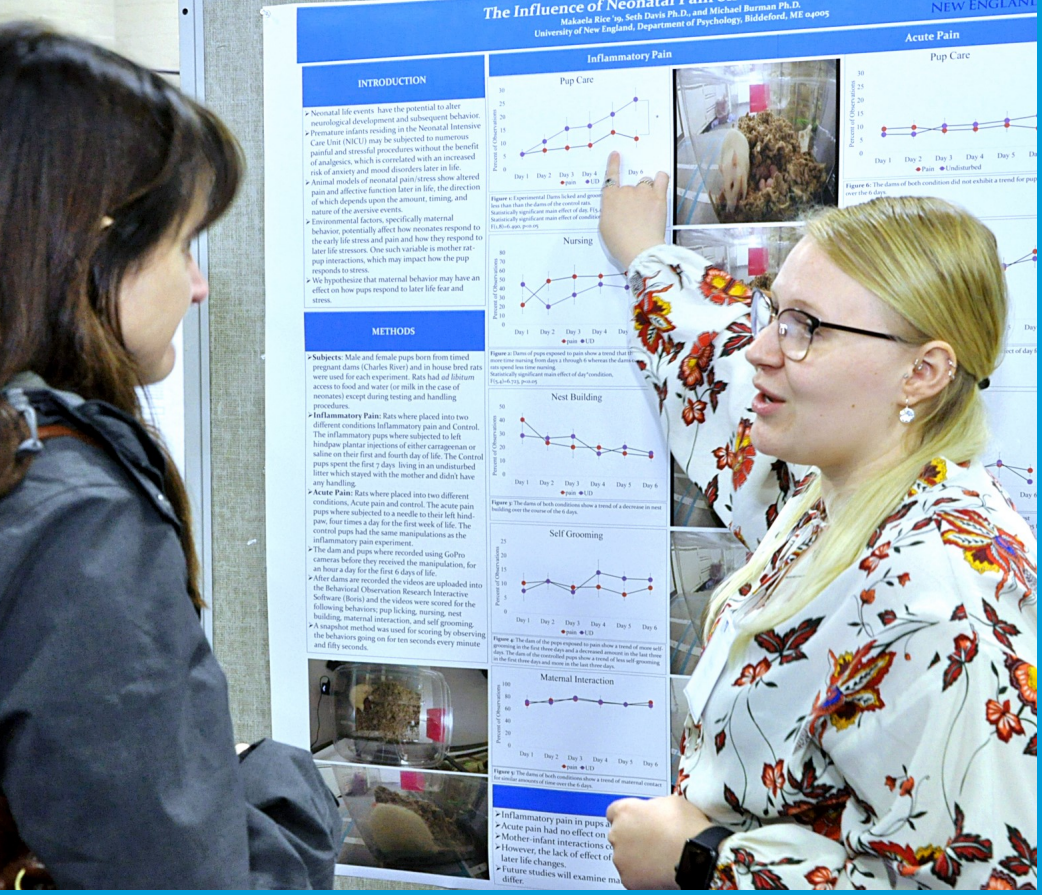
PROGRAM



UNIVERSITY OF NEW ENGLAND

COLLEGE OF ARTS AND SCIENCES
SUMMER UNDERGRADUATE RESEARCH EXPERIENCE SYMPOSIUM

Saturday, September 28, 2019
9 a.m. - 11:30 a.m.

UNE
UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

PROGRAM

Summer Undergraduate Research Symposium

Saturday, September 28, 2019 | 9 a.m. – 11:30 a.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

Jonathan Millen, Ph.D.
Dean, College of Arts and Sciences

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

Research at UNE

Research at UNE

On behalf of the UNE College of Arts and Sciences, welcome to the 2019 Summer Undergraduate Research Experience (SURE) Symposium! This annual event features the work of over 30 students that have performed research during the summer on campus and in regions throughout the northeastern United States. We're also pleased to have students from the Westbrook College of Health Professions presenting their summer research today. Over the summer, UNE 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 Oceanography to Neuroscience and Biology have spent their summer investigating a diverse array of research questions, including:

