



PROGRAM

UNIVERSITY OF NEW ENGLAND

**COLLEGE OF ARTS AND SCIENCES
SUMMER UNDERGRADUATE
RESEARCH EXPERIENCE SYMPOSIUM**

Saturday, September 29, 2018
9 a.m. - 12:30 p.m.



UNIVERSITY OF
NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

Summer Undergraduate Research Symposium

Saturday, September 29, 2018 | 9 a.m. – 12:30 p.m.

9:00 a.m. to 11:00 a.m.

Poster Presentations
Multi-Purpose Rooms
Campus Center

11:00 a.m. to 11:30 a.m.

Remarks
Multi-Purpose Rooms
Campus Center

Jeanne A.K. Hey, Ph.D.
Dean of the College of Arts and Sciences

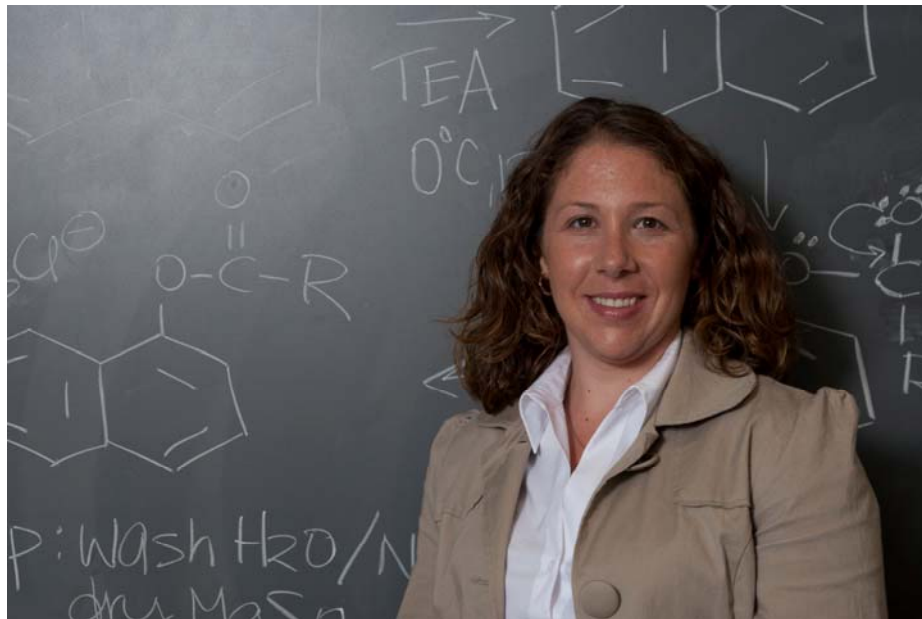
James D. Herbert, Ph.D.
President, University of New England

11:30 a.m. to 12:30 p.m.

Lab Tours
Byron Lab, Marine Science Center 105B
Roese Lab, Alford Center for Health Sciences 243



Research at UNE



Research at UNE

On behalf of the UNE College of Arts and Sciences, welcome to the 2018 Summer Undergraduate Research Experience (SURE) Symposium! This annual event features the work of over 40 students that have performed research during the summer at our home campus in Biddeford and regions throughout the northeastern United States. Over the summer, our students worked closely with dedicated faculty to build on the knowledge they have acquired through their coursework, to explore advanced realms of understanding, and to prepare for continued study in their fields.

Students from disciplines ranging from Chemistry and Marine Science to Psychology and Animal Behavior have spent their summer investigating a diverse array of research questions, including:

- *Are Bobolinks and Savannah Sparrows responding to a warmer climate?*
- *Does exposure to sexist information predict the pricing of cosmetics and performance on knowledge-based tasks?*
- *What quantity and type of microplastics are present in Maine's Sebago Lake?*
- *How does the type of text affect reading performance?*
- *What comprises the diet of Grey Seals (H; grypus) and how can this be determined?*
- *How does the structure of metalloles influence their photophysical properties and how can this information be applied to organic light emitting diodes (OLEDs)?*

These projects are the basis for future scholarly work in the field of research through articles, presentations, manuscripts, and more.

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

Dr. Amy Keirstead
Associate Dean and Associate Professor of Chemistry
College of Arts and Sciences



Poster 1

Interannual analysis of reproduction and energy investment within a population of farmed blue mussels

Presenter: Michele Condon '19

Majors: Marine Science, Marine Biology, Environmental Science

Advisors: Adam St. Gelais, MS; Carrie Byron, PhD

Contributor: Connor Jones

With the Gulf of Maine rapidly changing, it is valuable for farmers and scientists to understand the current health of farmed blue mussel populations. Through the use of histological techniques, the reproductive cycle and energy investment of the mussels was analyzed to help understand their health. This research gives an indication of when the mussels are most developed, when possible spawning events are occurring, and when the mussels are most vulnerable to environmental stress.

