University of New England
College of Arts and Sciences

24TH ANNUAL SPRING RESEARCH SYMPOSIUM

UNIVERSITY OF NEW ENGLAND

INNOVATION FOR A HEALTHIER PLANET

Friday • May 3, 2024

CONTENTS

RESEARCH AT UNE

On behalf of the UNE College of Arts and Sciences (CAS) Dean's Office, welcome to the 2023-24 CAS Spring Research Symposium! This event, now in its 24th year (and with a record number of presentations and students,) showcases the scholarly and creative endeavors of our students through works of art, posters, and oral discussions, and it represents the outcomes of over 200 talented students working under the direction of dedicated faculty and professional staff.

Please join us in celebrating the hard work, enthusiasm, and creativity of our students by learning 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

SCHEDULE

Friday, May 3, 2024 | 9:30 a.m. to 4 p.m.

Poster Presentations

9:30 to 11:30 a.m. | *Alfond Forum 283 AB*

Lunch and Distinguished Alumni Speaker

11:30 a.m. to 12:30 p.m. | *Alfond Forum Blue Court*

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

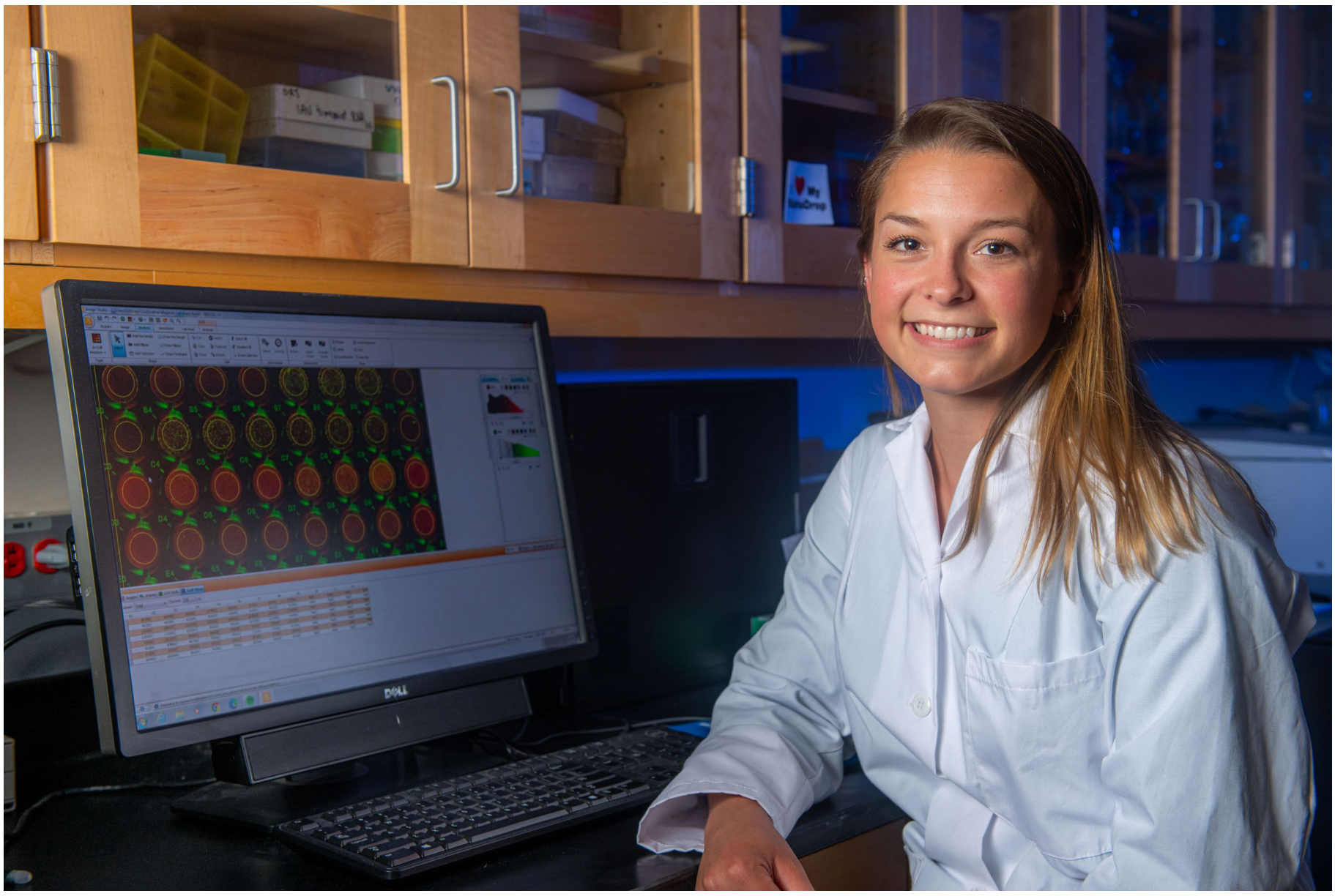
Avery Bond, B.S. ’19 (Medical Biology)
Distinguished Alumni Speaker

Oral Presentations

1 to 4 p.m. | *Decary Hall, Second Floor Classrooms*

DISTINGUISHED ALUMNI SPEAKER

Avery Bond, B.S. ’19 (Medical Biology)



Avery Bond is a Ph.D. candidate in Microbiology at the University of Maine in Orono, Maine. Following her Bachelor of Science from UNE in 2019 (major in Medical Biology-Medical Sciences and minor in Education), Bond joined the research group of Melissa Maginnis, Ph.D. in the Department of Molecular and Biomedical Sciences. Her areas of research focus include (1) defining the role of calcium signaling during JC polyomavirus infection and (2) environmental sampling of viruses using bio-inspired membranes. As a Ph.D. candidate, Bond has co-authored three peer-reviewed publications, including a first-author publication in Antiviral Research (2024), delivered three oral presentations, and presented or been a

co-author on 24 poster presentations at regional, national, and international meetings. Bond and her work have been highlighted by regional news outlets (News Center Maine, WVII Fox Bangor) and she has earned numerous awards including First Place at the Bioscience Association of Maine Fast-Pitch Competition and the Best Graduate Presentation in Biomedical Sciences (twice) from the University of Maine. When not in the research lab, Bond is an active volunteer at science outreach events including as a judge for the Maine State Science Fair. Bond is on track to defend her Ph.D. work this spring and beginning in June will be a R&D Scientist and Maine Molecular Quality Controls Inc. (Saco).

While a student at UNE, Bond engaged in undergraduate research with Kristin Burkholder, Ph.D., Associate Professor and Assistant Academic Director in the School of Biological Sciences, and was a two-time Summer Undergraduate Research Experience (SURE) Award recipient. Bond's undergraduate research focused on (1) activation of the macrophage autophagy system by MRSA and (2) the effect of biofilm growth phase on intracellular survival of Staphylococcus epidermis. A student-athlete, Bond was the Commonwealth Coast Conference Senior Scholar Athlete for Women's Soccer and was named a member of the Alpha Chi National Honor Society and a Member of the Chi Alpha Sigma National College Athlete Honor Society. Bond was the Outstanding Student in Medical Biology-Medical Sciences in 2019 and continues to engage with her alma mater as an alumni panelist for career exploration events. We are delighted to welcome Avery back to UNE and CAS as the 2024 Distinguished Alumni Speaker.

POSTER PRESENTATIONS

LEGEND

63. Goat Island Alternative Energy Project

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

Course *ENV 262 Gulf of Maine Field Studies II*

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. Emotion Through Art

Sophia Lanza ’26 | *Sarah Gorham, M.F.A.*

At times when words are not enough, there is a blank canvas waiting for you to pour your emotions out onto. Art is a universal outlet where anyone can express themselves and be understood by the masses. Something subjective, intangible and abstract such as our complex range of human emotions begs to be articulated and understood. Acting as a gateway into the mind, art is an incredibly vital tool for understanding human nature.

2. The Archival Afterlife of Private Writing: An Internship Experience Following the 1896 Diary of a Westbrook College Student From the Maine Women Writers Collection

Christine Baker ’25 | *Jennifer Tuttle, Ph.D.*, *Sarah Baker, M.A., M.L.I.S.*

ENG 491 English Studies Internship I

This presentation describes an internship with the MWWC focusing on the 1896 diary of Lucy Leighton Crandon of Columbia Falls, Maine, and her journey first attending Westbrook College. The internship followed the diary through the processes of acquisition, cataloguing, writing the finding aid, scanning and transcription. It also entails researching the history of Westbrook College and the experiences of young women from that era to produce online and physical exhibits.

3. My Internship Experience with The Telling Room

Mya Hankes ’24 | *Michael Cripps, Ph.D.*

CMM 430 Internship in Communications

This presentation will highlight the key takeaway from my experience with The Telling Room.

4. My Internship Experience at the Portland Press Herald

Emily Hedegard ’25 | *Michael Cripps, Ph.D.*

CMM 430 Internship in Communications

A presentation describing my experience as an intern at the Portland Press Herald, including my published work, things I learned, and more.

5. Professional Educator Review Board (PERB)

School of Education

All students enrolled in the internship must demonstrate their teaching competence with respect to Maine Common Core Teaching Standards before the Professional Educator Review Board (PERB). The Board is comprised of professional administrators and educators from area schools as well as UNE faculty. Students are required to develop a presentation reflecting their proficiency in meeting these state standards and present and defend the presentation in front of the Board. A week before their presentation students submit their ePortfolio to their evaluating committee. In their portfolio they have a section labeled PERB PACKET and include: Letter of introduction, resume, analysis by intern, analysis by cooperating teacher and analysis by supervisor. The PERB interview takes about 75 minutes with a presentation, review of portfolio, interview, and recommendations by the committee. Passing PERB is a requirement for completion of the certification program and subsequently being recommended to the Maine State Department of Education for teacher licensure.

6. What Role Does News Media Play in the Construction of the Human Trafficking Narrative?

Delaney Butts ’25, Lia Storniolo ’24, Annika Bassett ’24 | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

We will be presenting on how media affects the human trafficking narrative. Based on this information we will look at how the public understands human trafficking and how it is often misunderstood by the public.

7. Getting into the Weeds: The Cannabis Industry and its Influence on Human Trafficking

Bryan Rodriguez ’24, Candace Baker ’25, Michael Packowski ’24 | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

Although the US Drug Enforcement Administration still categorizes cannabis as a Schedule 1 drug, many states and countries have legalized or decriminalized its use on some level. The current cannabis industry requires large amounts of human labor to cultivate and process its products. This poster seeks to analyze how the booming cannabis industry impacts the growing issue of human trafficking, specifically in terms of labor.

8. Global Supply Chains in Relation to Labor Trafficking Policies

Austin Johnson ’24, Nick Brown ’24, Samantha Innerfield ’24 | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

The global supply chain will be looked at through the lens of labor trafficking. Three different sectors in particular: flower industry, clothing/fast fashion, and banana plantations will be examined as examples to how these big industries follow or go against labor policies put in place.

9. Concordance between Self-reported Hoarding Symptoms and Behavioral Tendencies in Hoarding Patients and Collectors

Magdalene Meek ’25, Eva Fortier ’26 | *Ashley Shaw, Ph.D.*

PSY 286 Research in the Behavioral Sciences

The focus of this research study is to assess the concordance between self-report of hoarding symptoms and performance on behavioral tasks in hoarding patients and collectors. Additionally, the inclusion of both collectors and hoarding patients within the project attempts to expand upon previous research. We predict that the correlation between self-report and behavior will be lower in patients with hoarding than collectors. Understanding potential correlations may give suggestions on ways we can better assess hoarding.

American Psychological Foundation/Council of Graduate Departments of Psychology (APF/COGDOP) William and Dorothy Bevan Scholarship; University of Miami Department of Psychology/Fred C. and Helen Donn Flipse Research Support Fund

10. Person Perception and Evaluation of College Applicant Essays

Trinity Huff ’26, Rachel Martin ’26, Alayna Swan ’24, Magdalene Meek ’25 | *Julie Peterson, Ph.D.*

PSY 285 Psychology Research Methods

The general purpose of this research study is to better understand how gender identity and socioeconomic status play a role in people’s perceptions of likely college acceptance and assumed academic success in college after reading a fake college essay (generated by AI). Our project thus explores how participant bias in person perception regarding individuals with marginalized gender and socioeconomic identities colors evaluations of college essays and the students who supposedly wrote those essays.