- *How does age-based discrimination affect the daily lives of older adults?*
- *What is the neurochemical basis to explain the relationship between neonatal trauma and anxiety later in life?*
- *How can electronic devices reduce the bycatch of sharks in longline fisheries?*
- *Can the nanostructure of porcupine quills be characterized and used in the development of biotechnology applications?*
- *Is supercritical carbon dioxide an appropriate solvent to extract compounds from terrestrial Martian samples?*
- *Does a neck strengthening program improve the neck reaction time, towards reducing the severity of head impacts in sport?*

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

Computational analysis of water in homodimer interfaces of biglycan and decorin

Presenter: Deanna Phipps '20
Major: Medical Biology
Minor: Health, Medicine & Society
Advisor: Olgun Guvench, M.D., Ph.D.
Contributors: Avery Liotta-Henderson; Rawan Maadi '20; Elizabeth Whitmore; Mariem Ghoula

Small leucine-rich proteoglycans biglycan (BGN) and decorin (DCN) regulate cellular pathways within the extracellularmatrix. Following previous molecular dynamics (MD) simulations of each BGN and DCN, we examined the number of waters present within the homodimer interface following each stage of MD. Per system, the number of water molecules in the protein interface increased 5-fold for BGN and 10-fold for DCN during the heating stage and was similar in the final frame of each subsequent stage.

Poster 2

Non-lethal Sex Determination of Atlantic Cod using Portable Ultrasound

Presenter: Ben LaFreniere '22
Major: Marine Science
Minor: Applied Mathematics
Advisor: James Sulikowski, Ph.D.
Contributors: Brooke Anderson; Hannah Verkamp; Jasmine Nyce '20; Kristen Wurth '22

Atlantic Cod (*Gadus morhua*) are a monomorphic species that currently require necropsy to determine sex. The goal of this study was to design a method of non-lethal sex determination of Atlantic Cod (*Gadus morhua*) in the Gulf of Maine using portable ultrasounds. Based on our results, we believe a method is possible if specimens are sampled in early spring before mating and if a smaller probe is used that performs at a higher frequency and lower depth.

Poster 3

Monitoring juvenile fish assemblages in the Saco River Estuary, Gulf of Maine

Presenter: Zachary Carver '21
Major: Marine Biology
Advisor: Angela Cicia
Contributors: Dean Hernandez '22; Summer Bishop '20; Taylor Gibson '22

Building off the foundations of an established monitoring project, the current study sought to continue to monitor the presence and abundance of juvenile fish species present in the Saco River Estuary (SRE) using beach seines and modified lobster. Continuing this research and comparing abundance data to previous years will allow for an increased understanding of how/if juvenile fish assembles are changing and what potential impact these changes could have on this critical habitat.

Poster 4

Descending pain inhibition mediates sex differences in temporomandibular joint osteoarthritis pain

Presenter: Andrew Elkinson '20
Major: Medical Biology
Minor: Applied Mathematics
Advisor: Tamara King, Ph.D.
Contributors: Craig Yanuszeski, D.O.; Victoria Eaton '20

Temporomandibular joint (TMJ) osteoarthritis (OA) is twice as prevalent and reported as more severe in women compared to men. We examined whether descending pain modulatory pathways from the rostral ventromedial medulla (RVM) protects males from development of TMJOA pain. In male rats treated with low dose MIA that does not induce ongoing pain, we demonstrate that RVM naloxone induced conditioned place aversion indicating that blocking opioid receptors in the RVM unmasks an underlying pain state.

Poster 5

Determining reliability of static ultrasound measures of the multifidus and erector spinae muscles and feasibility of measuring spinous process movement during the Reverse Hyperextension

Presenter: Katie Flynn '20
Major: Applied Exercise Science
Minor: Coaching
Advisor: Michael Lawrence
Contributors: Michael Lawrence; Adrienne McAuley

Our study's purpose was to determine the intra-rater reliability of static ultrasound measures of the cross-sectional area and thickness of the multifidus muscle and the thickness of the erector spinae muscle at L4, as well as the feasibility of measuring any change in the intermammillary distance between consecutive vertebrae during the reverse hyperextension exercise. Results showed that the ICC was reliable and comparing the flexed vs bottom RHE position measurements, was found to be significant.