Poster 2

The change in lipid bioavailability of sugar kelp through degradation

Presenter: Erynn Mills '19

Majors: Marine Science, Marine Biology

Minor: Climate Change Studies

Advisor: Carrie Byron, PhD

Contributor: Adrianus Both

To address the question "Does the bioavailability of kelp detritus change throughout degradation?" we used chemicals found in digestive tracts to imitate bivalve stomachs. Preliminary results suggest lipid dissolution does occur within the digestion cocktail. These results are important because farms are limited by the availability of phytoplankton for bivalves to eat. Knowing the lipid content bioavailable from detritus for farmed bivalves helps us understand what food resources additional to phytoplankton are available to them.

Poster 3

Survival of *Staphylococcus epidermidis* inside host cells differs between planktonic, biofilm-resident and biofilm-released bacteria

Presenter: Avery Bond '19
Major: Medical Biology
Advisor: Kristin Burkholder, PhD

Staphylococcus epidermidis is a leading cause of bacterial bloodstream infections. Infection is exacerbated by biofilm formation and bacterial survival within host macrophages and endothelial cells. Bacteria exhibit differential gene expression in planktonic, biofilm-resident, and biofilm-released states. How these states impact intracellular survival is unknown. We found that intra-macrophage survival is greatest for biofilm-released *S. epidermidis*, while planktonic-state *S. epidermidis* survived best in endothelial cells. Findings warrant study of the impact of growth state on virulence.

Poster 4

The Price of Sexism: Exposure to Sexist Information Predicts Cosmetic Pricing

Presenter: Mackenzie Deveau '19
Major: Psychology
Minors: Women's and Gender Studies, Political Science
Advisor: Julie Peterson, PhD

Past work in our lab suggests that rejected women overvalue products tied to female standards of beauty. We've decided to explore sexism as a type of rejection. Specifically, we are looking to see if women exposed to sexism are willing to pay more for cosmetic products, such as mascara or anti-aging cream. I believe the results of this research will reveal how sexism can affect consumer behavior in ways that perpetuate the capitalistic, patriarchal society.



Poster 5

Preliminary Investigations into the Abiotic Factors Driving Movement and an Initial Population Estimate of Atlantic Sturgeon Within the Saco River Estuary

Presenter: Austin Flanigan '19

Majors: Marine Science, Marine Biology, Applied Mathematics

Minor: Chemistry

Advisor: James Sulikowski, PhD

Contributors: Joseph Langan '15; Sarah Hylton '16

This project sought to: 1) Determine the abiotic factors responsible for driving Atlantic sturgeon movement in the Saco River estuary and 2) To estimate how many fish are utilizing this estuary. Preliminary results indicate temperature, conductivity, pH, and dissolved oxygen were statistically significant in determining fish location, and estimates indicate approximately 5,000 Atlantic sturgeon rely on the estuary yearly. Given the threatened status of these fish, understanding movement and population size is essential for management.

Poster 6

Development of a Screening Method to Develop new Alzheimer Disease (AD) Drugs

Presenter: Emma McCormac '20

Major: Medical Biology

Minor: Philosophy

Advisor: Benjamin Harrison, PhD

Contributor: Eliza Grlickova-Duzevik, PhD

The overall goal was to develop a cell-culture based Nerve Growth Factor assay to be used for future development of peptide drugs. Three classes of cell penetrating peptide were tested for cell penetration activity, toxicity and effects on cell morphology. This research is important in the first steps of designing a delivery system for peptide drugs to treat Alzheimer's Disease.

Poster 7

Contribution of Primary Cilia to Corneal Innervation in Dry Eye

Presenter: Katy Lowe '20
Major: Neuroscience
Minors: Biophysics, Applied Mathematics
Advisor: Ian Meng, PhD

This research project aimed to discover the role of primary cilia in primary afferent neurons that innervate the cornea, and in their response to dry eye. *Ift88* is a gene that is required for the functioning of primary cilia. Results indicated that the deletion of *Ift88* in corneal afferent neurons altered corneal nerve morphology. No further changes were found in mice with dry eye.

