University of New England
College of Arts and Sciences
Westbrook College of Health Professions



Summer Undergraduate RESEARCH EXPERIENCE Symposium

SATURDAY
October 17, 2026

UNE
UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

SCHEDULE

Saturday, October 17, 2026 | 9–11 a.m.

Ripich Commons, Second Floor

RESEARCH AT UNE

Welcome to the 2026 Summer Undergraduate Research Experience (SURE) Symposium! This annual event features the work of our students in the College of Arts and Sciences (CAS) and the Westbrook College of Health Professions (WCHP) who performed research over the summer, working closely with dedicated faculty and professional staff. In doing so, our students built on the knowledge they acquired through their coursework, gained valuable hands-on skills in their fields, and enjoyed an intensive research experience that fosters the habits of mind and professional competencies that will benefit them in their future careers.

From the Portland Campus for the Health Sciences to UNE's 363 Acre Forest and from Saco Bay to the Pleasant Point peninsula (Sipayik) along the coast of Maine, 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 form the basis for additional presentations, manuscripts, articles, and more.

Please join us in celebrating the hard work, dedication, and creativity of our students while learning more about their fascinating projects. We hope you enjoy your day!

Amy Keirstead, Ph.D.
Associate Dean and Associate Professor of Chemistry
College of Arts and Sciences

John Rosene, D.P.E., LAT, ATC, CSCS, ACSM EP-C
Clinical Professor of Exercise and Sport Performance
Westbrook College of Health Professions

PRESENTATIONS

LEGEND

63. Goat Island Alternative Energy Project

Student Author(s) Cameron Indeck '22 | *Pam Morgan, Ph.D.* ***Faculty Advisor(s)***

Abstract

Goat Island, offshore 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.

Funded by

Kennebunkport Conservation Trust and the Gulf of Maine Institute.

1. Evaluating Estuarine Nutrient Limitation and Phytoplankton Responses in the Saco River Estuary, Maine, USA

Esme Jamison ’27 (MS) | *Patricia Thibodeau, Ph.D.*

Phytoplankton drive marine primary production, making them a key part of biogeochemical cycling and ecosystem. To grow, these microscopic organisms rely on sunlight and nutrients (i.e., nitrogen and phosphorus), which are found throughout oceans in varying concentrations. To evaluate spatiotemporal patterns in nutrient limitation, bioassays were conducted along the salinity gradient of the Saco River Estuary, ME, across three seasons. Results showed substantial spatiotemporal variations. Understanding these dynamic patterns helps to inform future nutrient management.

Maine Space Grant Consortium

2. Effect of Increased Temperature on Eastern Oyster Metabolism

Lily Despirito ’27 | *Gwangseok Yoon, Ph.D.*

The Gulf of Maine is warming faster than the global ocean, making it crucial to understand how increasing temperatures affect marine organisms and ecosystems. This project tested the hypothesis that increased temperature affects Eastern Oyster *(Crassostrea virginica)* metabolism and enzyme activity. Oysters were acclimated to two temperature treatments, 18°C and 26°C, for one week. Metabolic rate was measured using a flow-through respirometry system, while biochemical enzyme assays were conducted to assess energy allocation.

3. Effects of Short Term Cold Exposure on Energy Metabolism of American Eels

Elijah Reulet ’27, Faith Santiago ’28, Caleb Poulin ’28 (MS), Lily Despirito ’27 | *Gwangseok Yoon, Ph.D.*

Short-term cold exposure may alter cellular stress responses and energetic regulation, which could affect how juvenile eels maintain physiological function under winter rearing conditions. We measured the activity of metabolic enzymes in combination with gene expression in eels that were kept at either 21°C or 16°C. These findings will inform strategies for eel conservation aquaculture in Maine.

UNE/GMRI Accelerator Fund, Maine Space Grant Consortium

4. Integrating a One Health Approach into the Co-Creation of an Environmental Needs Assessment with the Sipayik Environmental Department, Passamaquoddy Tribal Nation, Pleasant Point (Sipayik), Maine

Isabel Ryan ’27 | *Sarah Ebel, Ph.D.*

This research aims to understand how environmental change impacts the health of Passamaquoddy Tribal residents, their environment, and the wildlife around them. Using the One Health framework to analyze results, a Western framework derived from traditional ecological knowledge of Indigenous ontology, data was coded and used to inform an environmental needs assessment for the Tribe. The needs assessment will inform the Tribe of current threats that are impacting the community to provide recommendations for adaptation.