Poster 6

Detection of abnormal stathmin-2 mRNA processing in amyotrophic lateral sclerosis (ALS) patient samples and in cells with TDP43 depletion

Presenter: Samia Pratt '20
Major: Neuroscience
Minor: Marine Science (Marine Biology)
Advisor: Clotilde Lagier-Tourenne, M.D., Ph.D.

Amyotrophic Lateral Sclerosis (ALS) is a fatal neurodegenerative disease that affects the motor neurons of the body. TDP43 pathology is seen in nearly all patients and understanding its mechanisms may help with potential therapies. The goal of this project was to induce a depletion in nuclear levels of TDP43 to observe the consequential abnormal Stathmin-2 mRNA processing and the cryptic Exon 2Aa, thus creating a cellular model mimicking what can be seen in patient samples.

Poster 7

Complexation of yttrium and the rare earth elements with silicate at seawater ionic strength

Presenter: Joshua Dalo '20
Majors: Chemistry, Marine Sciences (Marine Biology)
Advisor: Johan Schijf, Ph.D.

Little attention has been directed towards evaluating the aqueous speciation of yttrium and rare earth elements (YREE) with regards to silicate complexation. Therefore, we determined the stability of Eu-silicate complexes through conducting potentiometric titrations at seawater ionic strength (0.7 M $NaClO_4$). Our $log\beta_1$ and $log\beta_2$ stability constants correlate with literature values obtained from different techniques. These results support recent models that indicate YREE-silicate complex speciation is negligible in seawater, expect in the deep Pacific Ocean.

Poster 8

A Comparison of Flood Stage vs. Ebb Stage Phytoplankton in a Tidally Dominated Estuary

Presenter: Tessa Rock '21
Major: Marine Science (Marine Biology)
Minor: Anthropology
Advisor: Stephan Zeeman, Ph.D.

Phytoplankton are vital organisms for every marine ecosystem. They play a key role in providing food for the primary consumers that live in these ecosystems. By utilizing the Flow Cam to capture images of the phytoplankton in each water sample, species composition can be determined through statistical analysis. The data indicates that grazing is occurring between the mouth of the Saco River and the bridge. Further analysis will indicate which specific species are being grazed upon the most.

Poster 9

Development towards a green fluorescent protein-sensing biopolymer as a prototype for a novel electrochemical sensing technology

Presenter: Galen Arnold '22
Major: Medical Biology
Advisor: Eva Rose Balog, Ph.D.
Contributors: Laura Marvin '20; Wynter Paiva '20

This research describes the progress made towards developing a versatile, novel, electrochemical nanotechnology purposed for biosensing. By manipulating the amino acid composition of tunable elastin-like polymers (ELPs), we aim to ultimately synthesize a unique, noninvasive method of detecting unspecified analytes by characterizing the bioconjugation of this unique protein complex to a gold surface. This approach involves the individual expression and purification of three distinct proteins and describing the features of the interactions between these proteins.

Poster 10

The Nanoscale Morphology and Topography of Porcupine Quills

Presenter: Laura Marvin '20
Major: Biochemistry
Minor: Applied Mathematics
Advisor: Eva Rose Balog, Ph.D.
Contributor: James Vesenka, Ph.D.

This summer's research was dedicated to developing a procedure for cleaning and imaging porcupine quills. The instrument that was used to image the porcupine quills was the Atomic Force Microscope. Both the black tip and the white shaft were successfully imaged on separate occasions. In addition, the ideal sample prep procedure was developed for both the black tip and the white shaft. The process of editing the images was developed during this time period.

Poster 11

Modulating anxiety and fear response in neonatal pain treated rats via CRF receptor 2

Presenter: Mariah Berchulski '21
Major: Neuroscience
Minor: Applied Mathematics
Advisor: Michael Burman, Ph.D.
Contributor: Seth Davis, Ph.D.

Neonatal pain and trauma have been found to cause mental health, addiction, and pain sensitivity consequences later in life. Corticotrophin-releasing factor receptor 2 (CRFR2) is hypothesized to play a key role in mediating these consequences, specifically in the central nucleus of the amygdala (CeA). Thus, bilaterally blocking CRFR2 local to the CeA with a chemical antagonist should alter these consequences seen through decreased pain sensitivity, increased levels of learned fear response and anxiety-like response.