11. The Effects of Traits and Breed Stereotypes on People’s Decision to Adopt a Dog

Brianna Colson ’26, Ellijah Hanley ’26, Kassidy Bradshaw ’25 | *Jennifer Stiegler-Balfour, Ph.D.*

PSY 285 Psychology Research Methods

Our goal was to examine people’s perception of dog breeds when emphasizing either a positive or negative breed trait in a Yellow Labrador or a Rottweiler on adoptability. To answer the question, participants viewed a picture of a dog, read a description about the dog, and subsequently answered various questions about their perceptions of the dog (e.g. likelihood of adoption, likeability of the dog, and a demographic survey).

12. The Effect of Accessories on the Perception of Dogs and Cats

Ashley Araneo ’26, Michaela Chapman ’26, Samantha Peterson ’26, Katie Van Steele ’26 | *Jennifer Stiegler-Balfour, Ph.D.*

PSY 285 Psychology Research Methods

The purpose of this study is to identify whether an accessory, such as a bowtie, will have an effect on how a person perceives dogs and cats in shelters. Participants were given a survey that asked them to look at a picture of a cat or dog either with or without a bowtie and then answer a series of questions.

13. The Effect of Violence in Animation Style on Emotional Well-being

Elliot La Ganza ’24, Emma Clark ’25, Rachael Rooney ’24, Laurel Mason ’26 | *Julie Peterson, Ph.D.*

PSY 285 Psychology Research Methods

The general purpose of this research study is to better understand the relationship between animation styles (hyper-realistic versus cartoon) in violent video games and emotional well-being.

14. Family Academic Trajectory: Investigating the Role of Parental Education in Shaping Academic Goals

Alexandra Devlin ’26, Allison Mazzarella ’25, Callie Huppe ’25, Nick DeBruin ’26 | *Julie Peterson, Ph.D.*

PSY 285 Psychology Research Methods

In this study, we aimed to better understand the connection between the participants’ parents’ education status and its effect on their academic standards. We hypothesized that parental influence will have a significant influence on the participants’ view of their satisfaction with their education and their hopes for further education.

15. How Prevalent is Labor Trafficking in the U.S. Citrus Agriculture Sector Compared to Other Agricultural Industries?

Alyssa Cobb ’24, Eddy Kutter ’24, Amber Tewksbury ’24, | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

We will be presenting scholarly articles and data showing the prevalence of labor trafficking in the U.S. citrus industry as well as showing parallels with other agricultural industries in the U.S.

16. The Effect of Animal Type and Age on Donations to Animal Organizations

Megan Burns ’26, Eden Sidman ’26, Mali Smith ’26, Meredith Bailey ’26 | *Julie Peterson, Ph.D.*

PSY 285 Psychology Research Methods

In this study we are investigating the effect that the age of the animal in an advertisement (young vs. old) has on a participant's willingness to donate to the ASPCA (American Society For The Prevention of Cruelty to Animals) and if animal type (dog vs. cat) moderates this effect.

17. The Effects of Adoption Method and Breed on Future Dog Selection Preferences.

Eliza Brooks ’26, Timothy Cantwell ’26, Sarah Goble ’26, Grace Hutjens ’26 | *Jennifer Stiegler-Balfour, Ph.D.*

PSY 285 Psychology Research Methods

This study aims to test dog adoption preferences based on a description and picture. Participants viewed a picture of either a Labrador Retriever or German Shepherd and were told that the dogs were either from a shelter or breeder. Subsequently, they were asked to indicate the level of likelihood that they would adopt the dog along with various other measures (e.g., previous adoption history, likeability of the dog, predictions on behavior of described dog).

18. The Effects of Mood on Moral Decision-making

Ethan Sexton ’26, Callyn Eon ’26, Andrew Lemieux ’26, Marquez Higgins ’26 | *Jennifer Stiegler-Balfour, Ph.D.*

PSY 285 Psychology Research Methods

The goal of the study was to determine the effect of mood and perspective on decision making. Participants experienced either a positive or negative mood induction and then answered questions about a moral dilemma, which was posed in either the first- or third- person. We expect that participants in the negative and first-person conditions will act more selfishly compared to the other conditions.

19. Cognitive Capacity in Close Relationships: Do Beliefs About Willpower Influence Relationship Functioning?

Ethan Sexton ’26, Danielle McCarthy’26 | *Julie Peterson, Ph.D.*

The goal of this research study is to examine how beliefs about the self, relationship partners, and willpower influence relationships functioning in friendships and romantic relationships.

20. Self-Esteem and Attachment Style as Predictors of Authenticity on Instagram and TikTok

Lily Lewark ’27, Bridget Lynch ’25 | *Julie Peterson, Ph.D.*

This poster presentation focuses on how beliefs about the self (e.g., self-esteem) and relationship schemas (e.g., attachment style) predict authenticity on social media platforms like Instagram and TikTok.

21. Student Perceptions and Preferences of Remote Learning During and After COVID-19

Lauryn Alley ’24, Sarah Gray ’25 | *Jennifer Stiegler-Balfour, Ph.D.*

COVID-19 related stress due to emergency remote learning influenced students’ perceptions of online learning environments. 407 undergraduates watched a pre-recorded lecture, completed a recognition task, and answered questions regarding fatigue levels over the course of the last week, ability to focus, task effort motivation, and COVID-19 concern. Results showed a significant positive correlation between COVID-19 concern and fatigue and revealed a significant indirect effect of COVID-19 concern on ability to focus via reported fatigue levels.

22. Metacomprehension Judgments and the Predictive Value of Reading Assessments for Comprehension Performance

Gracie Ouellette ’24, Jadyn Stevens ’27, Ella Murthi ’27 | *Jennifer Stiegler-Balfour, Ph.D.*

Reading comprehension has been shown to be a significant predictor of academic performance. The current study examined how three reading comprehension tests predicted comprehension for narrative versus expository text types. Differences in the accuracy of students’ metacomprehension for both text types were also examined. 462 participants across two experiments took part in the study. Results revealed differences in the predictive value between the reading comprehension tests along with students’ metacomprehension for narrative versus expository texts.

23. Caffeine's Effect on Spatial Memory Retention in Mice

Finley Morrison '27, Jasmin Townsend-Ng '26 |
Tamara King, Ph.D., Denise Giuvelis, Jared Zuke, Abbi Felix

Caffeine is a stimulant that many humans consume daily to heighten focus and learning. Using a mouse model, we will observe the effects of caffeine on spatial memory retention in the novel object recognition assay. This study will investigate time mice spend observing a novel vs familiar object after caffeine administration. We hypothesize that, upon caffeine administration, the spatial memory retention of mice will increase.

National Institute of General Medical Sciences (NIGMS)

24. The Effect of an Unfamiliar Environment on Anxiety Behaviors in Male and Female Mice

Katherine Kimball '26 | *Tamara King, Ph.D., Denise Giuvelis, Jared Zuke, Abbi Felix*

This study will score anxiety behaviors using an ethogram and marble burying test while the mouse is in an unfamiliar environment for five minutes. We will then look at the effect the unfamiliar environment has using an open-field test to measure distance traveled and where the mouse is spending its time. We hypothesize that male mice will show more anxiety behaviors compared to females following time spent in an unfamiliar environment.

National Institute of General Medical Sciences (NIGMS)

25. The Roundabout Impact of Enrichment on Mouse Behavior

Evan Faulkner ’26, Cody Keilbach ’27 | *Tamara King, Ph.D., Denise Giuvelis, Jared Zuke, Abbi Felix*

Enrichment for research animals is minimal although it may improve quality of life. We examined the effect of adding enrichment into mouse home cages. Reactions to the enrichment were scored over time using an ethogram. The study utilized several quantifiable measures including grip strength, Rotarod, and open field. We predicted that enrichment increased motor coordination and decreased anxiety in mice. Enrichment, or lack of, can be a significant confound in animal studies.

National Institute of General Medical Sciences (NIGMS)

26. *In Vivo* Quantitative Analysis of Fluorescent Protein Expression as a Biomarker of Thermal Stress Response in the Staghorn Coral *(Acropora cervicornis)*

Caitlin Cournoyer ’24, Mia Meister ’24, Rachel Becker ’24, Ethan Burke ’25, Annika Doeppers ’25, Elizabeth Tracy ’26, Mason Gorrondona ’27 | *Jeri Fox, Ph.D.*

This project investigates the expression levels of fluorescent proteins (FPs) in the threatened staghorn coral *(Acropora cervicornis)* as potential biomarkers for thermal stress response. Coral fluorescence is known to be influenced by environmental stressors, including elevated temperatures. These biomarkers of change are analyzed through confocal microscopy and imaging. By quantifying FP expression *in vivo* under short-term and long-term heat stress conditions, this research aims to establish a link between FP levels and thermal tolerance thresholds.

27. Exploring Green Heterogeneous Catalysis for Making Medicinally Relevant Amides

Caitlin Cournoyer ’24, Jayden Hamann ’26,
Shannon McLaughlin ’26 | *Amy Deveau, Ph.D*

CHE 251 University Organic Chemistry II

A comparison of synthetic approaches for the synthesis of medicinally relevant amides using heterogeneous catalysis will be presented.

28. Green Acetylation of Eugenol for Sultone Synthesis

Matthew Miller ’24, Hannah Muskavitch ’26,
Kai Watkins ’24 | *Amy Deveau, Ph.D.*

CHE 251 University Organic Chemistry II

This project focuses on the green acetylation of eugenol using a recyclable, non-toxic catalyst to synthesize acetyl eugenol and subsequent sultone derivatives. Sultone derivatives have many industrial applications, such as in the production of polymers and detergents.

29. Synthesis and Use of Coumarin Derivatives via Green Pechmann Condensation

Addie Miller ’25, Abigail Becker ’26, Brianna Regan ’24,
Babia Prakash ’26 | *Amy Deveau, Ph.D.*

CHE 251 University Organic Chemistry II

The synthesis and use of fluorescent coumarin derivatives will be discussed.

30. Nineteen Years of Psychopharmacology Research at the Stevenson Lab

Lily Bennett ’28, April Falstad ’25, Justice Picard ’24, Hannah LaCourse B.S. ’23, Francesca Asmus B.S. ’22, Ravin Davis B.S. ’21 | *Glenn Stevenson, Ph.D.*

This is the final poster from the Stevenson psychopharmacology laboratory. Our research trajectories have been (1) methods development for the pain field, (2) drug discovery efforts for pain and addiction, and (3) receptor interactions. Here we show some of our data from each of the three research areas. Over the years our collaborators have been University of Arizona College of Medicine, Harvard, UPenn, NIH and UNE COM. Laboratory staff has been exclusively UNE undergraduate students.

Kahn Family Foundation; National Institute of Health (NIH)

31. The Potential to Incorporate Aquaculture Sites into Marine Protected Areas

Kasey Zuchlewski ’24 | *Carrie Byron, Ph.D.*

MAR 445 Social Ecological Aquaculture

Placing marine protected areas (MPAs) and aquaculture zones in shared spaces is vital for efficient resource management, simplifying zone identification and promoting an Ecosystem Approach to Aquaculture (EAA). Placing aquaculture sites within MPAs minimizes disruption to stakeholders and utilizes existing healthy ecosystems, addressing concerns about site selection and environmental impact in aquaculture projects. This integration benefits both aquatic biodiversity and sustainable food production.

32. Relationship Between Substrate Complexity and Biodiversity in the Rocky Intertidal Ecosystem

Katelyn DeWater ’25, Kasey Zuchlewski ’24, Frank Mangiacapra ’24, Julia Gentili ’24, Jacob Lincourt ’24 | *Carrie Byron, Ph.D., Will Kochtitzky, Ph.D.*

MAR 350 Marine Ecology and GIS 364 Spatial Analysis

The rocky intertidal is a biodiverse ecosystem that can support a variety and abundance of marine organisms. One factor that can influence biodiversity is habitat complexity and substrate rugosity. This study attempts to quantify habitat complexity based on substrate type using data from drone surveys. We aim to understand how biodiversity in the rocky intertidal is related to substrate complexity by examining the relationship between habitat complexity and quadrat biodiversity surveys at Biddeford Pool, ME.