Poster 8

Evaluation of Maine *Ulva lactuca* Extracts with Antimicrobial Properties to Determine Optimal Storage Conditions: Time and Temperature-Based Stability Analysis

Presenter: Anderson Sinde '19
Major: Biochemistry
Advisor: Amy Deveau, PhD
Contributor: Kristin Burkholder, PhD

Bacterial resistance to drugs has increased dramatically over several years. *Ulva lactuca* has been found to inhibit growth of certain *S. aureus* strains; A stability analysis was performed on *U&a lactuca* to determine optimal storage conditions for maximizing the antimicrobial activity within the extracted compound. The current results show increased inhibition for the first month of storage at all temperatures for the *S' aureus* strains, identifying one month as an option for optimal storage conditions.

Poster 9

*Semisynthesis of *Uvae Ursina* Partial Purifications*

Presenter: Derek DeMartinis '20

Major: Biochemistry

Minor: Marine Biology

Advisor: Amy Deveau, PhD

Contributors: Amber Cusson '18; Anderson Sinde '19

The purpose of this research was to partially purify *Uvae Ursina* extracts while using semisynthesis reactions to determine the compound with the most anti-inhibitory effects against *Staphylococcus aureus* (MRSA). Preparatory thin layer chromatography was used to partially purify the extracts. The resulting fractions were screened against USA 300 and Newman bacterial MRSA strands. Compound D, E, and F all showed antimicrobial activity along with the pyrogallol standard. Further analysis of these fractions will be conducted.

Poster 10

The Peter J Morgane Research Collection on the Dolphin Brain

Presenter: Samia Pratt '20

Major: Neuroscience

Minor: Marine Biology

Advisors: Cally Gurley, MS; David Mokler, PhD

The goal of this project was to organize, classify, scan, list, catalog, and house a scientific research collection on dissected cetaceans by Dr. Peter J. Morgane, at UNE 1985 - 2010. He worked with over a dozen species, comparing their brains to other various mammals, his work uniquely combining neuroscience and marine biology. Dr. Morgane's early research has been organized and made accessible for research by academics, students, and scientists in this growing field.

Poster 11

Detection of human pathogens on sugar kelp using microbiological and molecular methods

Presenter: Melyssa Demers '19

Major: Biochemistry

Minor: Philosophy

Advisor: Kristin Burkholder, PhD

Contributors: Olivia Barberi; Adam St. Gelais, MS; Carrie Byron, PhD

Sugar kelp is growing in popularity as a food product. While its production is a burgeoning Maine industry, there are no methodological guidelines for detecting human pathogens in kelp. We compared microbiological (plating) and molecular (qPCR) methods, and the necessity of microbiological enrichment, for detecting pathogens on kelp inoculated with *Vibrio parahaemolyticus*, *E. coli* O934 H4 and *Salmonella Typhimurium*; Both plating and qPCR detected pathogens, but qPCR provided increased sensitivity and may eliminate need for enrichment.

Poster 12

Impact of macroalgae extracts on bacterial biofilm formation

Presenter: Katharina Roese '21

Major: Biochemistry

Advisor: Kristin Burkholder, PhD

Contributors: Melyssa Demers '19; Ursula Roese, PhD; Amy Deveau, PhD

A novel approach for combating drug-resistant infections is to target pathogen virulence rather than directly killing bacteria. A common virulence trait is formation of biofilms, microbial slime which aids in colonization of host tissues. We tested the effect of extracts from marine macroalgae on bacterial biofilm formation and found that algal extracts decreased biofilm formation by *Pseudomonas aeruginosa* and *Staphylococcus epidermidis* without impeding viability. Therefore, compounds derived from macroalgae could prove useful in drug discovery.



Poster 13

Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) age and growth in the Gulf of Mexico

Presenter: Abigail Hayne '19

Major: Marine Science

Minor: English

Advisor: James Sulikowski, PhD

The Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) is frequently caught accidentally in commercial and recreational fisheries. Since life history information, particularly age data, is crucial in assessing stocks and ecological risk, the present study was launched to reevaluate the age and growth of sharpnose sharks from the Gulf of Mexico. Preliminary results suggest that the species' life history has been altered by this indirect fishing pressure, resulting in individuals reaching sexual maturity at younger ages.

Poster 14

Detection of Green Crab (*Carcinus maenas*) Larvae Through eDNA and FlowCam Analyses

Presenter: Ariella Danziger '19

Majors: Marine Science, Marine Biology, Elementary Education

Advisor: Markus Frederich, PhD

Green crabs are an invasive species whose population is monitored in Biddeford Pool in a long-term study. Our data show that they are egg bearing in the winter. To determine if the eggs are viable year-round, we analyzed plankton using a FlowCam. Additionally, we designed an eDNA protocol to detect the presence of green crabs. Next, we will correlate these analyses to test which method allows for a reliable monitoring program for marine invasive species.