Poster 12

Methodological development for the pilot exploratory trials of noxious electrical stimulation and eccentric exercise on pain sensitivity and serum biomarkers related to pain

Presenter: Shannon Keavy '20
Major: Health, Wellness and Occupational Studies
Minor: Special Education
Advisor: Scott Stackhouse
Contributors: Scott Stackhouse, Ph.D., P.T.; Amanda Turner, M.S.

Previous work in the primary investigator's laboratory showed that both eccentric exercise and transcutaneous electrical nerve stimulation (TENS) reduce mechanical pain sensitivity. However, studies in animal models have implicated other mechanisms of analgesia including changes in neurotransmitters. The goal of this presentation is to explain the methodological development of the pilot trials to collect data in healthy subjects to investigate potential mechanisms underlying immediate and next-day analgesic effects of noxious TENS and eccentric exercise.

Poster 13

Investigating adhesion and delamination in UV curable coatings with anisotropic polymerization

Presenter: Cody Shaw '20
Major: Chemistry
Minor: Applied Mathematics
Advisor: James W. Rawlins, Ph.D.

The goal of the research was to achieve adhesion of a UV curable coating to allow for better protection of metal substrates. A network of coatings with varying shrinkages and affinities were processed. The delamination rate, adhesion strengths, and cure conversion were investigated. These were done using the cyclic salt/fog chamber, MTS Insight, or the ATR-FTIR. It was determined that a coating was cured but at a gradient. It is hypothesized the outcome provides better adhesion.

Poster 14

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 (Marine Biology)
Advisor: James Sulikowski, Ph.D.

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. Results of this year's study have shown a wide variety of species and further statistical analysis will provide preliminary population estimates of fish assemblage in the Saco Bay.

Poster 15

Testing electronic bycatch reduction devices (BRDs) to investigate possible technologies that will reduce the bycatch of sharks in longline fisheries

Presenter: Bethany Brodbeck '22
Major: Marine Science (Marine Biology)
Minor: Applied Mathematics
Advisors: James Sulikowski, Ph.D.; Richard Brill, Ph.D.; Peter Bushnell,

Bycatch reduction devices (BRD's) are designed to impair an elasmobranch's electrosensory system using small voltages. Impairment of this system can deter individuals from biting onto baited longline hooks, resulting in a reduction of bycatch. Using sandbar sharks (*Carcharhinus plumbeus)* as a representative species two different experiments were conducted. Results of the experiments indicate that the sharks can detect the BRDs and were also significantly repelled by them, validating the possibility of deterrence in the field.

Poster 16

Solubility of Sulfur Containing Compounds Within Supercritical Carbon Dioxide

Presenter: Derek DeMartinis '20
Major: Biochemistry
Advisor: John Stubbs, Ph.D.

The Martian environment possesses sulfur containing compounds, however current analysis techniques often degrade the larger macromolecule, thus alternative techniques such as using supercritical carbon dioxide and water as solvents are important to research. Boiling point analysis, solubility tests, and vapor-liquid equilibria on sulfur compounds within otherworldly soils were conducted in relation to supercritical carbon dioxide and water. Results indicate the effective use of supercritical carbon dioxide without an enhancer could be used for analysis.

Poster 17

Primary cilia and the development and function of the heart

Presenter: Victoria Brewer '20
Major: Medical Biology
Minor: Health, Medicine, and Society
Advisor: Kerry Tucker, Ph.D.
Contributor: Lindsey Fitsimmons, M.S.

By performing electrocardiograms on postnatal day 1.0 mouse pups with defined ciliopathies, an electrophysiological phenotype can be established for the homozygous mutants that have congenital heart defects. The data I collected supports the presence of an identifiable electrophysiological phenotype of homozygous mutants with the loss of primary cilia in cardiac neural crest cells. This phenotype establishment leads to possibilities that more congenital heart defects could have electrophysiological phenotypes specific to the loss of primary cilia.

Poster 18

Techniques in current mapping using GPS drifters and an aerial drone

Presenter: Andy Robinson '20
Major: Marine Sciences (Oceanography)
Minor: Applied Mathematics
Advisor: Charles Tilburg, Ph.D.
Contributor: Michael Esty

Techniques used to study currents involve expensive equipment, making it difficult for small institutions to study bodies of water that are not of wide interest. We developed several inexpensive options for measuring surface currents and tracking water masses. An aerial drone, GPS drifters, and CTD casts used together provided valuable insights as to the processes occurring nearshore. The combined application of these methods will answer questions about circulation and surface currents around Biddeford Pool, ME.