33. Widespread Expansion of Salt Marsh Pools Observed in Maine Marshes Since 2009

Katelyn DeWater ’25, Matthew Pittsley ’24, Ruth Ellis ’26, Paige-Marie Merrill ’24 | *Will Kochtitzky, Ph.D.*

Salt marshes are important ecosystems because they provide habitat for endangered species, sequester carbon, and buffer the coastline from intense storms. This study compares the expanses of salt marsh pools between 2009 and 2021 on twelve salt marshes in Maine. On all marshes, an expansion of water cover was observed across the twelve-year timeframe. The results of this study support the need for intervention and restoration to help marshes be more resilient to climate change.

34. Exploring Sustainable Aquaculture Systems with Shrimp Using Biofloc Technology

Maddy Steen ’25, Mia Meister ’24, Ethan Burke ’25, Alex Chopivshy ’24, Emma Catling ’25, Tyler Druck ’24, Noah Malhas ’25, Katie DeWater ’25, Brittany Bull ’24 | *Jeri Fox, Ph.D.*

As the world of aquaponics continues to grow, innovations have been made to create a more sustainable food system. Biofloc recycles waste nutrients and filters the waste into non-toxic edible compounds while also improving water quality and reducing effluent. To achieve a self-sustaining, scaleable, and multi-trophic food production system, we focused on providing a local high-protein product alongside a nutrient-rich plant-based alternative. Potentially, Biofloc systems could create locally accessible seafood options for diverse inland communities.

35. Investigating a Stress Response in Corals Located on the Mesoamerican Barrier Reef System (Belize) Through Fluorescence Imaging and Photogrammetry

Mason Gorrondona ’27, Katelyn DeWater ’25, Clayton Nyiri ’25, Rachel Becker ’24, Megan Pike ’24, Kendall Tremblay ’24, Ethan Burke ’25, Ben Wheeler ’24, Mia Meister ’24, Elizabeth Tracy ’26 | *Jeri Fox, Ph.D.*

As climate change intensifies, corals are increasingly susceptible to bleaching, disease, and mortality. Recent literature suggests corals exhibiting greater fluorescence coverage are more resilient to thermal stressors. Fluorescence protein emittance and coral cover was identified on select reefs along the Mesoamerican Barrier Reef System (Belize) utilizing underwater imagery, photogrammetry, and geographic information systems (GIS). We aim to document changes of fluorescence protein emittance and coral cover over time on designated reefs.

36. Exploring Estuarine Dynamics: The Fate of River Plume Based on Salinity Patterns

Josephine Pikowski ’26 | *Charles Tilburg, Ph.D.*

The dynamics between freshwater and seawater in an estuarine environment is crucial to understanding the presence of marine organisms. Freshwater plumes impact circulation patterns which controls the flow of sediments, nutrients and pollutants. Salinity has been measured for 2 years off the dock on Ram Island. This research investigates oceanographic components such as Saco River freshwater discharge, sea level, and wind movement influence on the fate of river plume based on salinity around Ram Island.

37. Chemogenetic Silencing of Neurons in the Amygdala Ameliorates Stress-induced Tactile Hypersensitivity Following NICU-like Medical Trauma

Emma Naess B.S. ’23, M.S. ’24 | *Michael Burman, Ph.D.*

We use a rodent model to test the hypothesis that neurons in the Amygdala mediate the development of tactile hypersensitivity following neonatal medical trauma. Following painful neonatal manipulations, chemogenetic silencing of neurons in the Amygdala during a juvenile stressor occurred using an inhibitory DREADD approach. The silencing of the Amygdala successfully disrupted the development of tactile hypersensitivity, indicating that amygdala activation is essential for the lasting changes to pain sensitivity following neonatal trauma.

National Institute of General Medical Sciences (NIGMS); National Institute of Mental Health (NIMH)

38. Epigenetic Changes in DNA Methylation Are Involved in the Lasting Changes in Pain Sensitivity Following Neonatal Intensive Care Unit (NICU)-like Treatment in Rats

Aidan Fox ’24, Brayden Wesler ’26 | *Michael Burman, Ph.D.*

Neonates that spend time in the neonatal intensive care unit (NICU) have an increased susceptibility to later-life pain, but the mechanisms remain unknown. The Burman Collaborative has created a rodent model of NICU exposure that produces tactile hypersensitivity later in life. This project aims to examine whether epigenetic changes caused by neonatal trauma are responsible for those effects. We hypothesize that an injection of 5-AzaC, a DNA methyltransferase inhibitor, will reverse the observed hypersensitivity.

39. Early Life Pain and its Impacts on Cell Population Phenotype in the Central Amygdala

Brooklynn Merrill ’24, Megan Tomasch ’25 |
Michael Burman, Ph.D.

Infants who spend time in the neonatal intensive care unit (NICU) demonstrate increased susceptibility to chronic pain and anxiety disorders. We use a rodent NICU model which has identified the central nucleus of the amygdala (CeA) as a critical locus of these changes. We use RNAscope® to identify differences in cell biomarker expression which has demonstrated pain-induced changes in developmental trajectory of CeA cell phenotype, which may account for altered behaviors later in life.

Kahn Family Foundation; National Institute of General Medical Sciences (NIGMS) Centers of Biomedical Research Excellence (COBRE)

40. Small Mammal Fecal Pellets Provide Non-Invasive Species Detections at Caswell Training Area, Maine

Heather Marvin ’26, Aliyah Walker-Pasko ’24 | *Zachary Olson, Ph.D.*

The Northern bog lemming (*Mictomys borealis;* NBL) is a little-known small mammal that exists at the southern edge of its range in the Northeastern U.S. NBLs can be captured in traps, but very low capture rates hinder efforts to document patterns of presence and absence or further our knowledge of the species in general. Here, we report results of an intensive non-invasive survey of wetlands on the Caswell Training Area in Aroostook County, Maine.

41. Electronic Shark Deterrents Decrease Bycatch of Atlantic spiny dogfish *(Squalus acanthias)* in Recreational Groundfish Fisheries

Clayton Nyiri ’25, Michael Nguyen ’25 | *John Mohan, Ph.D., Sara Mirabilio, M.S., Richard Brill, Ph.D., Peter Bushnell, Ph.D., Walter Golet, Ph.D., Ilan Levine, Ph.D., Brian Davis, Ph.D.*

The accidental capture of nontarget species in fisheries is called bycatch. Bycatch may reduce catch rates of target species or damage gear. We investigate a microprocessor-based bycatch reduction device designed to deter Atlantic spiny dogfish *(Squalus acanthias)* in a Gulf of Maine recreational fishery by targeting the electroreceptor cells of sharks. We observed a 58% reduction in spiny dogfish catch on active treatments (electrical field emission) compared to control treatments, with target species catch unaffected.

National Oceanic and Atmospheric Administration (NOAA) Saltonstall-Kennedy Program

42. Identifying the Local Presence of White Sharks *(Carcharodon carcharias)* through Acoustic Telemetry in Saco Bay

Clayton Nyiri ’25, Michael Nguyen ’25 | *John A. Mohan, Ph.D., Matthew Davis, M.S., Megan V. Winton, M.S., Gregory B. Skomal, Ph.D.*

White sharks *(Carcharodon carcharias)* are native apex predators in the Northwest Atlantic with Cape Cod being a known hotspot of abundance. Locally in Maine, increasing seal populations combined with rising water temperatures may be influencing a geographic range expansion northward in this white shark population. The UNE acoustic telemetry array has elucidated fine scale coastal movements of White sharks in southern Maine detecting five sharks in five unique occurrences in 2022 and 2023.

Maine Outdoor Heritage Fund

43. All Hake Breaks Loose! Exploring Patterns in White Hake Otolith Elements and Isotopes

Benjamin Gowell ’25, Benjamin LaFreniere B.S. ’22, M.S. ’23 | *John Mohan, Ph.D., Rebecca Peters, M.S., Briony Donahue, M.S., Nathan Miller, Ph.D., Alicia Cruz-Uribe, Ph.D.*

MAR 410 Marine Science Research

White hake *(Urophycis tenuis)* are a key ecological demersal gadid species found within inshore and offshore habitats in the Gulf of Maine. Calcified earstones known as otoliths, are used for hearing and balance in fish. Otoliths reflect environmental temperature and physiology throughout life. In this study, both trace elements and stable isotopes demonstrate the efficacy of using otoliths to record changing environmental conditions reflecting the early life of hake.

44. Intertidal Spatial Competition of Sessile Organisms: Invertebrates vs. Macroalgae

Annika Doeppers ’25, Peter Hennessy ’25, Benjamin Gowell ’25 | *Carrie Byron, Ph.D.*

MAR 350 Marine Ecology

The Gulf of Maine (GoM) is home to several ecologically important habitats. The rocky intertidal is one such habitat that experiences different extreme states at high and low tides. Organisms that live in the intertidal zone tend to form complex competition-based communities across an elevation gradient in a process known as zonation. In this study, sessile invertebrate abundance and macroalgae coverage will be investigated across intertidal zones.

45. Makos and Manganese: Using Vertebral Chemistry to Determine Age of a Highly Migratory Shark

Peter Hennessy ’25 | *John Mohan, Ph.D.*

Stock management of shortfin mako sharks *(Isurus oxyrinchus)* is complicated due to challenges in aging individuals. The current method, based on visual identification of mineralized vertebral band pairs, suffers from uncertainty in growth ring periodicity and difficulty in band pair identification. Recent literature suggests a relationship between vertebral manganese and banding. This study utilizes a peak counting algorithm to test the correlation between manganese and band pairs, proposing an alternative aging method.

Save Our Seas Foundation

46. Impact of Different Colored Light on *Ulva lactuca* Thallus Length

Rachel Becker ’24, Rachel Gardner ’25, Ford Wooldridge ’25, Sophia Tearman ’24 | *Carrie Byron, Ph.D*

MAR 350 Marine Ecology

Ulva lactuca is an intertidal species of green seaweed that is growing in importance in the aquaculture field as a promising human food source. Understanding how *Ulva* reacts to different light conditions may help advance current cultivation methods. Thallus length for *Ulva lactuca* was measured after three weeks of growth in four separate colored light treatments: red, yellow, blue, and green.

47. Utilizing AI Machine Learning to Distinguish Coral Health Indicators on the Mesoamerican Barrier Reef System

Megan Pike ’24, Kendall Tremblay ’24, Mason Gorrondona ’27 | *Jeri Fox, Ph.D., Dipanjan Saha, Ph.D., Anurag Daga, M.S., Dhanush Adithya Balamurugan, M.S.*

Incidences of coral disease are becoming increasingly prevalent in the Caribbean Sea as a result of anthropogenic stressors. This project aims to utilize a unique application of machine learning to survey occurrences of coral disease on the Mesoamerican Barrier Reef System. Through a collaboration with the Institute for Experiential Robotics at Northeastern University, software is being trained to recognize the difference between healthy corals and corals exhibiting disease, utilizing imagery captured in Belize.

48. Investigating the Relationship Between Temperature and Invertebrate Biodiversity in Biddeford Pool from 2017 to 2024

Hannah Jacobs ’24, Tyler Druck ’24, Meghan Redpath ’24, Kendall Tremblay ’24, K Bellofiore ’24 | *Carrie Byron, Ph.D.*

MAR 350 Marine Ecology

In the Gulf of Maine, temperatures are continuing to rise, disrupting local ecosystems. To investigate this trend, we analyzed relationships between temperature (air and water) and invertebrate biodiversity in Biddeford Pool, from 2017-2024.

49. Concept Design for the University of New England’s Living Shoreline on the Common’s Cove

Lucas Cunningham ’25, Robyn Rollo ’25, K Bellofiore ’24, Juliann Lapierre ’24 | *Pam Morgan, Ph.D.*

ENV 262 Gulf of Maine Field Studies II

The Gulf of Maine Field Studies course concentrates on the deterioration of nearby salt marshes, focusing on the one by Ripich Commons. Our living shoreline design prioritizes salt marsh health, emphasizing biological elements over hard structures to preserve its integrity. By fostering biodiversity and aiding in marsh recovery, our concept aims to mitigate local impacts of climate change. Through teaching and implementation, we aim to raise awareness and promote environmental stewardship.

