. Especially as a worker in the health care industry, I learned that treating people with your best attitude can come a long way.” She has found that the most memorable part of her experience has been providing care to people and being given the opportunity to play a role in patients’ recovery. Martha is looking forward to continue serving her community.



Martha at work in Hoboken.

“I learned that treating people with your best attitude can come a long way.”

Experiential Education (ExEd) Spotlight: Bruno Pillari

May '22 Biology/Molecular Cell Physiology graduate Bruno Pillari completed an ExEd experience in the Spring 2022 semester at Parker Family Health Center (PFHC) in Red Bank, NJ. Bruno was alerted to the position through the Pre-Health Advising office at Monmouth, and jumped at the opportunity to gain valuable healthcare experience. Bruno was able to work as a medical scribe, and learned the flow of a normal patient visit and gained insight into physician-patient interaction. He also was able to put medical **(continued on p. 9)**



Bruno with Dr. Carmine Vaccaro, preparing for the arrival of their next patient.

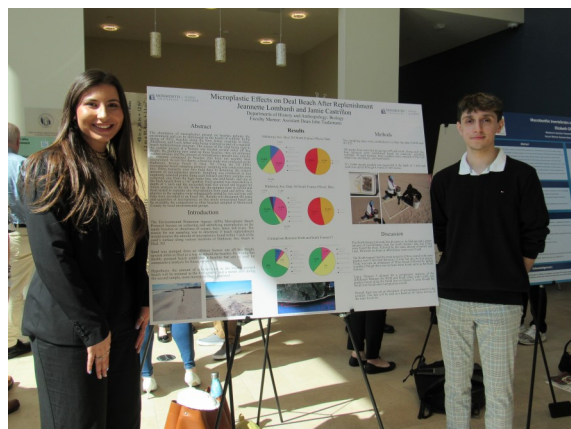
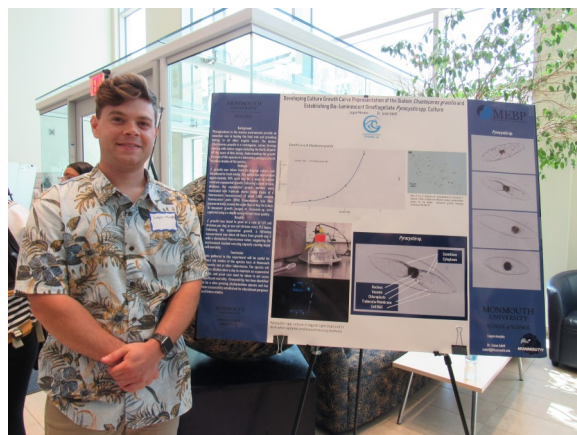
ExEd Spotlight, continued

terminology into use, and gained confidence in his choice of a career in medicine. Bruno commented, “I gained an extremely valuable insight on the social determinants of health, as PFHC works to serve uninsured people through volunteer work by various types of physicians. Being able to work for a medical clinic like the Parker Family Health Center has shown me what it truly means to be a healthcare provider.” Bruno feels that the most memora-

ble part of his experience was the ability to work closely with and make connections with physicians from a wide variety of medical specialties. Bruno’s advice for students contemplating ExEd is “to try your hardest to find an ExEd opportunity that pertains to what you plan on pursuing after graduation. It is super important to immerse yourself in your future field in order to ensure it is something you can see yourself doing for the rest of your

life and to make connections with people already in the field.”

“ Being able to work for a medical clinic like the Parker Family Health Center has shown me what it truly means to be a healthcare provider.”



Biology Publications

MU Faculty and Students*

Adolf, J.E., Saldutti, K., **Conlon, E.***, Ernst., E., Heddendorf, B., Shifren, S., and Schuster, R. “Nitrogen-limited Cyanobacterial Harmful Algal Blooms in Deal Lake, New Jersey,” *Urban Naturalist*, 2022, In press

Badlowski, G.A.*, **Adolf, J.E.**, Fouad, G. “Spatial analysis of water quality parameters in Hilo Bay, Hawai'i using a combination of interpolated surfaces and hot spot analysis,” *Environmental Monitoring and Assessment*, 2021, 193, 118.

Dunton, K.J., K. Sparta,* C.M. Martinez, M.G. Frisk, O.N. Shipley. “First observation of movement rates and repeated migration in a Western Atlantic torpedo ray (*Tetronarce occidentalis*, Storer, 1843) in the northwest Atlantic Ocean,” *Northeastern Naturalist* 2021, 28, N7.

Lionetti, K. A. Townsend, H. “Teaching microscopy remotely: two engaging options.” *Journal of Microbiology & Biology Education* 2022, 23, e00332-21

Fisher-Reid MC, Grayson K, Grouleff SR*, Hair MA, Matlaga TJ, Ireland AK*, Mead LS, St John A, Starr M, **Sterrett SC**, Streeter KN. “Eastern red-backed salamanders: A comprehensive review of an undervalued model in evolution, ecology, & behavior.” *Authorea Preprints*. 2021 Aug 3.

