



Saturday, October 5, 2024 | 9–11 a.m.
Alfond Center for Health Sciences Lobby

Poster Presentations

From the Portland Campus for the Health Sciences to the Scarborough Marsh, and from UNE's 363 Acre Forest to the Rachel Carson National Wildlife Refuge, our students have been busy investigating a diverse array of research questions. These projects might continue through their undergraduate years, evolve into a Master's thesis, and

L E G E N D

63. Goat Island Alternative Energy Project

Pam Morgan, Ph.D.

Goat Island, off shore Kennebunkport, Maine, has had an operating lighthouse since 1833. The lighthouse and buildings are powered by an underwater cable from the mainland, which is leaking electricity into the ocean.

1. The Impact of Prophylactic Ceftriaxone on Antimicrobial Resistance in Out-of-hospital Cardiac Arrest Patients

Kristin Burkholder, Ph.D.

With the uprising of awareness of antibiotic resistance, we have partnered with the Maine Health Institute of Research to assess the impact of prophylactic ceftriaxone on antimicrobial resistance in out-of-hospital cardiac arrest patients (OCHA). Ceftriaxone is the go-to antibiotic for OCHA patients to prevent early-onset pneumonia. This project assesses whether ceftriaxone affect

3.

7. DNA Extraction Procedure Influences Northern Bog Lemming Detection

Zach Olson, Ph.D.

As part of an ongoing project to study the northern bog lemming, we tested two DNA extraction procedures to determine which provided more accurate results. We used a medium of 500 μ l of buffer on all samples, and replicated the protocol with 500 μ l of homogenate. The majority of compared samples did not find the same species, and the use of homogenate found a significantly higher number of species than the use of buffer. Six out of twenty-three homogenate samples detected northern bog lemmings.

8. Non-invasive Sampling Detections in Small Mammal Pellets in Maine

Zach Olson, Ph.D.

The northern bog lemming (NBL; *Synaptomys borealis*) has been threatened in Maine since 1986 and there is

11. Methods Development for Microplastic Extraction in Oysters

Carrie Byron, Ph.D.

Microplastics (<5 mm) are an incessant issue throughout the global hydrosphere, disruptive to the functionality of organisms important to environmental services and anthropocentric utilization. Microplastic loading by farming gear type in oysters was explored through the pioneering of digestion, extraction, and visualization methodology. Additionally, a microplastic-aided microbial loading experimental design was built, maintained, and utilized through a duo-lab collaboration. These studies are still in development to achieve efficient and accurate methods and results.

12. Changes in Hind Paw Intraepidermal Nerve Fiber Density After Sciatic Nerve Crush in Wildtype and CD137L Knockout Mice

Josephine Nutakki, Elizabeth N. Bean, Ph.D., Ling Cao, MD, Ph.D.

CD137L is known to play a role in the development of sensory neuropathy. To understand its role better, we determined the nerve fiber density and composition in hind paw skin of CD137L Knockout (KO) or Wildtype (WT) animals before and after a nerve injury. We found that while the amount of nerve loss was similar in KO and WT animals, that the composition changed in KO animals, suggesting that one way CD137L contributes is by changing the composition of nerve types after injury.

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13. Deep Multifidus Muscle Activation During Routine Lumbar Strengthening Exercises

Michael Lawrence, M.S.

15. Analysis of UVVR in Scarborough and Biddeford Pool Salt Marshes Through Different Methods

William Kochtzky, Ph.D.

Vegetation is vital to salt marsh stability, measured with the Unvegetated Vegetated Ratio (UVVR). This project determined the UVVR of the Biddeford Pool and Scarborough salt marshes using manual digitization on USGS NAIP imagery (2009-2021) and Mavic3E drone imagery (2023), along with NDVI quantification from Mavic3M drone imagery (2024). NAIP imagery results showed an overall increase in UVVR, with marsh sections changing at different rates. Method comparison showed inconsistencies in results, needing further improvements.

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16. Investigation of the Effect of Lunar Cycles on Zoospore Release Timing

Patricia Thibodeau, Ph.D.