50. Applying Island Biogeography Theory to the Islands of Southern Maine

Katy Pedersen ’24 | *Jeffrey Parmelee, Ph.D.*

MAR 452 Natural History and Evolution of the Galápagos Fauna

In 1967, ecologists Robert MacArthur and Edward Wilson developed the theory of Island Biogeography that explains the dynamic changes of species’ populations. This theory can be applied to islands all over the world ranging from the Galápagos to right here in Maine. Using iNaturalist technology, this independent study aims to develop a field research experience for students to obtain data on the species that inhabit the islands of southern Maine.

51. Environmental DNA Methodology: Developing Species-specific Primers to Address Crustacean Presence in Casco Bay.

Anela McMichael ’24 | *Carrie Byron, Ph.D.*, *Markus Frederich, Ph.D.*

Environmental DNA (eDNA) has the promise to be an influential biomonitoring tool, addressing ecological health, biodiversity, and population densities. eDNA refers to the genetic material present in environmental samples. The genetic material is extracted and then quantified through quantitative polymerase chain reactions (qPCR). This process requires species-specific primers to identify targeted species. This project works to identify useful primers for native and invasive crustacean species, to contribute to the biomonitoring of crustaceans in Casco Bay.

The Nature Conservancy (TNC) and the Builder’s Initiative

52. Investigating Interspecific Niche Partitioning Among Two Species of *Littorina* Snails

Anela McMichael ’24, Anna Evans ’25, Molly Bourgeous ’25, Matt Pechkis ’25, Jacob Ford ’25 | *Carrie Byron, Ph.D.*

MAR 350 Marine Ecology

Scientific literature supports that common periwinkles *(Littorina littorea)* outcompete other gastropods, limiting their fundamental niches. The smooth periwinkle *(Littorina obtusata)* and *L. littorea* are both rocky intertidal gastropods of the Gulf of Maine. The competition and niche overlap among *L. littorea* and *L. obtusata* is understudied in literature. Due to the competitive nature of *L. littorea*, it is proposed that the *L. obtusata* experiences limitation to its fundamental niche by the presence of *L. littorea*.

53. Opening the Closure Zones: Saco Bay Aquaculture and Protecting the Working Waterfront

Maryn LaPlante ’25, Michael Scannell ’25, Hannah Jacobs ’24 | *Carrie Bryon, Ph.D.*

MAR 445 Social Ecological Aquaculture

Saco Bay should be reclassified as a Conditionally Approved or Conditionally Restricted Zone to allow for low trophic-level aquaculture that will ultimately benefit surrounding areas both economically and serve as an effective measure to mitigate coastal erosion and promote environmental sustainability.

54. Impact of Abiotic Environmental Conditions on the Reproductive Life Cycle of *Ulva lactuca*

Sophia Tearman ’24, Daniel Gallagher ’26,
Cole LaChapelle ’27 | *Carrie Bryon, Ph.D.*

Ulva lactuca is a common species of green seaweed found in the intertidal worldwide that has a growing appeal in the aquaculture sector as a human food source. To improve cultivation methods for *Ulva*, more information is needed on its reproductive biology and how it relates to environmental factors such as light, temperature, tides, and the lunar cycle. Multiple experiments were conducted to demonstrate important factors impacting the reproductive biology of *Ulva*.

Aquaculture Research Institute, CAS Summer Undergraduate Research Experience (SURE), Atlantic Sea Farms

55. Design and Implementation of Wave Energy Measurement Devices in the Intertidal Zone

Abigail Healy ’26, Sophia Tearman ’24 | *Carrie Byron, Ph.D., Chris Gregoricus*

The intertidal zone is a dynamic environment with variable wave energy. When conducting research in the intertidal zone, it is important to characterize this wave energy. We have designed two different devices to measure wave energy that are cost effective and easy to build. One device measures wave force using a tension spring and the other devise measures erosion from a calcium block. These devices were deployed in two locations in Biddeford to demonstrate effectiveness.

56. The Challenges of Designing a Genus-Specific Environmental DNA Primer for the Echinoderm *Asterias*

Harrison Stern B.S. '24, M.S. '25 | *Markus Frederich, Ph.D., Emily Rose Lancaster, M.S.*

Environmental DNA (eDNA) uses shed DNA in the environment to detect species. A newer application has been using eDNA to detect range shifts in species. The Gulf of Maine is warming faster than almost everywhere on Earth and is affecting many species, including the genus *Asterias*. But echinoderms being so closely related, make it hard to find primers to use to detect the DNA. Therefore, we are looking to develop and validate Genus-specific primers for *Asterias*.

Maine EPSCoR

57. Relationship Between Stress and Environmental DNA Release in Asian Shore Crabs

Tyler Ferrin M.S. '24 | *Markus Frederich, Ph.D.*

This presentation is an analysis of how environmental stressors like temperature, salinity, and pH affect the release of DNA in Asian shore crabs and its detectability in the environment. Stressors represent predicted effects of climate change, to show viability of a vital technology for a destabilizing invasive species in the Gulf of Maine over the next several decades. In addition, the effect of changing water chemistry on free DNA stability is also explored.

58. Thermal Tolerance of *Cancer borealis* (Jonah Crabs)

Anna Sinclair ’24 | *Markus Frederich, Ph.D.*

Climate change is expected to be a problem for many marine organisms. The Jonah crab *(Cancer borealis)* will be studied to estimate the impact that potential temperature changes will have on the North American East Coast ecosystem. The thermal tolerance and thresholds of these crabs is not well known, so this study will evaluate the various frameworks for determining these tolerances and thresholds.

National Science Foundation (NSF); CAS Summer Undergraduate Research Experience (SURE) Program; crabs provided by Jillian Robillard from Southern Maine Crabs LLC

59. Exploring Movement Patterns of Four Shark Species with Satellite Tags in the Gulf of Mexico

Grace Trost ’27 | *John Mohan, Ph.D., Addie Binstock, M.S.*

MAR 210 Marine Science Research

Shark migration is known to vary among species and sex. This study explored the distances traveled by four shark species (Blacktip, Bull, Tiger, and Great Hammerhead Sharks) equipped with satellite tags in the Gulf of Mexico between 2016-2021. The latitude and longitude of tag deployment and release locations were mapped in QGIS. The distances traveled were measured and compared among species and between sexes, highlighting the diversity of shark movement patterns.

60. Innovations for Bycatch-Free Baited-Hook Fisheries: Demonstrating Efficacy of Electronic Shark Deterrents

Michael Nguyen M.S. ’24 | *John Mohan, Ph.D.*

Shark populations are in steep decline worldwide due to unintended interactions with fishing gear, especially those utilizing baited hooks. After extensive laboratory trials testing Spiny dogfish *(Squalus acanthias)* final bite response in proximity to electronic devices, the efficacy of three electronic devices were field tested as shark deterrents in multiple baited-hook fisheries interacting with 778 sharks. Findings suggest that this technology offers a viable solution to the conservation challenge of shark bycatch in these fisheries.

National Oceanic and Atmospheric Administration (NOAA) Saltonstall-Kennedy Program

61. Studying RNase T2 Enzyme Through Growth Rate in *S. cerevisiae* Yeast

Adria Horton ’25, Ariel Martin ’26, Dez Schrankel ’24 | *Jennifer Garcia, Ph.D.*

RNase T2 is an enzyme found in both humans and yeast, the absence of which results in a rare neurological disorder. The growth rate of *S. cerevisiae* with RNase T2 deletion was studied to identify inhibition of cell growth through phosphate metabolism. Data collected displayed evidence of RNY1 rescue strains with similar growth rate to wild type, and catalytically inactive strains of RNY1 act similarly to RNY1 deletions, significantly linking RNase T2 activity and phosphate metabolism.

Maine IDeA Network of Biomedical Research Excellence (INBRE)

62. Antimicrobial Compounds from the Thallus and Reproductive Parts of the Seaweed *Fucus vesiculosus*

Mackenzie Beauvais ’26, Kyla Bentz ’26 | *Ursula Roese, Ph.D.*

BIO 210 Introduction to Bio Research

We collected brown algae of the species *Fucus vesiculosus* in Biddeford Pool on the coast of Maine. We are comparing extracts from the thallus of *Fucus vesiculosus* to extracts from reproductive organs. In disk diffusion assays, we are currently determining their antimicrobial potential against several human pathogens of *Staphylococcus* spp.

63. Effects of Temperature and Light on the Synthesis of Antimicrobial Compounds in *Fucus vesiculosus*

Joshua Gantert ’26 | *Ursula Roese, Ph.D.*

BIO 210 Introduction to Bio Research

Previous studies in our lab demonstrated antimicrobial properties from extracts of *Fucus vesiculosus*. This study aims to determine if elevated temperature and supplemental light will affect the amount of antimicrobial compounds in *F. vesiculosus*. Algae were harvested and transferred into a growth chamber for three days. Controls were shock frozen immediately in liquid nitrogen. Compounds were extracted with methanol and disk diffusion essay are used to tested against *Staphylococcus* spp. to determine antimicrobial activity.

64. Effect of the LL37 Family of Antimicrobial Peptides on Antibiotic-Mediated Killing of Staphylococcal Biofilms

Alya Theriault ’24, Anjanadevi Govindaraj ’24,
Katie Samperi ’26, Caycie Carozzo ’25, Juliana Miguel ’27 |
Kristin Burkholder, Ph.D.

Staphylococcus aureus is a common hospital- and community-acquired infection. Biofilms are crucial to its virulence and drug-resistance. We tested the effect of the antimicrobial peptide LL37 and its derivatives GF17, GF17d3, LL23v9, and 17BIPHE2 on the susceptibility of biofilm-resident *S. aureus* USA300 to the antibiotic linezolid. Using biofilm-killing assays, we observed greater bacterial killing when established biofilms treated with the combination of linezolid and a sublethal concentration of AMP compared to treatment with linezolid alone.

65. The Effect of Antimicrobial Peptides on Antibiotic-Mediated Killing of Staphylococcal Biofilms

Anjanadevi Govindaraj ’24, Alya Theriault ’24,
Katie Samperi ’26, Caycie Carozzo ’25, Juliana Miguel ’27 |
Kristin Burkholder, Ph.D.

Staphylococcus aureus is a common drug-resistant hospital and community-acquired infection. Biofilms are crucial to *S. aureus* virulence and novel therapeutics are needed. Here, we tested synthetic antimicrobial peptides IDR-1018, WR-12, D-IK8, and RI-10 on the susceptibility of biofilm-resident *S. aureus* USA300 to the antibiotic linezolid. Using biofilm-killing assays, we observed greater bacterial killing when established biofilms were treated with the combination of linezolid and a sublethal concentration of AMP compared to treatment with linezolid alone.

CAS Summer Undergraduate Research Experience (SURE) Program

66. Can Staphylococci Become Resistant to the Antibiotic Adjuvant Pyrogallol?

Dongjae (Jason) Kang ’25, Koby LaRose ’25, Nikhil Tirupathigari ’25, Yesul (Ashley) Kang ’23 |
Kristin Burkholder, Ph.D.

Staphylococcus epidermidis and *Staphylococcus aureus* are common bacterial pathogens that can cause invasive and potentially drug-resistant infections. The Burkholder lab previously found that the phenolic compound, pyrogallol, acts as an antibiotic adjuvant by increasing staphylococcal susceptibility to certain antibiotics. In this project, the ability of staphylococci to develop resistance to the effects of pyrogallol were assessed. This work will help elucidate the potential value of pyrogallol as an anti-staphylococcal antimicrobial adjuvant.

67. Microplastic Contamination and Tissue Distribution in Atlantic Sea Scallops

Amber-Rae Pesek ’26, Elizabeth Chmielewski ’26 |
Kristin Burkholder, Ph.D.

Ocean microplastics may pose a risk to seafood safety. Microplastics are ingested by marine organisms such as sea scallops, but it is unclear whether microplastics remain in the scallop digestive tract, which is not often consumed by humans, or translocate to edible tissues such as the adductor muscle. Here, we extracted and quantified microplastics from the gut and adductor muscle of Atlantic sea scallops to compare microplastic levels in edible versus non-edible scallop tissue.