5. Relationship Between Red Oak Tree Age and Lichen Biodiversity

Madison Gilbert ’28 | *Greg Zogg, Ph.D., Steven Travis, Ph.D.*

The goal of this study was to examine the relationship between red oak tree age and lichen biodiversity. After developing methods and conducting field, lab, and data analysis work, a statistically significant negative correlation between tree age and lichen diversity was found. This data could provide important insight into how best to preserve lichen biodiversity and their role in monitoring climate change.

6. Relationships Between Preseason Fitness and In-Season Performance in Collegiate Men’s Ice Hockey

Erica Lopas ’27 | *John Rosene, DPE, LAT, ATC, CSCS, ACSM EP-C*

This study examined relationships between preseason fitness testing and in-season performance in 210 NCAA Division III men’s hockey records from 2017–2025. Results showed that sophomores and seniors had greater farmer’s carry performance than freshmen, while juniors and seniors recorded more assists, shots, and higher plus/minus. Body fat percentage was negatively associated with shots after controlling for position. Overall, academic year differences were more evident in game performance, while individual preseason fitness measures had limited ability to explain in-season performance.

7. Seasonal Changes in Lower Extremity Power in NCAA Division III Football Players

Emilia Keane ’27 | *John Rosene, DPE, LAT, ATC, CSCS, ACSM EP-C*

This study examined changes in lower extremity power across a Division III football season (n=98). Vertical power decreased early, while horizontal and relative horizontal power increased and remained elevated. Relative vertical power varied by session and showed a class × session interaction, though class alone was not significant. Playing position significantly influenced all power measures. Findings suggest distinct temporal adaptations in power production across the competitive season.

8. *Phocidae* Photo Identification: Population Health and Predation Prevalence

Nel Nelson ’27, Isabella Parks ’26 | *Michelle Caputo, Ph.D.*

This study focuses on how predation occurrences and human interaction impacted the seal population in southern Maine, in addition to building a photo identification catalog. This is done using photos of fur patterns and visible wounds caused by predation or human interaction. We hypothesize that shark predation encounters will increase moving into the future as ocean temperatures continue to warm. Furthermore, these impacts will result in behavioral changes and shifts in haul-out sight preferences.

9. Effects of Concentric and Eccentric Neck Strengthening on Cervical Force and Neuromuscular Response

Maialen Dutka ’27, Kayden Haylock ’26, Jamie DuPont ’26, Erica Lopas ’27, Caitlin Gallo ’21, Allison Dresser ’23, Jess Tolzman ’22 | *John Rosene, DPE, LAT, ATC, CSCS, ACSM EP-C*

This study examined whether an eight-week neck strengthening program improves isometric force (IF) and neuromuscular response for head stabilization. Forty college-aged subjects completed either concentric or eccentric training. Both groups showed significantly greater IF post-training than pre-training ($p<0.001$). For time-to-peak EMG (TPEMG) on the right sternocleidomastoid, concentric training produced significantly lower values than eccentric training ($p=0.033$), indicating eccentric training led to greater TPEMG on the right SCM.

10. Assessing How Long-Distance Migration Affects the Risk of Blood Parasite Infection in Savannah Sparrows *(Passerculus sandwichensis)*

Caroline Rhodes ’27 | *Sam Slowinksi, Ph.D.*

Long-distance migration may influence parasite infection risk, and competing hypotheses predict different prevalence possibilities. We will test these hypotheses in Savannah Sparrows by comparing haemosporidian infection prevalence between short- and long-distance migrants. Blood samples collected in Vermont will undergo DNA extraction and PCR targeting the haemosporidian cytochrome B gene. Geolocator data will determine migration distance, allowing us to assess the relationship between migration and parasite infections.

Maine INBRE-SURF

11. Investigating *Acartia tonsa* Respiration Rate Changes Under Warming Seawater Temperatures

Jessie Mahowald ’28 | *Patricia Thibodeau, Ph.D.*

Measuring zooplankton respiration rates can reveal mechanisms of physiologic stress that ultimately impact their abundance and distribution, which may be changing in a warming Gulf of Maine. Respiration rates of *Acartia tonsa* were measured over 24 hours at ambient seawater temperature and a higher temperature treatment (+4°C). Results indicated no significant difference in respiration rates, revealing that *A. tonsa* were not metabolically stressed and may be well-acclimated to warming ocean temperatures given their high thermal tolerance.

Maine Space Grant Consortium

12. Neonatal Pain Produces Sex-Dependent Changes in Cell Populations in the Amygdala and Hypothalamus

Carissa Michaud ’28 | *Michael Burman, Ph.D.*

Patients who spend time in the neonatal intensive care unit (NICU) show vulnerability to later-life psychological conditions, including chronic pain. Using a rodent model of NICU-like repeated neonatal pain and maternal separation, we examined expression of 12 pain, stress, and cell type markers using RNAscope to examine amygdalar and hypothalamic structures of male and female rats, across different stages of development (PD6, PD12, PD24, PD48).