Poster 19

Effect of optogenetic activation of GABAergic inhibitory interneurons in mice

Presenter: Kaylee Townsend '21
Majors: Medical Biology, English
Minor: Writing
Advisor: Tamara King, Ph.D.
Contributor: Victoria Eaton '20

Spinal GABA signaling is a key component of pain inhibition. Spinal administration of GABA agonists produces antinociception and spinal GABA antagonists produces pain-like behaviors and hypersensitivity. We are using transgenic mice that have the channel rhodopsin 2 (ChR2) expressed selectively on VGAT expressing neurons. ChR2 activation-induced spinal GABA release blocks AITC-induced licking and induces thermal antinociception. These mice will be used to examine whether increasing GABA signaling in the spinal cord blocks cancer-induced bone pain.

Poster 20

Expression and purification of the novel protein, crustacyanin-elastin-like polymer (CR-ELP) fusion protein

Presenter: Wynter Paiva '19
Majors: Biochemistry, Medical Biology
Advisor: Eva Rose Balog, Ph.D.
Contributors 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. Preliminary results are promising however, none of the results have concretely proven the production of CRTC-ELPs.

Poster 21

Investigation of volatile and surface-associated Fucus vesiculosus *antimicrobial activity against human pathogens* Staphylococcus aureus *and* Salmonella Typhimurium

Presenter: Emma Tobin '20
Majors: Biochemistry, Biology
Advisor: Ursula Roese, Ph.D.
Contributor: Sy Hackett '22

The macroalga *Fucus vesiculosus* was investigated for volatile and surface-associated antimicrobial activity against three human pathogens including *Staphylococcus aureus* MSSA, S. *aureus* MRSA, and *Salmonella enterica serovar Typhimurium*. Volatiles were collected through the utilization of volatile collection traps whereas surface-associated compounds were extracted using a dipping method. Surface extracts were found to be effective against both *S. aureus* strains, suggesting that whole-tissue extraction methods may dilute antimicrobial compound concentration and consequently decrease efficacy.

Poster 22

Quantifying and comparing marine biodiversity between two established marine intertidal monitoring sites

Presenter: Summer Bishop '20
Major: Marine Science (Marine Biology)
Minor: Animal Behavior
Advisors: Angela Cicia; Markus Frederich, Ph.D.

The objectives of the study were to collect baseline diversity and abundance indices for the intertidal communities of two previously established long-term rocky intertidal monitoring sites, Ram Island and the Bird Sanctuary, while comparing diversity between the two stations. The sites have statistically different diversities, with zonation present at each site. Understanding diversity helps to indicate impacts for an ecosystem from anthropogenic or environmental causes as well as providing information for ecosystem management and conservation.

Poster 23

Impact of pyrogallol on bacterial biofilm development

Presenter: Katharina Roese '21
Major: Medical Biology
Minor: Mental Health Rehabilitation
Advisor: Kristin Burkholder, Ph.D.

The goal of this project was to determine the effect of the plant derived chemical pyrogallol, against the formation of biofilms by relevant human pathogens. Pyrogallol was tested against two strains of *Staphylococcus aureus* and two strains of *Staphylococcus epidermidis*, which are known to be major biofilm producers. Pyrogallol successfully inhibited biofilm formation of one of the *Staphylococcus aureus* strains, and one of the *Staphylococcus epidermidis* strains, without killing the bacteria.

Poster 24

Animal foraging and disgust: Effects of pathogen cues and pathogen risk on scavenging behavior

Presenter: Chris Torlone '20
Major: Medical Biology
Advisors: Kristin Burkholder, Ph.D.; Zach Olson, Ph.D.

Scavenging constitutes an understudied, but important, energy pathway in terrestrial ecosystems, and occurs when an animal feeds on a carcass that it did not kill. Most carcasses are readily consumed by vertebrate scavengers, suggesting that carcasses may serve as a 'free meal' for whatever animal first encounters them on the landscape. We tested the free meal hypothesis by focusing on a suspected risk that scavengers would face: the risk of pathogen exposure from the carcasses.