68. Impact of Prophylactic Ceftriaxone on Antimicrobial Resistance in Out-of-Hospital Cardiac Arrest Patients

Cailyn Wheeler ’25, Sarah Ibraham ’24, Julia Gold ’27, Vrushabh Daga ’25, Prakash Patel ’25 | *Kristin Burkholder, Ph.D.*

With the uprising of awareness of antibiotic resistance, we have partnered with the MaineHealth Institute of Research to assess the impact of prophylactic ceftriaxone on antimicrobial resistance in out-of-hospital cardiac arrest patients (OCHA). Ceftriaxone is the go-to antibiotic for OCHA patients to prevent early-onset pneumonia. This project assesses whether ceftriaxone affects a patient’s antibiotic resistance and health outcomes.

MaineHealth Institute of Research

69. Are Microplastics Vectors for Bacterial Colonization of Fish?

Anastasia Metzger ’24, Lauren Adams ’25, Lyle Massoia M.S. ’24, Amber-Rae Pesek ’26 | *Kristin Burkholder, Ph.D.*

BIO 410 Biological Sciences Research

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

UNE Faculty Mini-Grant Award from the Office of Research and Scholarship

70. Variances in Ciliate Load Within the Gills of Intertidal and Epipelagic *Mytilus edulis*

Ryan Wright ’24, Anastasia Metzger ’24 | *Carrie Byron, Ph.D., Connor Jones, M.S.*

MAR 350 Marine Ecology

Mytilus edulis is an economically important aquaculture product and ecologically vital aquatic denizen of Maine. To protect these organisms and Maine’s aquaculture farmers, it is necessary to understand where in the water column *M. edulis* is least stressed. In this experiment we examined the frequency and intensity of infective gill ciliates in epipelagic and intertidal mussels as a measure of stress to determine where in the water these organisms should be cultured.

71. Enhancing the Genetic Analysis of Rare Exoskeleton Coloration in *Homarus americanus*

Ruby Motulsky ’25, Claire Fecteau-Volk ’26 |
Markus Frederich, Ph.D.

This project aims to investigate the genetic underpinnings of different *Homarus americanus* coloration with UNE’s unique collection of rare lobsters: blue, yellow, orange, split, and calico. The literature provides insufficient information on the reasons behind these colors. Our goal is to utilize UNE’s rare lobster group in order to thoroughly understand rare shell coloration. With a new generation soon to hatch from our orange lobster, we hope to enhance our understanding of our group.

72. Restoring the UNE Salt Marsh Through Living Shorelines

Emily Kalinoski ’24, Ruby Motulsky ’25, Emma Lake ’26 | *Pam Morgan, Ph.D.*

ENV 262 Gulf of Maine Field Studies II

Salt marshes are crucial ecosystems to coastal communities. Climate change has resulted in severe marsh erosion in front of the Commons lawn. Living shorelines protect, stabilize, and enhance eroding coastlines. Our group has created a design that enhances the current state of the marsh and strengthens it to withstand sea-level rise. We plan on using several techniques ranging from hardened structures to new native vegetation that will be implemented in the near future.

73. From Burr to Seedling: Early Stages of Speed Breeding Transgenic American Chestnut

Emma Lake ’26, Jacob Osmer ’27 | *Thomas Klak, Ph.D.*

ENV 410 Research American Chestnut

We have used transgenic speed breeding to grow harvested chestnuts into young seedlings in a fraction of the time it takes outdoors. Nuts were stratified at room temperature to decrease the time from harvest date to when roots sprouted. Sprouted nuts were then sowed and monitored as they developed into viable seedlings. We have tracked survival and death rates and examined the potential of different transgenic lines (D54 and DarWin) for reintroduction outdoors.

Quimby Family Foundation, PW Sprague Memorial Foundation, and other private donors

74. Implementing a Living Shoreline at UNE

Alexa Livingston ’24, Cavin McNamara ’25, Rachel Lee ’26 | *Pam Morgan, Ph.D.*

ENV 262 Gulf of Maine Field Studies II

We created a sustainable design for a living shoreline on the UNE marsh, which is currently being threatened by degradation caused by early agricultural practices and erosion from sea level rise and increased storm intensity. Aspects of our design will be considered in the project’s construction in spring 2025 that is being funded through a private grant.

75. Transgenic American Chestnut Speed Breeding Through Lab Pollination

Madelyn Houston ’26, Rachel Lee ’26 | *Thomas Klak, Ph.D.*

ENV 410 Research American Chestnut

Through advanced speed breeding methods, we’ve grown transgenic pollen- and flower-bearing chestnut trees indoors — we are the only lab to have done that. We work with two transgenic lines (Darling54 and Darwin) and four breeding groups therein. We’ve strived to produce homozygosity, i.e. plants with two copies of the transgene which protects against the fungal blight *Cryphonectria parasitica*. We have thus far produced one homozygous tree, with more likely to come by semester’s end.

Quimby Family Foundation, PW Sprague Memorial Foundation, and other private donors

76. The Effects of Arrow mRNA Knockdown on the Dendritic Arbor of Primary Nociceptors of *Drosophila melanogaster*

Dawson Turcotte ’24, Trevor Flanagan M.S. ’25 | *Geoffrey Ganter, Ph.D.*

The Wnt/Wg pathway has been implicated in the regulation of abnormal pain. The effects of manipulation of Wnt/Wg component Arrow (mammal homolog: LRP6) expression in the primary nociceptor were investigated using morphometric analysis of the dendritic arbor of *Drosophila melanogaster*. Confocal imaging of nociceptor-specific GFP expression was used to quantify dendritic length and branching. These approaches test the hypothesis that Arrow plays a role in regulation of pain sensitivity, potentially through dendritic regression.

NIGMS Centers of Biomedical Research Excellence (COBRE); National Institute of Health (NIH)

77. Does NompB influence nociceptive sensitivity in *Drosophila*?

Connor Nowak ’24 | *Geoffrey Ganter, Ph.D., Julie Moulton, M.S., Kerry Tucker, Ph.D, Lindsey Fitzsimons, Ph.D*

The primary cilium may be related to pain sensitivity. NompB is a gene that is involved in the construction of the primary cilium found in the nociceptor in *Drosophila melanogaster*. To confirm, we used confocal microscopy to localize GFP-tagged NompB to the nociceptor. We utilized Von Frey stimulation to quantify mechanical sensitivity. A GAL-4/UAS model was used to localize NompB under-expression to the nociceptor. We hypothesize that under-expressing NompB will cause hyposensitivity.

NIGMS Centers of Biomedical Research Excellence (COBRE); National Institute of Health (NIH)

78. The Influence of Autophagic RNA Decay on Mitochondrial Gene Expression in *Saccharomyces cerevisiae*

Amelia Burbidge '27 | *Jennifer Garcia, Ph.D.*

In the progression of neurodegenerative disorders, such as amyotrophic lateral sclerosis (ALS), mitochondrial dysfunction is one of three known pathways to disease progression. In order to observe the impact of mRNA regulation and mitochondrial dysfunction, we used yeast cells to test the impact of autophagic RNA decay on mitochondria function. Using RTqPCR in different autophagic RNA decay mutant deletions, the change in mitochondrial RNA concentrations was measured over time.

Boettcher Foundation

79. Autophagic RNA Decay in *Saccharomyces cerevisiae*

Tehreem Pasha '25 | *Jennifer Garcia, Ph.D*

ALS is a significant neurological disorder that is thought to involve RNA protein granule toxicity and autophagy dysfunction. Under conditions of stress autophagy can degrade proteins, damaged organelles, and RNA. This study looks at the understudied autophagic RNA decay mechanism in baker's yeast to help guide research in better understanding ALS. Using live cell imaging of potential autophagic RNA decay target, RNA fragments, we test if this RNA can be targeted for autophagic degradation.

Boettcher Foundation

80. Can the Insertion of RNase T2 Into *S. Cerevisiae* Rescue rny1 Deficiency?

Connor Pepin '27 | *Jennifer Garcia, Ph.D.*

Using *S. cerevisiae*, we aimed to insert a potential human growth suppressor gene, RNase T2, into *S. cerevisiae*. We used a yeast transformation protocol to add the RNase T2 gene into *S. cerevisiae*. We did this to see if it is possible to rescue an Rny1 deficiency. We speculate that RNase T2 enzymes, like Rny1, contribute to phosphate metabolism and maybe be conserved in human RNase T2 enzymes.

Maine IDeA Network of Biomedical Research Excellence (INBRE)

81. System Size Dependence of Poly(Vinyl Acetate) Behavior in Supercritical Carbon Dioxide Via Molecular Simulation

Peter Swanson '24 | *John Stubbs, Ph.D.*

The structural and dynamical properties of varyingly branched poly(vinyl acetate) in supercritical carbon dioxide are investigated using classical molecular dynamics simulations over a 1 microsecond timescale. A range of pressures, temperatures, and number of molecules are examined in order to elucidate the properties and behaviors that could influence the solubility of small molecule additives, which are a key part of possible future applications of these systems.

82. Efficiency of Phytoremediation of Lead using *Brassica oleracea var. italica*

Melody Swartz ’24 | *Jerome Mullin, Ph.D.*

CHE 410 Research I

Phytoremediation uses hyperaccumulating plants or microorganisms to uptake toxins in the environment. *Brassica oleracea var. italica* will be grown in soil containing serial doses of a lead compound. The plants were germinated under a growing light in uncontaminated soil and moved to contaminated soil in a greenhouse after successful germination. After allowing the plants to grow in contaminated soil for one month, samples of the plants will be collected and analyzed using anodic stripping voltammetry.

83. An Investigation into I-90, I-40 and KI-8 Elastin-like Protein Migration and Aggregation

Hannah D’Amaddio ’24 | *James Vesenka, Ph.D.*

Atomic Force Microscopy was employed to image the migration and aggregation of I-90, I-40 and KI-8 elastin-like proteins. Comparisons of migration and aggregation patterns between elastin-like proteins were observed and analyzed.

84. An Investigation into the Effects of PFOA Exposure on Gene Expression in Zebrafish Larvae

Callum Boudreau ’24 | *Deena Small, Ph.D.*

CHE 310L Fundamentals of Biochemistry Lab

PFOA is an environmental chemical contaminant found in humans and other living things. However, not much is known about its biological effects. This study examined changes in gene expression, morphology, and behavior in zebrafish larvae exposed to PFOA for three days. Understanding PFOA’s molecular impact is vital due to its widespread environmental presence and potential adverse effects on organisms.

85. Spectrophotometric Determination of Ascorbic Acid and Electrochemical Determination of Lead

Shannon Alvino ’24 | *Jerome Mullin, Ph.D.*

The focus of this research effort is to adapt, develop, and optimize effective and reliable analytical methods for possible implementation in undergraduate analytical chemistry labs. These methods include the spectrophotometric determination of ascorbic acid in OTC vitamin C tablets and the electrochemical determination of lead. The details and performance characteristics of the methods, along with their relevant figures of merit, will be described.

86. How can the Northeast Multispecies (Groundfish) Fishery Change in Response to Climate Change Impacts? A Case Study of Winter Flounder *(Pseudopleuronectes americanus)*

Brittney Bull '24 | *Susan Farady, J.D.*

MAF 400 Marine Affairs Capstone

With climate change causing warming waters, many species of fish have continued to migrate north to stay within preferred parameters. Marine species have complex life cycles with perceptible ecologies for each life stage, which can also be greatly affected by temperature. The Northeast Multispecies (Groundfish) Fishery is known for its valuable fish, like winter flounder and Atlantic cod. Using winter flounder as a base species, the fishery's plans and general recommendations will be looked at.

87. Transgenic American Chestnut *(Castanea dentata)* Orchard: Evaluating Trees for Fungal Blight Tolerance *(Cryphonectria parasitica)*

Virginia Grace May '24 | *Thomas Klak, Ph.D.*

In our experimental transgenic orchard in Cape Elizabeth, Maine, the UNE American Chestnut Restoration Project collected baseline data on the impacts of naturally occurring chestnut blight. Height, blight rating, and overall health is used to compare the transgenic Darling54 to their full siblings that did not inherit the transgenic Oxalate Oxidase (OxO) gene. These findings are a baseline for the inoculation trials this summer which are a field test of the transgenic trees' field performance.

