

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.

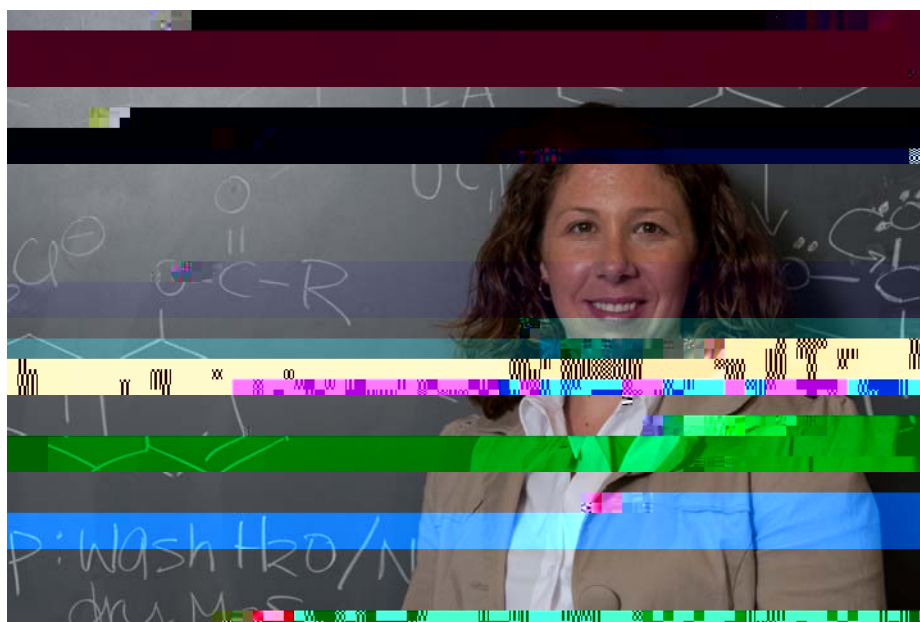


Saturday, September 29, 2018 | 9 a.m. – 12:30 p.m.

9:00 a.m. to 11:00 a.m.
Poster Presentations
Multi-Purpose Rooms
jff 0500



Researchat 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



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

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



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. It

Poster 8

Evaluation of MaineUva-actuca Extracts with Antimicrobial Properties to Determine Optimal Storage Conditions: Time and Temperature Based Stability Analysis



Symisynthesis of J va

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

Poster 12

Impact of macroalgae extracts on bacterial biofilm formation



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: Everette 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 *Vibrio cholerae* and *Escherichia 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; Katherine 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 gene expression of stress in infected vs. non-infected mussels.



Poster 17

Photophysical Characterization and Aggregation Induced Emission (AIE) of Group 14 Siloles and Germales

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

%

. .093 Tc '180.64 Tjor:

‡



Presence of Microplasmas in My

Poster 23

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

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

POSTER PRESENTATIONS

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 of the *88* 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: Jeremy 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

An 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 ScoTM'20

One local Maine brown alga, *Fucus vesiculosus* and two local Maine red algae, *Chondrus crispus* and *Ahnfeltia plicata*, were investigated for an 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. Inhibi

Poster 28

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



Poster 29

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

Presenter: Julia Biagini '20

POSTER PRESENTATIONS

Rejec14



Poster 33

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

Presenter: Jasmine Nyce '20
Major: Marine Science
Advisor: James Sulikowski, PhD

1/4

Estimating Small Mammal Populations in the UNE Woods

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 Frederich, 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 ship 1.4071850Tc014aTj/TT101Tf33.56894.1976TD.0006Tc(dem,)Tj21Tf1.80TD0Tc



Poster 37

Characterizing Protein Polymer Materials From the Nanoscale
to the Mesoscale

Presenter: Laura Marvin '20

Major: Biochemistry

Advisor: Eva Rose Balog, PhD

Contributors:

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

Poster 40

Modeling NaCl and CaCl₂ interactions with anionic and
zwitterionic membranes

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 genetic 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

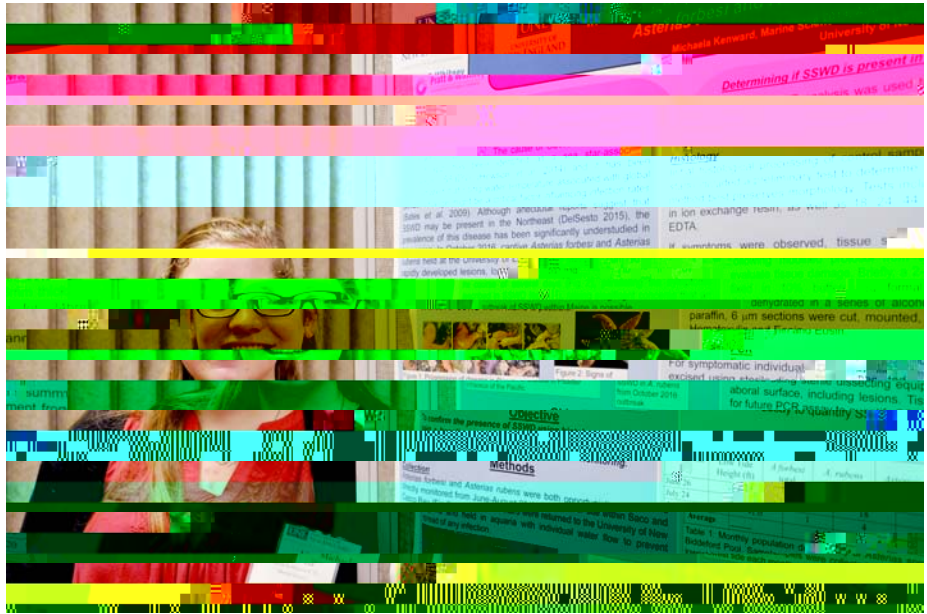
Presenter: Nicole Volosin '19

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 analyze 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.





Thank You!

The annual SURE Symposium would not be possible without the support of many individuals and organizations who each contribute in their own way.

First, a hearty THANK YOU to the faculty mentors who have supported the students in carrying out the research presented here today. Your generosity of time and effort has allowed the students to complete truly remarkable work. Likewise, the College of Arts and Sciences

THANK YOU!