Poster 15

Ensuring Kelp is Safe to Eat- Assessing the Bacteria Associated with Kelp Processed for Human Consumption

Presenter: Everett Pierce '20

Major: Marine Science

Advisor: Carrie Byron, PhD

Contributors: Gretchen Grebe, MS; Olivia Barberi

The commercial variant of kelp aquaculture is still in development, with many potential regulations still being tested, including aspects of food safety through both harvest and preparation. My project is based upon the preparation aspect of this, with my methods involving drying freshly harvested kelp, then rehydrating and testing this kelp for harmful bacteria such as *V. cholera* and *E. coli*

Poster 16

An Assessment of Trematode Infection in Farmed Blue Mussels (*Mytilus edulis*) in Casco Bay, Maine

Presenter: Aubrey Jane '21

Major: Marine Science, Marine Biology, Medical Biology

Advisors: Adam St. Gelais, MS, Carrie Byron, PhD, Markus Frederick, PhD

Contributors: Connor Jones; Katie Parker; Michele Condon '19

Proctoeces maculatus a subtropical trematode species has been traveling up the Eastern coast of the United States- likely due to rising ocean temperatures. Its current northernmost range is Dover, New Hampshire, but after identifying the species histologically within mussels sampled from Casco Bay, it is possible that its range extends to Maine. Genetic confirmation of this hypothesis is being performed via PCR, in addition to monitoring genetic expressions of stress in infected vs. non-infected mussels.



Poster 17

Photophysical Characterization and Aggregation-induced Emission (AIE) of Group 14 Siloles and Gerroles

Presenter: Carolyn Lucy '19

Major: Biochemistry

Minor: Applied Mathematics

Advisor: Jerry Mullin, PhD

Fluorescence occurs by the emission of a photon excited to a higher state. Fluorescent properties vary with the type of compound, including the unusual occurrence of aggregation-induced emission (AIE). The proposed goal of this research is to increase the understanding of AIE of fluorescence from Group 14 metallole compounds and how varying structural features either increase or decrease their efficiency as emitters.

Poster 18

The Role of Anatomical Plasticity in Sex Differences Seen in Chronic Pain

Presenter: Samantha Dinsdale '19

Majors: Medical Biology, Medical Sciences

Minor: Latin American Studies

Advisor: Benjamin Harrison, PhD

Contributor: Denise Giuvelis

The cutaneous trunci muscle reflex (CTMR) model is an optimal method to observe anatomical plasticity and collateral sprouting involved in neural regeneration. The CTMR activates a spinal cord reflex circuit by stimulating the dorsal thoracolumbar skin. As the nerves reinnervate, pain is often discovered. In this study, sex differences in pain and neural regeneration were observed. The spared dermatome model exhibited regeneration differences between sexes, indicating sex-determined variety in underlying biological mechanisms.

Poster 19

Optimizing Electronic Readers to Provide a Reasonable Alternative to Print

Presenter: Ellie Leighton '18

Major: Psychology

Minor: MHRTC, Special Education

Advisor: Jennifer Stiegler-Balfour, PhD

Knowing the popularity of reading on electronics, it is important to understand how cognitive processes are affected when reading on digital devices. The current project aims to gain further insight into how font type influences reader performance on electronic devices (i.e. Kindle e-reader). Specifically, we will examine the impact of font type on fatigue and eye-strain. We expect that serif fonts will produce higher levels of eyestrain and fatigue when compared to sans serif fonts.

Poster 20

Monitoring Impacts of Climate Change on UNE's Upland Forest; Development and Implementation of a Long-term Protocol

Presenter: Carmen Dancy '20

Majors: Environmental Science, Biological Sciences

Advisor: Greg Zogg, PhD

Contributors: Pam Morgan, PhD; Jes Szetela '19; Steve Travis, PhD; Nikolai Fernandez '19

I developed and implemented a climate change monitoring protocol within the 363-acre UNE oak-pine forest which will give future students baseline data for documenting and understanding the effects of climate change. I analyzed the understory plant community and assessed the structure and health of the overstory trees at three separate upland sites. With climate change, tree health and species composition is expected to be altered in coming years due to changes in precipitation frequency and temperature.



Poster 21

Presence of Microplastics in Mytilus edulis Grown for Human Consumption

Presenter: Emily Hanson '19

Major: Marine Science

Advisor: Carrie Byron, PhD

Contributors: Nicole Volosin '20, Stephan Zeeman, PhD

In order to magnify the amount of microplastics within blue mussels grown for human consumption, a methodology must be identified. Once a methodology is identified, further research can be done to solve this growing problem. The mussels were tested in 69% nitric acid and 30% hydrogen peroxide, as well as lab-made 30% hydrogen peroxide.