Fleming, J., C. Sutherland, **S.C. Sterrett**, E.H.C. Grant. “Experimental evaluation of spatial capture–recapture study design,” *Ecological Applications* 2021, 31, 1-11.

Haydt, N.T., D.J. Hocking and **S.C. Sterrett**. “Spatial capture-recapture derived turtle capture probabilities and densities in the Chesapeake and Ohio Canal.” 2022, *Journal of Herpetology*. In press.

Loeffler, C. R., Abraham, A., Stopa, J. E., Flores Quintana, H. A., Jester, E. L. E., La Pinta, J., Deeds, J., Benner, R. A., **Adolf, J.** “Ciguatera in Hawai'i: Fisheries forecasting using geospatial and environmental analyses for the invasive *Cephalopholis argus* (Epinephelidae),” *Environmental Research*, 2021, 207, 112164.

Soni, S.*, **Parekh, M. Y.***, **Jive, J. A.***, **Mack, J. P.** and **Lobo, D. E.** “Kumquat essential oil decreases proliferation and activates JNK signaling and apoptosis in HT-1080 fibrosarcoma cells,” *Molecular and Cellular Biochemistry*, 2022, 477, 445-453.

Sterrett, S.C., T. Dubreuil, M. O'Donnell, A. Brand, E.H.C. Grant. “Testing assumptions in the use of PIT tags to study movement of *Plethodon* salamanders.” 2022, *Journal of Herpetology*. In press.

Stoeckle, M.Y., **Adolf, J.E.**, Ausubel, J.H., Charlop-Powers, Z., **Dunton, K.J.** and Hinks, G., “Current laboratory protocols for detecting fish species with environmental DNA optimize sensitivity and reproducibility, especially for more abundant populations.” 2022, *ICES Journal of Marine Science*.

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Stoeckle, M.Y., **J. Adolf**, Z. Charlop-Powers, **K.J. Dunton**, G. Hinks, S.M. Vanmorter. "Trawl and eDNA Assessment of Marine Fish Diversity, Seasonality, and Relative Abundance in Coastal New Jersey, U.S.A.," *ICES Journal of Marine Sciences*, 2021, 78, 293-304.

Xuereb, A. Rougemont, Q., Tiffin, P., Xue, H., **M. Phifer-Rixey**. "Individual-based eco-evolutionary models for understanding adaptation in changing seas." *Proceedings of the Royal Society B*, 2021, 288, 20212006

Presentations at Regional and National Meetings

2022

Craft, H., M.G. Frisk, E.C. Ingram, **K.J. Dunton** "Temporal Monitoring of the Endangered Atlantic Sturgeon (*Acipenser oxyrinchus*) in Sandy Hook and Raritan Bay," NJ. 151st American Fisheries Society Annual Meeting, **2021****

Craft, H.**, **S.C. Sterrett**, G. Fouad "Statewide prioritization of vernal pools for pond-breeding amphibians in New Jersey," Northeast Association of Fish and Wildlife Agencies, **2022**.

Berzins, R.J.**, **S.C. Sterrett** "Evaluating the Detection of Diamond-backed Terrapin (*Malaclemys terrapin*) from an Unmanned Aerial System Using 3D Printed Models," Northeast Partners in Amphibian and Reptile Conservation Annual Meeting, **2021**

Berzins, R.J.**, R.A. Katz, **S.C. Sterrett** "Evaluating the Detection of Diamond-backed Terrapin (*Malaclemys terrapin*) from an Unmanned Aerial System Using 3D Printed Models," Northeast Association of Fish and Wildlife Agencies, **2022**.

Garcia, D.**, **Bass, N.****, **Catalfumo, M.**** "Effect of cypress essential oil on HT-1080 cell proliferation." William Paterson University Undergraduate Research Symposium, 2022.

Pastore A.**, **Daneshgar, P.P.** and Lisa J. "Exploring Ghost Forests: Assessing the Impact of Storm Surge and Sea-Level Rise on Coastal Forests in New Jersey. Atlantic Estuarine Research Society," 2022. Virtual Conference.

2021

Craft, H.**, M.G. Frisk, E.C. Ingram, **K.J. Dunton** "Temporal Monitoring of the Endangered Atlantic Sturgeon (*Acipenser oxyrinchus*) in Sandy Hook and Raritan Bay," NJ. 151st American Fisheries Society Annual Meeting, 2021

Dunton, K.J., **M. Nguyen**, D. Dyson, **B. DiRenzi****, and J. Kneebone. "Demographics Post-Release Survival of Sharks Captured in the Recreational Land-Based Surf Fishery." 151st American Fisheries Society Annual Meeting, 2021

Reverendo, C.**, **Longo, T.****, **Phifer-Rixey, M.** "Variation in traits related to reproduction in new strains of wild-derived mice," Society for the Study of Evolution, **2021**.

Stoeckle, M.Y., **Adolf, J.**, Charlop-Powers, Z., **Dunton, K.J.**, Hinks, G. and VanMorter, S.M. "Trawl and eDNA Assessment of Marine Fish Diversity, Seasonality, and Relative Abundance in Coastal New Jersey." 151st American Fisheries Society Annual Meeting, **2021**