Poster 25

An investigation into the extraction of bioactive secondary metabolites: a comparison of procedures and environment

Presenter: Kayla Cerri '21
Major: Biochemistry
Advisor: Amy Deveau, Ph.D.
Contributors: Kristin Burkholder, Ph.D.; Amber Cusson '20

Antibiotic resistance is a major challenge the world is facing. In reference to SEANET goal 3: Aquaculture Innovations, this project researches the impact of environment on metabolites produced by *U. lactuca*, and effects of drying method on bioactivity of extracts against MRSA in a comparison of extraction procedures. Results show no specific impact of drying method on bioactivity, but the environment has shown to influence the presence of metabolites active in the cytoprotective Nrf2-ARE pathway.

Poster 26

The self and daily life in older adults

Presenter: Hannah Christian '20
Major: Psychology
Minor: Mental Health Rehabilitation
Advisor: Julie Peterson, Ph.D.

This study examines the effect of ageism (discrimination based on one's chronological age) on older adults (60+) in their daily lives. This includes their sleeping behavior, mortality salience, drinking behavior and many other behaviors that influence their overall mental health. Additionally, we explored how having strong social ties and personal relationships may help to mitigate the negative effects of ageism, and promote healthy behaviors and positive thoughts.

Poster 27

Synthesis, characterization, and antimicrobial impact of (+)-Usnic Acid derivatives with an additional bioactive phenyl amino motif

Presenter: May Callahan '20
Major: Biochemistry
Advisors: Amy Deveau, Ph.D.; Kristin Burkholder, Ph.D.

Phenyl amine derivatives of (+)-Usnic Acid were synthesized using literature procedures and characterized spectroscopically. Derivatives were analyzed against methicillin-resistant *S. aureus* (MRSA) USA 300, *S. aureus* Newman, and *E. coli* KMBI 7 using disc diffusion assay; On average, aniline enamino derivatives inhibited more than (+)-Usnic Acid: USA300 at 50 mg/mL, and Newman at 25 mg/mL. Aniline amino derivatives inhibited more than (+)-Usnic Acid: USA300 at 100 mg/mL, and Newman at 50 mg/mL.

Poster 28

Using Baited Remote Underwater Video Surveys (BRUVS) to Observe Species Composition, Distribution, and Habitat Use of Invertebrates, Marine Mammals, and Marine Birds in Saco Bay

Presenter: Kristen Wurth '22
Majors: Marine Science, Education
Advisor: James Sulikowski, Ph.D.
Contributor: Jasmine Nyce '20

Baited Remote Underwater Video Surveys (BRUVS) are a noninvasive way to understand the composition, distribution and habitat use of different invertebrates, marine mammals and marine birds. Surveys were conducted in the Saco Bay, near Stratton Island. Surveying presence and abundance of different organisms gives an understanding of ecosystem structure. Species observed were the American Lobster, Jonah Crab, Lions Mane Jellyfish, Common Starfish, Rock Crab and Harbor Seal. Many are essential to Maine's fisheries and economy.

Poster 29

*Plankton Analysis and Competing Fouling Organisms of Farmed Blue Mussel (*Mytilus Edulis*) in Casco Bay, Maine*

Presenter: Drew Haschig '21
Major: Marine Biology
Advisor: Carrie Byron, Ph.D.

Mussel farmers should be more informed on when to deploy their mussel lines for seed collection and whether they should move their lines up or down in the water column to avoid competitive organisms from fouling their mussel lines. This has been accomplished through the use of quantitative and qualitative field research methods. Data was collected every 2 weeks at a farm site in Casco Bay using CTD casts, plankton tows, loggers and settlement plates.

Poster 30

Investigating reading comprehension on digital devices in younger and older adults

Presenter: Nicole Martin '21
Major: Psychology
Minors: Neuroscience, Special Education
Advisor: Jennifer Stiegler-Balfour, Ph.D.

As reading on digital devices rises, it is important to understand how cognitive process are affected. While most previous research focuses on college age samples, this study investigates how older adults have transitioned to using e-readers (e.g., iPad or Kindle). Specifically, our study investigates what digital devices (and their respective options for customization) suit older adults the best and what role general technology comfort level plays when older adults utilize device devices for reading.