Kahn Family Foundation, National Institutes of Health

13. Conducting Photo-Identification Methods on the Cryptic Species, Harbor Porpoises *(Phocoena phocoena)*, in Saco Bay

Jillian Bender '27 | *Michelle Caputo, Ph.D.*

Harbor porpoises *(Phocoena phocoena)* are widely distributed throughout the sub-Arctic, Arctic, and temperate waters of the Atlantic, including the Gulf of Maine. This study investigated their occurrence, abundance, and behavior in Saco Bay and surrounding waters using boat-based surveys and photo-identification methods. Harbor porpoises were encountered 72 times, but usable photographs were collected during only 27 encounters. These results highlight challenges with photo identification and support exploring alternative methods, such as passive acoustic monitoring, to better understand population trends.

14. Effect of Antimicrobial Peptides on Antibiotic Penetration of *Staphylococcal* Biofilms

Juliana Miguel '27 | *Kristin Burkholder, Ph.D.*

Investigating the use of antimicrobial peptides in conjunction with vancomycin to improve the antibiotic penetration of *staphylococcal* biofilms using both an agar diffusion assay and confocal microscopy.

15. Community Connection: The Story of the Biddeford Mills

Chloe Boulle ’27 | *Jonathan DeCoster, Ph.D.*

Preserving the history of New England’s mills for the future, we worked to build community engagement and outreach between the city of Biddeford and their history via archival research, oral history dissemination, and the usage of both physical and digital media.

St. Francis College Class of 1969

16. Recombinant Biglycan Effect on TNF-, Human IL-, and Human IL-6 Responses in Co-cultured Fibroblast and Macrophages

Dima Mohamad ’26 | *Scott Wood, Ph.D.*

In this specific experiment, the presence of cytokines TNF-A, IL-Beta, and IL-6 were examined in fibroblast, macrophages, and co-cultured fibroblasts and macrophages. The purpose is to examine if the presence of recombinant biglycan has an effect on the extracellular matrix of the cells causing a change in the inflammatory cytokines signals. Conditioned media of the fibroblast, macrophages, and co-cultured fibroblast and macrophages was collected and examined ELISA kits to compare the conditioned media pro-inflammatory activity to the controls.

17. Effect of Microplastics on Pathogen Adhesion to Human Epithelial Cells

Tyler Janik ’26 | *Kristin Burkholder, Ph.D.*

Microplastics are pervasive environmental contaminants, yet their influence on human pathogens remains poorly understood. Microplastic surfaces can harbor microbial biofilms and may act as vectors that alter pathogen interaction with their host. We investigated whether exposure to different sizes of microplastics affects the ability of two common human pathogens to adhere to their typical site of infection. These findings may help identify a link between plastic pollution and infection risk.

Maine INBRE-SURF

18. Making Zebrafish Happy: Improving Zebrafish Welfare with Discreet Housing and Clear Signaling

Taya Lawrence ’28, Kristen Leite ’27, Phoebe Bickford ’29 | *Brian Greco, Ph.D.*

The project explored novel care protocols on the welfare of laboratory zebrafish. We used four conditions: control, discreet, signaled, and mixed tanks. Discreet fish experienced tanks covered by camouflage netting to limit their view of care team members. Signaled fish were classically conditioned to a sound that predicted the arrival of food. Mixed fish experienced both conditions. We hypothesized that such changes would enhance the fish’s welfare.

Maine Space Grant Consortium, Office of Research and Innovation

19. Occurrence of Small Cetaceans in the Gulf of Maine

Kara Mickiewicz ’26 | *Michelle Caputo, Ph.D.*

This project identified occurrence hot spots and environmental drivers of small cetacean distribution in the Gulf of Maine using UNE survey data and long-term OBIS records. Harbor porpoises, Atlantic white-sided dolphins, common dolphins, and minke whales show potential seasonal shifts linked to depth, slope, and offshore productivity features. These findings highlight how small cetaceans use nearshore and basin-edge habitats and provide a foundation for future behavioral analyses and long-term monitoring as the dataset grows.

Maine Space Grant Consortium

20. Activation of the Deep and Superficial Lumbar Multifidus during Pallof Press Variations

Eric Booth ’27 (MS), Trint Schenk ’27 (MS) | *Michael Lawrence, Ph.D., CSCS, CPSS*

We hope to identify which exercises best train muscles weakened by low back pain. First, we must examine how these muscles are activated in individuals without low back pain. Our goal is to determine whether one variation of the Pallof press is more effective at strengthening these spinal stabilizing muscles. This is one of the first studies to examine activation of the deep multifidus fibers during exercise.