Poster 22

Coral Health Monitoring Using Multispectral Photography and Coral Mapping

Presenter: Kimberly Donoghue '19

Major: Marine Science

Minors: Chemistry, Biophysics

Advisor: Jeri Fox, PhD

Contributor: Michael Esty

Reoccurring bleaching events are rapidly destroying coral reefs. Using spectral analysis, detail 3D mapping and photography will help in future research to assess coral health. A platform and methodology that was created for the pilot experiment that was conducted in Belize in Jan 2018 was refined. Instead a Blue Robotics ROV was assembled, fluorescent lights were programmed for protein excitation, and skills for Agisoft PhotoScan were acquired to analyze future data collected in Belize.

Poster 23

Determining the diet composition of Grey Seals (*H. grypus*) through scat analysis

Presenter: Dominique Mellone '21
Majors: Marine Science, Marine Biology
Advisor: Kathryn Ono, PhD

This project determined the diet composition of grey seals (*H. grypus*), specifically if they are consuming target species of New England fisheries. The results depict that American Sand Lance (*A. americanus*) make up the majority of the diet, both in the number of prey consumed and biomass. The findings of this research are important because it shows that fisheries' target species, such as Atlantic Cod, make up less than 1% of the seals' diet.

Poster 24

First steps toward identification of antimicrobial compounds from local macroalgae

Presenter: Andrea L. Call '19
Major: Biological Sciences
Minors: Applied Mathematics, Chemistry
Advisor: Ursula Roese, PhD
Contributors: Emma Tobin '20; Olivia Scott '20; Kristin Burkholder, PhD

The antimicrobial activity of three macroalgae species was investigated, and steps were taken towards identifying the responsible compound(s). Methanolic extractions were performed, the activity of extracts confirmed and the minimum concentration required to inhibit bacterial growth determined. Using HPLC, extracts were fractionated, and the active fraction determined. Preliminary results indicate the most polar fraction is responsible for the antimicrobial activity. This has implications about the active compound(s) and gives direction for further research.



Poster 25

A sex-dependent role for forebrain primary cilia in memory function in mice

Presenter: Taylor Paquin '20

Majors: Animal Behavior/ Pre-Vet

Advisor: Michael Burman, PhD

Contributors: Kerry Tucker, PhD; Michael Burman, PhD

The goal of this experiment was to determine if primary cilia in the forebrain of mice play a role in cognition and memory. Mice with a knockout *Ift88* gene, which aids in the formation of primary cilia, were compared to control mice. Mice were run through a fear conditioning protocol to compare extinction. It was found that there is a sex difference within how long it takes mutant mice to extinguish fear.

Poster 26

Generating a Novel Crustacyanin-Elastin-Like Polymer Fusion Protein

Presenter: Wynter Paiva '20

Majors: Biochemistry, Medical Biology Pre-Med

Advisor: Eva Rose Balog, PhD

Contributors: Jeffery M. Halpern, PhD; Laura Marvin '20

Crustacyanin is a carotenoprotein with potential applications in a wide range of nano/biotechnologies and materials. However, soluble expression of this protein is low, making such applications impractical. We are making an elastin-like polymer/crustacyanin fusion protein with the goals of improving soluble expression, facilitating purification, and creating novel functional protein materials.

Poster 27

Antimicrobial activity found from the surface of local macroalgae using two extraction methods

Presenter: Emma Tobin '20

Majors: Biochemistry, Biology

Advisor: Ursula Roese, PhD

Contributors: Andrea Call '19; Olivia Scott '20

One local Maine brown alga, *Fucus vesiculosus*, and two local Maine red algae, *Chondrus crispus* and *Ahnfeltia plicata*, were investigated for antimicrobial properties originating from the surface of their tissue using two methods. Surface antimicrobial activity was seen in *Fucus vesiculosus* against *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus* (MRSA) through one of the performed methods. Inhibition resulting from tissue surfaces suggest that whole tissue extraction methods may dilute and decrease effectiveness against human pathogenic bacteria.

Poster 28

How will UNE's red maple swamps respond to climate change?

Presenter: Jessica Szetela '19

Major: Environmental Science

Minor: Climate Change Studies

Advisor: Pam Morgan, PhD

Contributors: Carmen Dancy '20; Nikolai Fernandez '19; Gregory Zogg, PhD; Steven Travis, PhD

Climate change is expected to cause southern Maine to become warmer and wetter, causing hydrological changes that can lead to species compositional shifts in red maple swamps (RMS). This summer, I developed an ecological monitoring protocol to observe the changes that will occur in RMS as our climate changes. I also conducted a plant diversity survey, installed ground-water wells, and recorded tree characteristics to document a baseline for UNE's RMS.