Quimby Family Foundation, PW Sprauge Memorial Foundation, & Private Donors

88. Thwaites Glacier Retreat

Jasmyne Bickford ’25 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

The question I will be trying to solve is the Doomsday Glacier retreat since 1972 to present day. I want to see how much sea ice we have lost from 1972 to now and hypothesize how that will impact surrounding areas.

89. Mapping Potential Properties for Scarborough Land Trust Future Acquisition

Jake Tobin ’25 | *Will Kochtitzky, Ph.D., Noah Perlut, Ph.D., Susan Farady, J.D.*

GIS 495 GIS Internship

The objective of this project was to investigate the habitat needs of five distinct species groups, each comprising multiple species with similar habitat requirements, present or potentially found within the Town of Scarborough. By leveraging GIS data and habitat information sources, I identified suitable land parcels for potential acquisition by Scarborough Land Trust. Informed by considerations of connectivity, zoning regulations, and current land usage, these recommendations aimed to optimize conservation efforts and preserve vital habitats.

Scarborough Land Trust

90. Washed Away: 84 Years of Coastal Erosion Trends in Camp Ellis, Maine

Jake Tobin '25 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

This study examines the coastal erosion of Camp Ellis, Maine over the past 85 years, employing aerial photo mosaics, satellite imagery, and drone surveys. Digitizing shorelines from various sources, I quantify land loss and analyze trends. We know that the shoreline has changed drastically as a result of the jetty and this project aims to quantify the change. These findings will contribute to a deeper understanding of coastal dynamics and inform future mitigation efforts.

91. How a 3D Printed Map of the Saco Bay Can Provide Insight into its Physical Properties

Andrew O'Toole '25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Bathymetry has a great deal of influence on an aquatic environment's dynamics and physical properties. Using NOAA elevation and bathymetry data in QGIS, I created a map of the Saco Bay that was then converted into a 3D printed model. This 1/25000th scale model of the Bay can provide an enhanced level of understanding into the functionality of its features and their surroundings beyond what could be inferred from a traditional 2D map or image.

92. Flood Damage on Goose Rocks and Fortunes Rocks Beaches

Morgan Henderson ’25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Flooding in coastal areas in becoming an increasingly relevant issue with sea level rise and an increase in storm surges. It is important to assess the damage that has been done to the coastal areas and find a way to protect them. For this project QGIS and drone data are used to assess coastal vulnerability and damage from recent flooding in January 2024 on Fortunes Rocks Beach and Goose Rocks Beach.

93. The Effects of Human Development on the Coast of Island Park

Aquinnah Thayer ’25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

This project will display the coastline change in the neighborhood of Island Park, Portsmouth, RI and record the correlation that human development has potentially had on it. The methods used for this include aerial photos, satellite imagery, the HDI index, and local records.

94. Risk of Algal Blooms in Maine Lakes

Conner Boisvert ’26 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Using algal bloom frequency data collected by the state of Maine, observations can be made concerning potential nitrogen and phosphorus runoff from farmland near lake watersheds which may be the cause of higher risks of algae growth in certain lakes. This could lead to potential harm in lake wildlife and even property prices along these lakes.

95. The Impact of Sea Level Rise on Indigenous Subsistence Resources in Passamaquody Pleasant Point Reservation, ME

Sophia King ’25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

With recent increases in storm surges and sea level rise predictions, indigenous communities are incredibly vulnerable. Not only do they risk losing critical land but this land loss can result in a loss of traditional resources such as hunting and fishing. My hope is that maps such as these can not only bring awareness to this threat but also help guide action and policy to protect indigenous communities and their culture.

96. 2024 Storm Damage in Coastal Maine

Paige-Marie Merrill ’24, Matthew Pittsley ’24, Ruth Ellis ’26, Katelyn DeWater ’25, Quinn Thayer ’26 | *Will Kochtitzky, Ph.D.*

GIS 410 GIS Research

Earlier this year, subsequent winter storms coincided with astronomical high tides, resulting in an extreme storm surge on January 10th and 13th. The historic 14.57 ft tide on January 13th replaced the previous 1978 record, causing severe flooding, structural damage, and coastal erosion. We examined the effects of the storms through media coverage as well as drone surveys and tidal data that lead to over $70 million in damage to public infrastructure alone.

Maine Space Grant Consortium

97. Comparing Spatiotemporal Chlorophyll-a Concentrations Using Open-Source *In Situ* and Satellite Oceanographic Data

Christopher Weis ’24 | *Alicia Williams, Ph.D.*

MAR 366 Advanced Oceanography Geological/Biological

Chlorophyll-a concentrations is a well-established proxy for primary productivity in the ocean. This project will use open-source *in situ* data and remote satellite images to observe variations in chlorophyll-a concentrations across spatiotemporal ranges. Data will be analyzed using GIS and compared statistically. We expect there to be differences in seasonal patterns between stations and data sources. We hope to gain a better understanding of how chlorophyll-a concentration trends are determined in a changing ocean.

98. Distribution and Variation of Copepod Species in Southeastern Pacific Oxygen Minimum Zones

Emma Hutchings ’26, Olivia Leighton ’27, Piper Stagg ’27 | *Patricia Thibodeau, Ph.D.*

MAR 210 Marine Science Research

The poster displays various figures in correspondence to data collected in three southeastern pacific plankton tow cruises. The results from these cruises showed changes in copepod distribution dependent on ecological and oxygen zones. This data can be used to predict future trends in copepod populations as a result of climate change.

99. Ocean Acidification Experiments for Plankton in the Gulf of Maine

Esme Jamison ’26, Edward Iannuzzi-Sucich ’27 | *Patricia Thibodeau, Ph.D.*

MAR 210 Marine Science Research

The goal of our study is to examine the effects of carbon dioxide, pH, and alkalinity on zooplankton physiology. This semester we are setting up a compartmentalized filtration system, in either a randomized block or systematic design, to manipulate these factors. The data collected will help the scientific community understand the effects of ocean acidification and global warming on zooplankton over time, as well as predict how they would respond to ocean alkalinity enhancement.

100. Gilgamesh Promotes Nociceptive Sensitivity in *Drosophila melanogaster*

Zachary Ahmida ’24 | *Geoffrey Ganter, Ph.D*

We tested the hypothesis that the protein Gilgamesh (Gish) in the Wnt/Wg pathway Gish promotes nociceptive sensitivity in *Drosophila melanogaster*. This was accomplished using Ppk-Gal4 / UAS-Gish-IR to underexpress Gish specifically in nociceptors. Larvae were tested for mechanical nociceptive sensitivity via a 2346 kPa von Frey filament and compared with normal controls. The Gish-underexpressing animals showed a significant hyposensitivity compared with control larvae, thereby supporting the hypothesis.

NIGMS Centers of Biomedical Research Excellence (COBRE); National Institute of Health (NIH)

101. Saltwater Nutrient Analysis and Buoyancy Evaluation of MycoBuoys: Advancing Sustainable Solutions for Marine Environments

Maxwell Bleyle '26 | *Carrie Byron, Ph.D.*

Novel buoys made from fungus, marketed as Mycobuoys, are early in development and are being tested as an alternative to plastic-based buoys. Mycobuoys are being investigated for buoyancy durability and for nutrient leaching. Mycobuoys were deployed in Saco Bay and monitored regularly for buoyancy. Experimental tank water with buoys underwent nutrient analysis to measure the leaching of nitrogen and phosphorus.

Northeast Sustainable Agriculture Research and Education Program (SARE) Grant

102. Measuring Sediment Acclimation on UNE's Fringing Salt Marsh

Sam Walsh '24 | *Pam Morgan, Ph.D.*

UNE's fringing salt marsh has been subjected to both the threats of erosion from storm surges and sea level rise. In order to measure if this marsh will be able to keep up with the rates of sea level rise, the rate of sediment acclimation must be studied. From this study, it was found that the rates of sediment acclimation seen on UNE's fringing marsh is comparable to salt marshes found elsewhere in the world.

103. Cost Effective Ways to Design Advanced Aquarium Systems

Daniel Lucas ’24, Zach Nicholson ’24, Cait Avelis ’24 | *Michael Galloway, M.S.*

We are developing two different aquarium systems employing budget-conscious materials and methods; a mudskipper tank with an in-tank tidal system and a compact jellyfish system allowing you to maintain multiple generations. Both of these systems’ commercially available counterparts are much more expensive and require more space. Using acrylic and other cheaper materials makes these systems more widely available to educational and general personal systems with limited available funding and/or space.

104. Quantifying Striped Bass *(Morone saxatilis)* eDNA Persistence in Controlled Conditions

Kade Tyrrell ’24 | *John Mohan, Ph.D., Markus Frederich Ph.D.*

MAR 410 Marine Science Research

Environmental DNA (eDNA) is produced from organisms shedding trace genetic signatures through urine, skin fragments, scales and mucus. This experiment determines how long striped bass eDNA degrades in controlled conditions. Striped bass were held in two small pools for two hours, removed, and water samples were serially extracted at intervals throughout a 24-hour period, filtered and analyzed by qPCR. We found that eDNA is detectable for a period between 4-6 hours.

UNE Faculty Mini-Grant Award from the Office of Research and Scholarship

105. From Space to Sea: Understanding Climate Signals in Ocean Currents

Patrick Spezzano ’24 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis, GIS 410 GIS Research

Using earth observing satellites, we aim to better understand the implications of a warming ocean on both local ocean currents in the Gulf of Maine, as well as large scale ocean circulation patterns in the Pacific basin during El Nino/La Nina periods. Satellite data is presented as altimetry data, allowing us to visualize the height difference of ocean currents and circulation patterns separate from mean sea surface height.

106. Is There a Difference in How Fast Vegetation Grows Back After a Wildfire Between Santa Barbara/Ventura Counties, CA, and Old Minto, AK?

Abigail O’Hern, ’24 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

In 2018, the Thomas Fire swept across California and the Mooseheart Fire struck Alaska. This study examines the Normalized Difference Vegetation Indexes (NDVIs) of both areas’ pre-fire vegetation and post-fire regrowth. Analyzing growth patterns of vegetation that grows back after a wildfire can determine vegetation resilience as well as the difference in recovery across the US.

107. Trends in Timing and Intensity of Phytoplankton Blooms in the Gulf of Maine from 2002-2023

Ruth Ellis ’26 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Phytoplankton are foundational to many marine food webs, sequester carbon, and produce oxygen. They rely on both sunlight and nutrient availability for growth. As climate change and pollution affect ocean temperature and the availability of nutrients and sunlight, we are observing changes in phytoplankton blooms. This research uses NASA’s MODIS-aqua satellite chlorophyll concentration imagery from 2002-2023 to understand the overarching trends in blooms and how different factors affect timing and intensity.

108. Seasonal Trends for Warming of Gulf of Maine

Justin Arnone ’25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Research aims to ascertain seasonal temperature shifts in the Gulf of Maine (2002-2023) using Aqua MODIS satellite data. Hypothesizes reveal colder winters and warmer summers, with a long-term upward trend. Through comparing winter (December) and summer (July) temperatures, it seeks to elucidate seasonal variations, offering insights into ongoing changes in the Gulf’s climate throughout the years.

109. Aerial and Satellite Imagery Being Used to Predict Factors Contributing to Change Within the Coffee Lake Wetland (Wilsonville, OR)

Jackson Miller ’26 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

Aerial and satellite imagery will be correlated over a long period of time (30 years or more) to produce maps comparing the area of the Coffee Lake Wetlands over time. Coffee Lake Wetlands is a relatively small wetland in Wilsonville, Oregon. Once the changes over time are visualized, possible infrastructural or anthropological developments and changes will be observed on a visual and historical level. Visually development that occurs over time can be visualized on maps of the area to see if development coincides with the changing wetland.