Hartford University Dean’s Research Fund Award

21. The Continual Conservation of the American Herring Gull *(Larus smithsonia)* and the Great Black-Back Gull *(Larus marinus)*

Asterin Trzepacz ’29 | *Noah Perlut, Ph.D.*

Presentation regarding the monitoring of gull nests, diets, and nesting locations in hopes of conserving what is now a common species but is on the path to becoming rare.

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22. Assessing Wind Variability and Station Correlation in the Gulf of Maine

Olivia Leighton ’27 | *Charles Tilburg, Ph.D.*

Anecdotal reports of shifting Gulf of Maine wind patterns have grown, but remain hard to quantify due to a lack of long-term, localized records. This project compares a climate reanalysis product and linear regression models to characterize wind conditions in Saco Bay, using the best model to generate a 30-year wind speed and direction hindcast. Findings demonstrate the value of localized hindcasting for detecting trends, with implications for future coastal conditions in Saco Bay.

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23. Public Perception of Coastal Wetlands and Shoreline Management Techniques in Maine

Annabella Lafond ’27 | *Emily Wood, M.E.M., Jennifer Brousseau, Ph.D.*

This poster explores public awareness, knowledge, and preferences regarding coastal wetlands and shoreline management in Maine. Surveys of recreational beach users examine perceptions of nature-based and hardened shoreline protection, concerns about coastal change, and the benefits people associate with wetlands. Comparisons across beach locations and resident and visitor groups aim to inform public outreach and coastal management that reflects community values and supports long-term resilience.

24. Does Mechanical Injury to *Fucus vesiculosus* Induce the Production of Antimicrobial Compounds?

Ethan Case ’28 | *Ursula Roese, Ph.D.*

The brown algae *Fucus vesiculosis*, commonly found on the coast of Maine, has been shown to have antimicrobial properties that can inhibit the growth of different strains of *Staphylococcus aureus*. Our research investigated the possibility of increasing the production of these antimicrobial properties using mechanical injury and methyl jasmonate, a signaling compound produced during a stress response.

Maine INBRE-SURF

25. Seasonal and Interannual Changes in Diatom and Dinoflagellate Phytoplankton Communities in Saco Bay, Gulf of Maine

Abigail Brinkmann ’28 | *Patricia Thibodeau, Ph.D.*

Phytoplankton are photosynthetic microorganisms essential to marine ecosystems as primary producers and as indicators of oceanic change. This project focused on how temperature and salinity relate to the diatom and dinoflagellate populations within Saco Bay using data from the Plankton lab time series. Results from this project help increase the understanding of how these factors affect phytoplankton populations within Saco Bay.

Maine Space Grant Consortium

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THANK YOU

THANK YOU!

The projects that you've enjoyed today are tangible products of the efforts of many people and units across the University of New England, who each do our part — individually and collectively — so that our students can contribute toward a greater understanding of their field of study. Here, we recognize individuals and organizations who have made our students' SURE projects and the SURE symposium a success, recognizing that it takes a village to achieve these impressive outcomes.

First, a hearty **THANK YOU** to the faculty mentors and professional staff who have supported the students in carrying out the research presented here today. Your generosity with your time and effort has allowed the students to complete truly remarkable work. Likewise, the College of Arts and Sciences Undergraduate Research, Scholarship, and Creative Activity Committee was instrumental in the success of our 2026 CAS SURE program.

Several agencies have sponsored the students' summer research through fellowships and grants, including the Maine Space Grant Consortium, the UNE/GMRI Accelerator Fund, Maine INBRE, the Kahn Family Foundation, the National Institutes of Health, St. Francis College Class of 1969, the UNE Office of Research and Innovation, Hartford University Dean's Research Fund Award, the UNE Girard Marine Science Center, and the UNE College of Arts and Sciences and the Westbrook College of Health Professions

Dean's Offices. Thank you for your investment in our students. Appreciation is also extended to UNE Institutional Advancement, the Office of Admissions and Marketing, and UNE Conference Services for their help in executing our event.

Thank you to all of the family and friends who have traveled to UNE to support their students during this event, and for your support during their busy summer research period. Whether you consoled your student when their experiment was a bust or shared their excitement when they experienced their "aha" moment, we appreciate you being part of our community.

Finally, we'd like to extend a special thank you to Erinn Stetson, Bekah Robertson, and Katie Starr, who have provided invaluable logistical and tactical support during all stages of the SURE 2026 program, including this symposium.

—Dr. Amy Keirstead

—Dr. John Rosene

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