Poster 29

Seabird Food Habits: an Ecological Indicator of Warming in the Gulf of Maine

Presenter: Julia Biagini '20

Major: Neuroscience

Minor: Philosophy

Advisor: Zach Olson, PhD

Contributor: Linda Welch

The Gulf of Maine's geography makes it susceptible to warming and acidification, changes which may influence local ecology. We extracted prey DNA from the scat samples of four species of seabirds to determine their food habits, and used next generation sequencing to detect their vertebrate prey items. We will compare our findings to data collected from direct observation of feeding birds, and address how species diets might be changing in response to climate change.

Poster 30

Investigating the physiological stress associated with longline capture for sharks caught in the Gulf of Maine

Presenter: Jennifer Knotek '20

Majors: Marine Science, Marine Biology

Advisor: James Sulikowski, PhD

The pelagic longline fishery in the Atlantic Ocean plays important roles in the economy and sustainability in surrounding ecosystems. This fishery captures a variety of shark species in the Gulf of Maine (GOM), and such handling may cause increased stress levels and potentially mortality. This study investigates stress related indicators in the blood chemistry of longline captured sharks in the GOM. Preliminary data may provide suggestions on improved fishing methods and management of these species.

Poster 31

Rejection Sensitivity as a Mediator between Child Victimization and Adult Relationships

Presenter: Julia Beebe '19
Major: Psychology
Minor: MHRT/C, Business Administration
Advisor: Patricia Long, PhD

Child victimization is extremely prevalent in the world. Children may experience physical, sexual, and emotional abuse, and neglect throughout their adolescence, and these experiences may shape their perspective. Studies show that child victimization impacts future relationships, but mediating roles that exist between these variables have not always been studied. This current study examines how rejection sensitivity may develop from experiences of child victimization and how levels of rejection sensitivity may impact the victim's adult relationships.

Poster 32

The influence of neonatal pain on maternal behavior

Presenter: Makaela Rice '19
Major: Neuroscience
Advisor: Michael Burman, PhD
Contributors: Jared Zuke; Seth Davis, PhD

Early life trauma has lasting consequences on cognitive behavior. Maternal-infant interactions could potentially affect how neonates that are exposed to early life pain or stress respond to a later life trauma. Neonatal pups are subjected to either pain, stress, or no manipulation and dam-pup interactions are recorded. Though both dams exhibited a similar amount of maternal contact with the pups, the specific behaviors differed per condition, with experimental dams exhibiting more pup care.



Poster 33

Using baited remote underwater video surveys (BRUVS) to observe fish species assemblages in Saco Bay near Stratton Island

Presenter: Jasmine Nyce '20

Major: Marine Science

Advisor: James Sulikowski, PhD

Baited remote underwater video surveys (BRUVS) are a relatively new, noninvasive tool used to estimate marine community parameters to better understand ecosystem structure and function. The Saco Bay has previously been shown to support a large diversity of commercially and recreationally important fish species. Preliminary BRUVS results support this observation and indicate an abundance of species frequently appearing in the Saco Bay.

Poster 34

Estimating Small Mammal Populations in the UNE Woods

Presenter: Nikolai Fernandez '19

Major: Biological Sciences

Advisor: Steven Travis, PhD

Climate change is affecting ecosystems worldwide and the small mammals residing therein. I developed a monitoring protocol to measure population levels of small mammals at three sites in the UNE woods. I set up 100 x 100-meter grids and trapped for four consecutive nights within each. I caught mostly cricetid rodents in the genus *Peromyscus*. These data will provide a baseline to see how climate change is affecting small mammal populations over the coming decades.

Poster 35

Quantifying and comparing marine biodiversity between two marine intertidal sites

Presenter: Summer Bishop '20

Major: Marine Science

Minor: Animal Behavior

Advisors: Angela Cicia, MS; Markus Frederick, PhD

Contributor: Carrie Byron, PhD

Monitoring changes in a habitat's biodiversity is critical to determine how long-term stressors such as climate change will impact that health of that system. As such the objectives of the current study were to quantify and compare biodiversity indices between two marine intertidal sites, an exposed shoreline (East Point, Biddeford Pool) and a coastal island (Ram Island). The exposed shoreline site was significantly more diverse with *Fucus vesiculosus* being the dominant macroalgae species.

Poster 36

Location tracking of remotely operated underwater vehicles

Presenter: Lauren Hayden '19

Majors: Marine Science, Oceanography

Advisor: Stephan Zeeman, PhD

Contributor: Michael Esty

Remotely operated underwater vehicles (ROVs) allow researchers to view benthic structure and habitat. A persistent problem has been linking an exact GPS location with the recorded data. To remedy this problem the Water Linked underwater GPS and Humminbird scanning sonar were utilized, in tandem, to track the ROV and geo-reference the collected images. The proposed site of the MARINER kelp farm, located adjacent to Ram Island, was used as a proving ground for this novel combination.