Ulva lactuca offers great opportunities for use in aquaculture due to its high nutrient content and potential use in pharmaceuticals. In order to understand the phenology and challenges associated with farming *Ulva lactuca*, my goal was to investigate how the lunar cycle affected the timing of zoospore releases in the natural environment. Correlation between the lunar cycle and zoospore release timing was not able to be determined, and further sampling is needed

17. Quantifying Shifting Phytoplankton Populations in the Gulf of Maine

Patricia Thibodeau, Ph.D.

Phytoplankton communities in the Gulf of Maine have normally been diatoms in the spring, followed by dinoflagellates in the summer bloom. When waters are warmer, diatoms are the more dominant species compared to dinoflagellates. This project aims to quantify the shift in phytoplankton populations at Ram Island. Diatoms were the dominant group except for in May, dinoflagellates were dominant. Therefore, the increase in water temperature did lead to a shift in previously known phytoplankton populations.

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18. Lichen Diversity and the Relationship with Red Oak T

19. Thermal Tolerance of Jonah Crabs and an Analysis of Thermal Tolerance Frameworks

Markus Frederich, Ph.D.

This study evaluates several thermal tolerance frameworks to identify those that are most ecologically relevant. The thermal sensitivity of Jonah crabs is used in this study to evaluate these frameworks against each other. Many methods can be used to characterize the thermal sensitivity of the organisms and generate data to compare the different frameworks. Work conducted this summer focused on lacta useC V AC

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21. Oxidation Chemistry with Copper Complexes and Hydrogen Peroxide

Stephen Fox, Ph.D.

Cyclohexane, hydrogen peroxide, and dicopper(I,I)-1,8-naphthyridine-2,7-diimine complexes are reacted together to explore the mechanism behind their oxidation reaction, and how it might be used in industry. GCMS analysis is performed to find the three primary products: cyclohexanol, cyclohexanone, and hydroperoxycyclohexane. Radical trap experiments are performed to discover that the reaction is primarily radical based. Filtered byproduct is analyzed to find an unknown pure compound, which requires further investigation.

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22. Heat-Shock Primer Design and Culturing of

Markus Frederich, Ph.D.

Chesapeake Bay Net les (*Chrysaora chesapeakei*) are a species
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25. Unraveling the Mystery of Rare Coloration of (American Lobster)

Markus Frederich, Ph.D.

This project investigates the gene expression of carotenoproteins in American lobsters (*Homarus americanus*) exhibiting rare color variations. Using UNE's and other New England institutions' collection of rare lobsters (orange, split, calico, etc.), the genetic differences between each phenotype will be quantified and compared. The addition of Peaches, an orange lobster with eggs, displays inheritance patterns of coloration that can be observed and quantified starting from hatch.

BioME

26. Are Microplastics Vectors for Bacterial Colonization of Fish?

Kristin Burkholder, Ph.D.

Ocean microplastics are substrates for bacterial attachment. If ingested by marine organisms, microplastics may facilitate pathogen entry into the human food supply. However, no studies have examined this relationship. To test this, zebrafish, a model organism for edible finfish, were exposed to bacteria alone or bacteria associated with microparticles made of plastic or wool, and bacterial load was measured across fish tissues. Molecular methods were used to identify environmental bacteria exhibiting high binding to microplastics.

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27. Vertebral Chemistry Traces the Life History of Migratory Shortfin Mako Sharks

John Mohan, Ph.D.

Two methods to study life history of organisms using trace element chemistry were investigated on the shortfin mako. Multi-elemental signature distinguished between sharks of separate regions based on their maternal and first year of life signatures to moderate success. Peaks in Mn concentration profiles were explored as a proxy for band pair age identification. This study presents preliminary results on the limitations and advantages of using vertebral chemistry to reveal life histories of sharks.

28. Role of Wg/WNT Pathway in Nociceptive Sensitivity in

Julie K. Moulton, M.S.,

Lindsey A. Fitzsimons, Ph.D., Kerry L. Tucker, Ph.D.,

Geoffrey K. Ganter, Ph.D.