Poster 31

The efficacy of a neck strengthening program on neck reaction time

Presenter: Caitlin Barret '20
Major: Applied Exercise Science
Minor: Nutrition
Advisor: John Rosene, DPE, ATC, CSCS, ACSM EP-C

The purpose of this investigation was to examine if a 10-week neck strengthening program improves neck reaction time to external loading within a college population. Peak force, time to peak force, and time to neck muscular activation were objective markers used to quantify the neck strengthening program. 25 students volunteered to complete the program. This research supports further examination of potential intervention strategies to reduce the severity of the effects of head impacts in sport.

Poster 32

Monitoring the effects of climate change on shrew and insect population dynamics in a New England forest

Presenter: Ian Miller '20
Major: Environmental Science
Minor: Geographic Information Systems
Advisor: Steven Travis, Ph.D.
Contributor: Sam Palmisano '21

The primary goal of this project was to monitor shrew and insect population levels in UNE's 363-acre property and to determine if they are affected by climate change. This summer's goal was to collect baseline data of the shrews and insects' populations. This baseline data is crucial to this long term study so current populations can be compared to future ones. Baseline data was able to be collected for the insects but not the shrews.

Poster 33

Behavioral Testing in Transgenic Rats: An Investigation on the Effects of Inhibited CRF Expression

Presenter: Kayla Looper '21
Major: Neuroscience
Advisor: Michael Burman, Ph.D.
Contributor: Haley Gagne '22

Neonatal pain has previously been shown to affect later-life anxiety-like behavior and pain sensitivity. This project investigates if differences in this kind of behavior can be eliminated by inhibiting the neuropeptide corticotropin releasing factor (CRF) in the central nucleus of the amygdala (CeA). This inhibition was created through a neonatal injection of a modified virus that establishes a designer receptor exclusively activated by a designer drug (DREADD) in the CRF-containing neurons of the CeA.

Poster 34

Optimization of a screening approach for Alzheimer's Disease Drug development

Presenter: Emma McCormac '19
Major: Medical Biology
Minor: Philosophy
Advisor: Benjamin Harrison, Ph.D.
Contributors: Eva Balog, Ph.D.; Eliza Grlickova-Duzevik; Merilla Michael

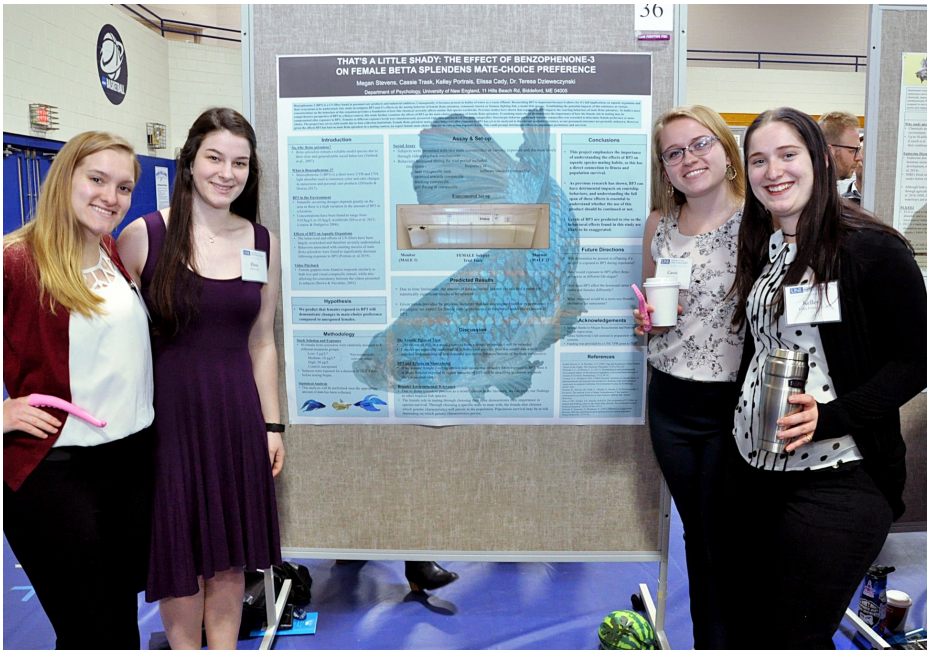
Alzheimer's Disease (AD) impacts the memory, reasoning, and mobility of 5 million elders. A major goal of the Harrison lab is to design peptide drugs that work to maintain the connection of the basal forebrain and CNS. This project contained two aims, the first being to find a cell penetrating peptide that optimally entered PC12 cells and the second being to test at what timeframe the found peptide was most penetrant into the cells. After this project, we now have created a conjugated peptide for further research on AD.