110. Effects of Ocean Warming on the Great Barrier Reef

Tyler Ellwanger ’25 | *Will Kochtitzky, Ph.D.*

GIS 162 Application of Geospatial Science and Technology

I will use Aqua MODIS satellite sea surface temperature data to observe the change in ocean temperature around the great barrier reef in the past 20 years, cross reference that with information regarding temperature at while coral bleach to show areas of dead coral. With that information I will then show hypothetical bleaching areas based on if the ocean temperature increases further, as a “future scenarios.” the overall objective of this project is to look how ocean warming in the past has affected corals, and to use that to predict future damage.

111. Uncovering Maine's Hidden History: Using Lidar Technology to Map Stone Structures in Saco and Biddeford

Marissa Carter '25 | *Will Kochtitzky, Ph.D.*, *Arthur Anderson, Ph.D.*

GIS 364 Spatial Analysis

Old stone walls and foundations can be found throughout New England, including on UNE's campus. This project investigates the effectiveness of Maine State Lidar data in detecting potential historic features in Saco and Biddeford. Known sites are identified using Lidar data, then compared to NAIP (National Agriculture Imagery Program) data to show the limitations of satellite imagery in detecting historic features due to vegetation density. These methods can be used statewide for Maine archaeological research.

112. Mapping the Bathymetry of the Saco River

Charles Genoways '25 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

Surveying post-dredging Saco River bathymetry with GIS Bathycat for UNE hydrological study.

113. Dune Destruction: Changes to Beaches and Dunes along York County's Coastline from January 2024 Winter Storms

Matthew Pittsley '24, Paige-Marie Merrill '24, Ruth Ellis '26, Katie DeWater '25, Quinn Thayer '26 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

Using drone imagery, we examined the impacts of the January 10th and 13th, 2024 storms to the beaches of York County (Goose Rocks, Fortunes Rocks, Hills Beach, Freddy, and Camp Ellis). We quantified the volume of sand lost, gained, or transported, and the dune destruction along these beaches during the storms in January. We saw widespread dune loss along these beaches.

114. How Does Glacier Terminus Type Impact Future Sea Level Rise from Russia and Antarctica?

Kaleigh Potter '25 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis, GIS 410 GIS Research

Glacier behaviors and attributes such as terminus type impact glacier mass balance and how quickly they may destabilize in the future. By classifying terminus type as either land, marine, or lake terminating and comparing mass balance data between each classification, I will examine the effects of terminus type mass balance, and create the first ever comprehensive terminus type dataset for Antarctica and the Russian Arctic.

115. Analyzing the Relationship Between Methane Emissions and Agriculture, Urbanization, and Fossil Fuel Energy Production in the United States

Caroline Fales '25 | *Will Kochtitzky, Ph.D.*

GIS 364 Spatial Analysis

This project intends to compare methane emissions measured through remote sensing techniques to areas with high densities of livestock farms, urbanization, and fossil fuel-producing power plants to correlate point sources of high methane emissions with human infrastructure. Using this data, a higher understanding of the major sources of methane emissions can be achieved, which could provide insight on solutions to reduce methane emissions.

116. Vertebral Insights: Chemical Tracers in Bull Sharks Distinguish Gulf of Mexico Populations

Nick Starosta M.S. '25 | *John Mohan, Ph.D., David Wells, Ph.D., Oscar Sosa-Nishizaki, Ph.D., Juan Carlos Perez-Jimenez, Ph.D.*

Shark populations have been experiencing overfishing for decades, leading to population declines. Migratory species, such as bull sharks, can move across international boundaries, complicating management. The north-south population connectivity of bull sharks was investigated using stable isotopes and trace elements within mineralized vertebral cartilage. Chemical signatures indicate separate ecological populations of bull sharks between regions of the Gulf, suggesting limited regional connectivity.

Texas A&M CONACYT Program

117. Assessing Age and Growth of Winter Flounder *Pseudopleuronectes americanus* Using Otoliths

Audrey S. Fox '26 | *John A. Mohan, Ph.D.*, *Benjamin LaFreniere, M.S.*

Understanding the age and growth of fish is critical for effective management and protection of their populations. Winter Flounder *(Pseudopleuronectes americanus)* are native to the Gulf of Maine but growth rate estimation data is lacking. In addition, otoliths have not historically been used to age this species. Here, otoliths were aged by counting growth rings and a preliminary growth curve was generated for fish collected in southern Maine during 2012.

118. Pilot Extraction and Observation of Microplastics in Bivalve Shellfish

Mikayla Straube '26 | *Carrie Bryon, Ph.D.*

Microplastics are plastics smaller than five millimeters. Their size and increasing abundance guarantees consumption by marine organisms. Plastic is cheap and lightweight, therefore frequently used by aquaculturists and fisheries in gear to raise or catch stock. The shedding of plastic off this gear contributes to the oceans' microplastic abundance. The methodology piloted this semester is to study whether the plastic of traditional culturing equipment is contributing to the amount of microplastics found in bivalve shellfish.

ORAL PRESENTATIONS

LEGEND

The Gulf of Maine: A Looking-Glass into Anthropogenic Climate Change

Student Author(s)

Lydia Pinard '22 | *Charles Tilburg, Ph.D.*

Faculty Advisor(s)

Course

ENV 262 Gulf of Maine Field Studies

Abstract

The Gulf of Maine (GoM) is warming faster than 99% of the global ocean. We selected 8 buoys throughout the GoM to represent 5 geographic regions. We then calculated specific heat, density, and change in temperature of seawater at each region from 2004-2020.

Presentation Location and Time

Decary 208 | 2:15 p.m.

Funded by

Maine Space Grant Consortium, UNE SURE Program

Makeup, Media, and Marketing to the Masses

Madi Robito ’25 | *Cathrine Frank, Ph.D., Jesse Miller, M.F.A.*

LIL 420 Arts and Humanities Capstone

This project details a comparative analysis in consumer communication and marketing effectiveness in the makeup industry. I will be analyzing and assessing three prominent makeup companies by creating a comprehensive rubric, aiming to identify key strengths and weaknesses in communication practices between three different companies. Finally, providing potential suggestions for each company regarding future marketing approaches.

Decary 205 | 1:00–1:10 p.m.

Brochure to Blackrock Farm

Colby Quest ’24 | *Jesse Miller, M.F.A., Catherine Frank, Ph.D.*

LIL 420 Arts and Humanities Capstone

This presentation is about Colby’s internship work with The Nonantum Resort and Blackrock Farm, both located in Kennebunkport. The product that will be shared is a brochure for Blackrock Farm, with both handheld and digital versions available. This work expands on a past project from the Professional and Technical Writing course completed two years ago.

Decary 205 | 1:10–1:20 p.m.

Mexico and the Hollywood Problem

Ben Fitzgerald ’24 | *Cathrine Frank Ph.D., Robert Alegre Ph.D.*

LIL 420 Arts and Humanities Capstone

This presentation will break down the concept of what Mexico is based on Hollywood’s understanding and how we then interpret it. Breaking down the book, Based On A True Story: Latin American History At The Movies by Donald F. Stevens will further an understanding of films from Viva Zapata to Three Amigos.

Decary 205 | 1:25–1:35 p.m.

Why Design for Users? A Deep Dive Into the Motives Behind UX Design and Product Optimization.

Tony Marciano ’24 | *Cathrine Frank, Ph.D.*

LIL 420 Arts and Humanities Capstone

This presentation will follow my journey as an artist, product developer, and graphic designer. I will visually present a mock website that I created for my class (LIL 420) in order to help my audience understand User Experience Design as a field, and why it’s useful. Many people ask “What’s UX?”, this presentation will be an informative look into what we do and why we do it.

Decary 205 | 1:35–1:45 p.m.

Media and You: How Media Consumption Influences Our Lives and Identities

Mya Hankes ’24 | *Catherine Frank, Ph.D., Jesse Miller, M.F.A.*

LIL 420 Arts and Humanities Capstone

Drawing from my own experience and published studies, this paper dives into the world of media consumption to analyze how media shapes identity.

Decary 205 | 1:50–2:00 p.m.

Uncharted Territories

Victoria Robichaud ’24 | *Catherine Frank, Ph.D.*

LIL 420 Arts and Humanities Capstone

This presentation will cover the production and revision of a travel essay regarding my study abroad experience in Tangier, Morocco. It discusses anxiety and the realities of facing your fears and hesitations. The PowerPoint will focus on the revision process and overall results from the steps taken to improve the piece for publication.

Decary 205 | 2:00–2:10 p.m.

Haunted by Hysteria: Exploring Medical Trauma and its Impact on Intersectional Identities

Dez Schrankel ’24 | *Catherine Frank, Ph.D., Jennifer Tuttle, Ph.D.*

LIL 420 Arts and Humanities Capstone

This presentation will explore and review the creation of an artist’s book based on medical trauma, marginalized groups, and how the past and present treatment of patients contributes to a larger cultural narrative around medicine. Topics will include the troubling history of certain medical practices, how systemic bias impacts the quality of care, and denial of patient autonomy regarding reproductive health.

Decary 205 | 2:15–2:25 p.m.

Premedical History at the University of New England

Zachary Harvey ’26 | *Jonathan DeCoster, Ph.D.*

HIS 397 History Independent Study

While we often focus on medical education and the formation of doctors, we frequently ignore the undergraduate experience. How does it influence our doctors and the perception of them by the rest of society? How can we change our curriculum to allow ourselves to perform better?

Decary 205 | 2:40–3:00 p.m.

Power and Knowledge in Education: The Politics of Censorship in Pre-College America

Angelina Parolisi ’24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

I am investigating and examining the political implications of censorship in the public education systems of Florida and Texas specifically, applying the critical methodology of Foucault from his work “Discipline and Punish: The Birth of the Prison.” More particularly, I am closely investigating the statements, statistics, testimonies, and records of the justifications and rationalizations of such censorship. Finally, I will discuss the people and groups of people who are attempting to confront and put a stop to this censorship.

Decary 206 | 1:00–1:20 p.m.

The Military Industrial Complex as Environmental Entity, Through the Cases of the Hanford Site and Pease Air Force Base

Jackson Schuyler ’24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

I wish to look at the US military industrial complex as an environmental entity, particularly in its effects through its negligence on local environments and people. I hope to examine this by looking at two specific cases of varying scale to be used as a broader microcosm of the larger issue as a whole. With these cases being the nuclear contamination from the Hanford site in Washington State and Pease Air Force in New Hampshire.

Decary 206 | 1:25–1:45 p.m.

Empire and the Politics of Archeology: the Use and Abuse of the Past in Iraq

Hauraa Alsilawi ’24 | *Ali Ahmida, Ph.D, Aurthur Anderson, Ph.D.*

PSC 491 Integrative Essay

This research investigates the complex dynamics between archaeology and imperialism in Iraq, focusing on the exploitation of archaeological heritage by British archaeologists in the 1920s, the impacts of the 2003 American-led invasion, and the destruction by ISIS in 2015-2016. It explores how archaeological narratives have been manipulated to legitimize power, employing theoretical insights to understand resistance against cultural domination. By examining various geopolitical contexts, this study aims to reveal how the past is weaponized for political objectives, impacting tangible heritage and cultural identity.

Decary 206 | 1:50–2:10 p.m.

Foucault and Chomsky on the Paradigm of Subjugation and Disciplined Knowledge in Post-Secondary American Education

Aidan Hosein '24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

This research paper will explore the current state of affairs of post-secondary education vis-à-vis the power dynamic between students, faculty, and administration. This paper will examine the freedom of students in their ability to speak and criticize faculty and administrators earnestly. And whether the introduction of student empowerment groups present merely an illusion of co-opted freedom. Then, this paper will analyze the paradigm through the lens of scholars such as Michelle Foucault and Noam Chomsky.

Decary 206 | 2:15–2:35 p.m.

Restorative Practices, Discipline, and Pedagogy in American Schools

Sarah McGonigle '24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

The American educational system is falling apart at the seams. When discussing education we focus on academics but schools foster much more than the academic achievements that define us all. Education encompasses three categories: behavior, academics, and educational practices. The purpose of my research is to focus on the first and third categories in relation to the school-to-prison pipeline and the implementation of restorative practices in American public schools

Decary 206 | 2:40–3:00 p.m.

Colonizing the Arctic? Hegemony, International Law, and Indigenous Peoples

Isabella Caprio ’24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

A comparative analysis of the current Arctic crisis to the scramble for Africa and the Suez Canal Crisis through hegemony, international law, and indigenous involvement and treatment.