Poster 37

Characterizing Protein Polymer Materials From the Nanoscale to the Mesoscale

Presenter: Laura Marvin '20

Major: Biochemistry

Advisor: Eva Rose Balog, PhD

Contributors: Wynter Pavia '20; James Vesenka, PhD

This summer's research was focused on characterizing ELP coacervates. There were several techniques that were used to characterize ELP coacervates. One technique that was used was the FlowCAM, which is an instrument that I used last year. Another instrument that I used was the AFM, atomic force microscopy. The last instrument that I used was the dynamic light scattering. The procedures for characterizing ELPs has been completely established for both the FlowCAM and the AFM.

Poster 38

Differences in Reading Performance Across Text Types

Presenter: Courtney Parent '19

Major: Psychology

Advisor: Jennifer Stiegler-Balfour, PhD

There currently are several standardized tests that are used to assess reading comprehension for both research and educational assessment. The current study examines these standardized comprehension measures and how well they can predict performance on different text types (e.g., expository and narrative). Additionally, the study will examine what other cognitive measures (e.g., working memory, metacognition) correlate highly with reading comprehension skill and will allow other researchers to pick a standardized test based on their specific research question.

Poster 39

Using eDNA From Water Samples to Find Northern Bog Lemmings

Presenter: Lauren Janitzki '19

Major: Animal Behavior

Advisor: Zach Olson, PhD

The project goal was to design primer sets that are able to identify and amplify specific mammalian DNA in water samples. The designed primer sets were tested in two capacities: 1- against known non-target mammals to test specificity, 2-tested using a dilution series (10 ng/uL) to test sensitivity. Results show that primer sets were consistently specific and sensitive on known samples. Moving forward, this method can be used to identify unknown samples with confidence.

Poster 40

Modeling NaCl and CaCl₂ interactions with anionic and zwitterionic membranes

Presenter: Jessica White '19

Majors: Biochemistry, Applied Mathematics

Advisor: Ronald Hills Jr, PhD

Contributor: Kathryn Chalmers '18

Molecular simulation is an important tool for understanding biological processes and pathways. Coarse grain model parameters were tested for their ability to represent the behavior of ions interacting with the lipid bilayer. The introduction of CaCl₂ and NaCl into the system is found to enable low or zero tension simulations. Close agreement is obtained with atomistic simulations, suggesting that the model will find general use in membrane protein simulations.



Poster 41

Species Identification of Small mammal DNA using Loop Mediated Isothermal Amplification

Presenter: Rachel Amoroso '19

Majors: Marine Science, Marine Biology, Animal Behavior

Advisor: Zach Olson, PhD

A non invasive genetics methods called Loop Mediated Isothermal Amplification, was used to detect northern bog lemmings, whose environment is becoming threatened due to climate change. We tested known Northern bog lemming DNA from tissue samples against known Southern bog lemming DNA . We further tested the reactions against a set of small mammal DNA pellets of unknown to me, small mammal species to test specificity.

Poster 42

Are Bobolinks and Savannah Sparrows responding to a warmer climate?

Presenter: Maeve McGowan '19

Major: Environmental Science

Minors: Climate Change Studies, Political Science

Advisor: Noah Perlut, PhD

My research project is examining the response of two migratory bird species, Savannah Sparrows (*Passerculus sandwichensis*) and Bobolinks (*Dolichonyx oryzivorus*) to phenological shifts resulting from climate change. To determine the variation in response among the two species, I have collected weather data of the past 17 years from each species' migratory sites and compared this data to the respective average nest initiation date in order to reflect any shift in the timing of their migration.

Poster 43

Identifying and Quantifying Microplastics in Sebago Lake of Maine

Presenter: Nicole Volosin '19

Majors: Marine Science, Marine Biology

Advisor: Stephan Zeeman, PhD

Contributors: Emily Hanson; Carrie Byron, PhD

Studies of microplastics in freshwater systems are still lacking much needed data. The goal of this project was to identify microplastics in samples taken from Sebago Lake in Maine. Another goal was to finalize the best way to identify microplastics in samples with accuracy. To do this I employed the dye Nile Red, and designed an experiment using different solvents, filter types, and concentrations of Nile Red to determine the best conditions.