We tested the hypothesis that the Wingless pathway regulates nociceptive sensitivity in *Drosophila*. Gal-4/UAS cell targeting technology was used to localize NompB and Gish under-expression to the nociceptor, thereby interrupting the Wingless pathway in two locations. NompB is a gene responsible for constructing the primary cilium, and Gish inactivates the Armadillo Destruction Complex. We utilized Von Frey stimulation to quantify resulting changes in mechanical sensitivity, and found significant differences compared to normal controls.

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31. Using eDNA to Estimate Seasonal Residency of Striped Bass in the Saco River

John Mohan, Ph.D., Markus Frederich, Ph.D.

Environmental DNA (eDNA) is a genetic signature that is produced from the shedding of biological material such as skin fragments, scales, urine, feces, gametes and mucus. eDNA is a noninvasive approach to collect standardized presence/absence data and conduct biodiversity sampling. Field samples from the Saco River, and Ram Island were explored to establish presence/absence of striped bass each month and then compared to respective acoustic telemetry detection data to compare the Saco River to the Atlantic Ocean.

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32. Postural Effects on Anaerobic Performance Metrics and Lactate Recovery During the Wingate Test

John Rosene, D.P.E.

Investigate variations in anaerobic performance metrics

35. Acetaldehyde-induced DNA Damage, Fanconi Anemia, and the Role of Oral Microbiome as Carcinogenic Source

Flavia Teles, D.D.S. (University of Pennsylvania)

Fanconi Anemia (FA) is a genetic disorder that increases the risk of oral squamous cell carcinoma (OSCC) by 700x-1500x. FA patients are highly susceptible due to their inability to tolerate standard treatments, like radiation and chemotherapy. This study aims to explore acetaldehyde (ACH), a microbial byproduct, as a potential carcinogen in OSCC development. By examining the ACH product on oral microorganisms, we hope to uncover mechanisms of OSCC, leading to better diagnostic and treatment options.

University of Pennsylvania School of Dental Medicine Department of

36. Characterizing the Scale of Pacific Halibut Distribution in the Bering Sea

Andrew Seitz, Ph.D. (University of Alaska Fairbanks)

Knowledge of Pacific halibut movements within the Bering Sea is limited to localized satellite telemetry studies, leaving basin-scale movements uncharacterized. To address this, past satellite telemetry data were analyzed using Hidden-Markov modeling techniques. Results indicate that during the summer fish display site fidelity to foraging areas, while during the winter they occupied common spawning grounds. These results suggest that Pacific halibut in the Bering Sea are a singular population that displays foraging contingent behavior.

University of Alaska Fairbanks School of Fisheries and Ocean Sciences

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CELEBRATING
15 YEARS

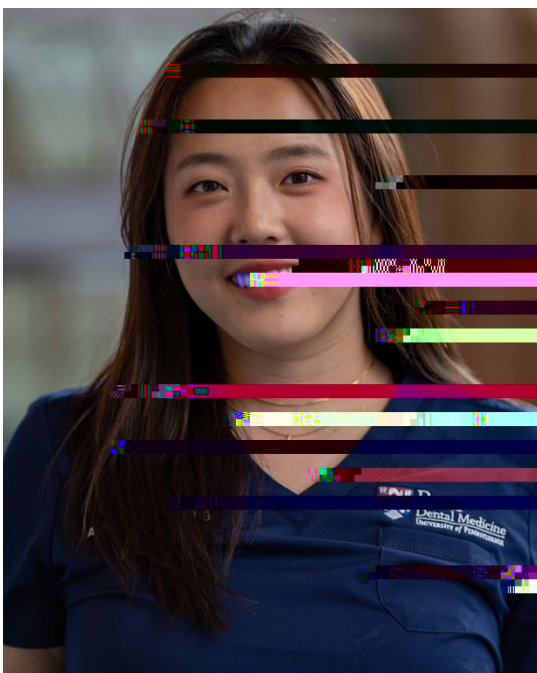




Aubrey Jane '20, '24

Bureau of Ocean Energy Management (BOEM)
at Maine Sea Grant

Through my SURE experience, I discovered my passion for research and realized my aptitude in this field. I learned that I love being on the water doing fieldwork and that I don't get seasick like my mother does.



Ashley Kang '22

Graduate Studies/MS/PhD

THANK YOU

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