Decary 206 | 3:05–3:25 p.m.

Challenging the Corporate Monopoly

Jude Kovatch ’24 | *Ali Ahmida, Ph.D.*

PSC 491 Integrative Essay

Elites in charge of sports teams accompanied with the corporate media have too much power and influence in the sports world, which is forever interrelated with politics. Players can be made to look like villains by the media or the elites in charge of specific teams, they of course, have their own driving factors themselves. Severe consequences could arise if a player doesn’t fit the political narrative or the political agenda currently being pushed.

Decary 206 | 3:30–3:50 p.m.

Investigating Olfactory Learning and Memory in House Crickets *(Acheta domesticus)*

Reegan Boucher ’24, Jennifer Hubbard ’24, Alyssa Canarelli ’25 |
Margaret Stanton, Ph.D.

PSY 425 Advanced Methods in Animal Behavior

The ability to memorize odors can be important for animals, especially those that rely on olfaction for finding food. Previous studies indicate that house crickets have the capacity for olfactory learning, but it is unclear whether they can remember and apply this knowledge in the short term. We hypothesize that house crickets exposed to an appetitive scent will complete mazes faster and more accurately than house crickets not exposed to an appetitive scent.

Decary 207 | 1:00–1:20 p.m.

Effects of the Calls of a Common Versus Uncommon Predator on Emergence in Male House Crickets *(Acheta domesticus)*

Gwen Wallingford ’24, Shannon Callaghan ’24 |
Margaret Stanton, Ph.D.

PSY 425 Advanced Methods in Animal Behavior

Previous research indicates that animals can use environmental cues to detect predators. Male house crickets *(Acheta domesticus)* have been shown to differ in time to emerge from a hiding spot when presented with a chemical cue from a predator. We predict that male house crickets also use auditory cues and will take longer to emerge from hiding when presented with a call from an avian predator compared to a call from an avian non predator.

Decary 207 | 1:25–1:45 p.m.

Effect of Predator Sound Cues on Hiding Behavior in House Crickets *(Acheta domesticus)*

Bridget McIntyre ’24, Mary Haley ’24 | *Margaret Stanton, Ph.D.*

PSY 425 Advanced Methods in Animal Behavior

Prior research has shown that male house crickets *(Acheta domesticus)* tend to have longer hiding times when exposed to known predator calls. The purpose of this study is to observe how male crickets respond to a common avian predator versus an uncommon avian predator call. We expect that the male house cricket will hide longer when exposed to predator calls than when not exposed to predator calls.

Decary 207 | 1:50–2:10 p.m.

House Cricket Response to Direct and Indirect Cues

Aliyah Walker-Pasko ’24, Elizabeth Soule ’24, Ex Todd ’24 | *Margaret Stanton, Ph.D.*

PSY 425 Advanced Methods in Animal Behavior

House crickets *(Acheta domesticus)* have been shown to behave differently in the presence of various types of stimuli. These stimuli can be categorized as direct or indirect cues relating to predation risk, with a direct cue being one from a predator, and an indirect cue being less obvious signals such as environmental conditions that could affect the risk of predation. This study tested cricket behavior in the presence of direct and indirect cues.

Decary 207 | 2:15–2:35 p.m.

The Effect of Anthropogenic Noise on Male House Cricket *(Acheta domesticus)* Chirping

Olivia Lauricella ’24, Lily Coath ’24, Adeline Leifer ’24 |
Margaret Stanton, Ph.D.

PSY 425 Advanced Methods in Animal Behavior

Studies have shown that in the presence of road noise male crickets are less likely to begin calling or will pause calling with increasing traffic noise (Costello & Symes, 2014), (Orci et al., 2016). The current study aims to further study the effects of anthropogenic noise on male house crickets by exposing crickets to different traffic noise levels (none, low, and high) and measuring chirping.

Decary 207 | 2:40–3:00 p.m.

Impact of Predator Cues on Mate Choice in Female House Crickets

Abigail Newman ’24, Cammy Justic ’24, Evan Delsignore ’24 |
Margaret Stanton, Ph.D.

PSY 425 Advanced Methods in Animal Behavior

Previous research has shown that female mate preference is impacted by male traits, with evidence suggesting that females will make “trade-offs’ ‘ when considering mate selection. Because females typically prefer males that present less risk of predation, we predict that females are more likely to choose males without a predator cue regardless of male quality.

Decary 207 | 3:05–3:25 p.m.

Medicine and Power: Investigating the Case of Endometriosis and the Bias Against Women in Health Care

Hannah Niles ’23 | *James Roche, Esq., LL.M., M.P.H.*

PSC 491 Integrative Essay

Endometriosis is an example of a larger power imbalance within the healthcare system, specifically between the medical professional and the female patient. The diagnosis and treatment of endometriosis is an example of a larger power struggle within the healthcare system between the medical professional and the female patient. This can be seen through the underdiagnosis/prolonging of diagnosis, the invasiveness of female healthcare in relation to endometriosis, lack of research focused on endometriosis, and lastly, the disbelief of women in pain with endometriosis.

Decary 207 | 3:30–3:50 p.m.

Unraveling Myths: The Unseen Side of Human Trafficking

Bella Caprio ’24, Logan DiScanio ’24, Olivia Hebert ’24, Alexandria Perry ’24 | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

A video spreading awareness for human trafficking that challenges the human trafficking narrative regarding sex and labor trafficking.

Decary 208 | 1:00–1:20 p.m.

"Modern Slavery" and "Human Trafficking" Are Not Interchangeable Terms

Willa Dolley '24, Joshua Cooke '25, Brooklynn Merrill '24, Abigail O'Hern '24 | *Alicia Peters, Ph.D.*

ANT 312 Human Trafficking

Human trafficking is vaguely defined under United States law, which drives the general public to draw their own conclusions. Subsequently, popular media uses "human trafficking" and "modern slavery" interchangeably to describe the criminal process, means, and purpose of exploiting persons for labor. Following literature analysis we will provide historical and current context of slavery and human trafficking to begin to correct the general public's misconceptions of "modern slavery."

Decary 208 | 1:25–1:45 p.m.

A Closer Look at Social Media and Gender Identity, Intimacy, and Consent Behaviors Among College Age Students

Anika Koopman '24 | *Alicia W. Peters, Ph.D., Julie Longua Peterson, Ph.D.*

SOC 494 Applied Social and Cultural Studies Thesis

In recent decades, social media plays a significant role in society, conveying information and messages that can impact our mood, relationships, and behavior. This study used a mixed methods approach, drawing on a combination of qualitative in-depth interviews and a survey of college age students. The goal of the study was to explore the role of social media in college students' experiences of dating, sexual behavior, and views of consent.

Decary 208 | 1:50–2:10 p.m.

Investigating Residency, Departure, and Arrival Times of Striped Bass *(Morone saxatilis)* in the Saco River Using Acoustic Telemetry

Benjamin Gowell ’25, Michael Nguyen ’24, Alexa Cacacie M.S. ’24 | *John Mohan, Ph.D.*

MAR 410 Marine Science Research

Striped bass *(Morone saxatilis)* are anadromous fish and exhibit long distance coastal migrations along the Atlantic coast. Emergency management measures were enacted in 2023 due to population concerns. An increasing challenge in striped bass fisheries management is the complex seasonal movement patterns of juveniles and adults. This study explores the fine scale movement patterns of striped bass that utilize the Saco River system through acoustic telemetry and explores potential factors that drive movements.

Decary 208 | 2:15–2:35 p.m.

Monitoring Chlorophyll-a Concentration in Saco River Estuary

Terrance Meinardus ’25 | *Patricia Thibodeau, Ph.D.*

MAR 410 Marine Science Research

Chlorophyll-a concentration is a proxy for phytoplankton biomass. A Turner fluorometer can measure chlorophyll-a fluorescence and is considered best practice to measure chlorophyll-a concentration. This experiment aims to calibrate a new Turner Trilogy fluorometer to ensure it accurately measures chlorophyll-a concentration. To test this goal, weekly samples from the Saco River Estuary will be collected and analyzed on the Turner fluorometer. Phytoplankton counts will also be used to validate phytoplankton biomass measured with fluorometry.

Decary 208 | 2:40–3:00 p.m.

Quantifying Ontogenetic Habitat use in Rainbow Smelt *(Osmerus mordax)* Using Otolith Geochemistry

Alexa Cacacie ’24 M.S. | *John Mohan, Ph.D.*

We used otolith geochemistry to investigate habitat use of rainbow smelt in Great Bay, NH. By quantifying Sr and Ba concentrations along core to edge transects, we established thresholds above which we were able to determine marine or freshwater residency. Habitat use was investigated across varying life stages, and we conclude that it is essential to understand the movement requirements of juvenile fish to better inform management decisions.

Decary 208 | 3:05–3:25 p.m.

Green Tea, Green Chemistry: Making Gold Nanoparticles with Less Chemical Waste

Carina Raya ’24, Amaya West ’25 | *Eva Rose Balog, Ph.D.*

CHE 375 Advanced Laboratory

Decary 209 | 1:00–1:20 p.m.

d-Orbital Splitting of the Iron Porphyrin Center in Heme Proteins: Integrating Computational Modeling with Experimental Nuclear Magnetic Resonance Analysis

Peter Swanson ’24, Ben Wheeler ’24 | *Eva Rose Balog, Ph.D.*

CHE 375 Advanced Laboratory

Decary 209 | 1:25–1:45 p.m.

Synthesis and Characterization of Opalescent Silica Nanoparticles

Terrance Meinardus ’24, Sam Spiese ’25, Michael Schulitz ’24 | *Eva Rose Balog, Ph.D.*

CHE 375 Advanced Laboratory

Decary 209 | 1:50–2:10 p.m.

In vitro Characterization of CELF4 RNA Binding Protein in Growth Factor Signaling

Michael Darby ’24 | *Benjamin Harrison, Ph.D.*

NEU 495 Neuroscience Laboratory Research

Growth factors stimulate cell proliferation and differentiation. Nerve growth factor (NGF) is involved with various pain conditions. CUGBP Elav-Like Family Member 4 (CELF4) modulates neural excitability. We used an in vitro model of PC12 cells overexpressing CELF4 via plasmid transfection to study its role in growth factor signaling. Early data shows a correlation between CELF4 expression and TrkA, an NGF receptor. Further investigation can offer insight into CELF4’s potential as a chronic pain intervention.

Decary 209 | 2:15–2:35 p.m.

DIRECTORY

POSTERS BY AUTHOR

DIRECTORY

ORAL PRESENTATION SCHEDULE

	Decary 205	Decary 206	Decary 207	Decary 208	Decary 209
1:00 – 1:20 p.m.	Robito, Quest	Parolisi	Boucher, Hubbard, & Canarelli	Caprio, DiScanio, Hebert, & Perry	Raya & West
1:25 – 1:45 p.m.	Fitzgerald, Marciano	Schuyler	Wallingford & Callaghan	Dolley, Cooke, Merrill, & O'Hern	Swanson & Wheeler
1:50 – 2:10 p.m.	Hankes, Robichaud	Alsilawi	McIntyre & Haley	Koopman	Meinardus, Spiese, & Schulitz
2:15 – 2:35 p.m.	Schrankel	Hosein	Walker-Pasko, Soule, & Todd	Gowell, Nguyen, & Cacacie	Darby
2:40 – 3:00 p.m.	Harvey	McGonigle	Lauricella, Coath, & Leifer	Meinardus	
3:05 – 3:25 p.m.		Caprio	Newman, Justic, & Delsignore	Cacacie	
3:30 – 3:50 p.m.		Kovatch	Niles		

THANK YOU

THANK YOU!

The 24th Annual College of Arts and Sciences Spring Research Symposium would not be possible without the support of many individuals and organizations who each contribute in their own way. Our record number of presentations this year is a testament to the enthusiasm and aptitude that our students have for research, scholarship, and creative activity, and the dedication of many members of the UNE Community and beyond toward supporting such endeavors.

First, a hearty THANK YOU to the faculty and professional staff mentors who have supported the students in carrying out their scholarly work or class projects presented here today. Your generosity of time and effort has allowed the students to complete truly remarkable work.

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— Amy Keirstead, Ph.D.

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