Poster 35

Effect of pathological pain on cholinergic interneuron activity in the Nucleus Accumbens

Presenter: Sam Schultz '20
Majors: Biochemistry, Medical Biology
Minor: Neuroscience
Advisors Christoph Straub, Ph.D.
Contributor: Maxwell Blazon

Chronic neuropathic pain is a pain state caused by lesion to the somatosensory system and affects 10% of the US population. Evidence has implicated the Nucleus Accumbens (NAc) as a major target in the transition to a chronic pain state, however, the functional organization of NAc microcircuits in a chronic pain state is poorly understood. Here we test the hypothesis that reduced dopamine levels in a chronic pain state lead to an increase of cholinergic interneuron (CIN) activity. We demonstrate that in a mouse model of neuropathic pain that there is a paralleled increase in CIN excitability.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Megan Stevens, Cassie Trask, Kelley Portrais, Elissa Cady, Dr. Teresa Dziewczynski
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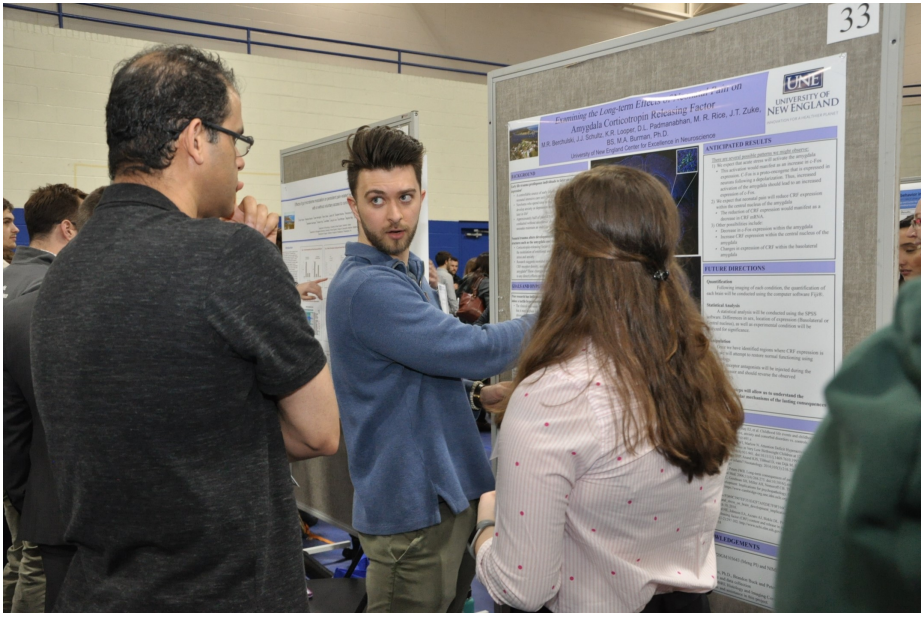
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ANTICIPATED RESULTS
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Thank You!

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 Undergraduate Research Committee was instrumental in the success of our 2019 SURE program.

Several agencies have sponsored the students' summer research through fellowships and grants including the Center of Biomedical Research Excellence for the Study of Pain and Sensory Function (COBRE, with funding from the National Institute of Health), the National Science Foundation (TURBO grant), the Maine Space Grant Consortium, the Maine EPSCoR program (NSF SEANET grant), Morton-Kelly Charitable Trust, the UNE Office of Research and Scholarship, and the UNE Marine Science Center. Thank you for your investment in our students. Appreciation is also extended to UNE Institutional Advancement 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.

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 2019 program, including this symposium.

Dr. Amy Keirstead

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