Investigating the prevalence of *Asterias forbesi* and *Asterias rubens* in the presence of Sea Star Wasting Disease (SSWD) in southern Maine, 2019; Angela...
 Michaela Kenward, Marine Science 2019; Angela...
 University of New England, Brunswick

Introduction
 Sea star wasting disease (SSWD) is a well documented infection that has recently decimated sea star populations on the United States west coast (Fig 1). The cause of SSWD in coastal Pacific Asteroid spp. has been identified as a sea star-associated densovirus (SSADV) (Hawson et al. 2014) and it has been demonstrated that rising water temperature associated with global climate change might be a critical factor influencing infection rates (Stalle et al. 2020). Although anecdotal reports suggest that SSWD may be present in the Northeast (DeSesto 2015), the prevalence of this disease has been significantly underreported in the region. In October 2018, captive *Asterias forbesi* and *Asterias rubens* held at the University of England's Marine Science Center rapidly developed lesions, lost limbs, and appeared to "melt" over the course of several days (Fig 2), paralleling the symptoms described in SSWD literature, raising significant concerns that an outbreak of SSWD within Maine is possible.

Objective
 To confirm the presence of SSWD using histology and PCR, and to gain a baseline estimate of the prevalence of this disease in the Buzzards Bay region through direct and opportunistic monitoring.

Methods
Asterias forbesi and *Asterias rubens* were both opportunistically and directly monitored from June-August 2017 at four sites within Buzzards Bay (Fig 3). All sea stars were returned to the University of New England and held in aquaria with individual water flow to prevent potential of any infection.

Determining if SSWD is present in Maine
 Histological and PCR analysis was used to determine if sea stars found in southern Maine were infected with SSADV as reported in West coast sea stars.

Histology
 Initial histological processing of control samples (symptomatic sea stars) included a preliminary test to determine the best method to preserve morphology. Tests included formalin fixation, followed by dehydration in a series of alcohol solutions, paraffin, 6 µm sections were cut, mounted, and stained with Hematoxylin and Eosin.

PCR
 For symptomatic individuals collected in summer 2019, a modified protocol from DeSesto (2015) was used to evaluate tissue damage. Briefly, a 2-3mm thick section of the aboral surface was fixed in 10% buffered formalin for 24hrs, followed by dehydration in a series of alcohol solutions, paraffin, 6 µm sections were cut, mounted, and stained with Hematoxylin and Eosin.

Results

Collection Date	Low Tide Height (ft)	# <i>A. forbesi</i> total	# <i>A. rubens</i> total	Asterias Total
June 26	-1.6	2	14	16
July 24	-1.5	2	18	20
August 24	-1.0	1	18	19
Average		1.67	15	16.67

Table 1: Monthly population density of *Asterias* spp. at East Buzzards Bay. Samples were collected along a 50-meter transect at low tide each month.

Directory of Poster Presenters

Name	Poster	Name	Poster
Rachel Amoroso	41	Connor Jones	1, 16
Olivia Barberi	11, 15	Jennifer Knotek	30
Julia Beebe	31	Joseph Langan	5
Julia Biagini	29	Ellie Leighton	19
Summer Bishop	35	Katy Lowe	7
Avery Bond	3	Carolyn Lucy	17
Adrianus Both	2	Laura Marvin	26, 37
Andrea Call	24, 27	Emma McCormac	6
Kathryn Chalmers	40	Maeve McGowan	42
Michele Condon	1, 16	Dominique Mellone	23
Amber Cusson	9	Erynn Mills	2
Carmen Dancy	20, 28	Jasmine Nyce	33
Ariella Danziger	14	Wynter Paiva	26, 37
Derek DeMartinis	9	Taylor Paquin	25
Melyssa Demers	11, 12	Courtney Parent	38
Mackenzie Deveau	4	Katie Parker	16
Samantha Dinsdale	18	Everett Pierce	15
Kimberly Donoghue	22	Samia Pratt	10
Michael Esty	22, 36	Makaela Rice	32
Nikolai Fernandez	20, 28, 34	Katharina Roese	12
Austin Flanigan	5	Olivia Scott	24, 27
Denise Giuvelis	18	Anderson Sinde	8,9
Emily Hanson	21, 43	Jessica Szetela	20, 28
Lauren Hayden	36	Emma Tobin	24, 27
Abigail Hayne	13	Nicole Volosin	21, 43
Sarah Hylton	5	Linda Welch	29
Aubrey Jane	16	Jessica White	40
Lauren Janitzki	39	Jared Zuke	32



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Thank You!

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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.

Finally, I'd like to extend a special thank you to Erinn Stetson who has provided invaluable logistical and tactical support during all aspects and stages of the SURE 2018 program, including this symposium.

Dr. Amy Keirstead

THANK YOU!



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