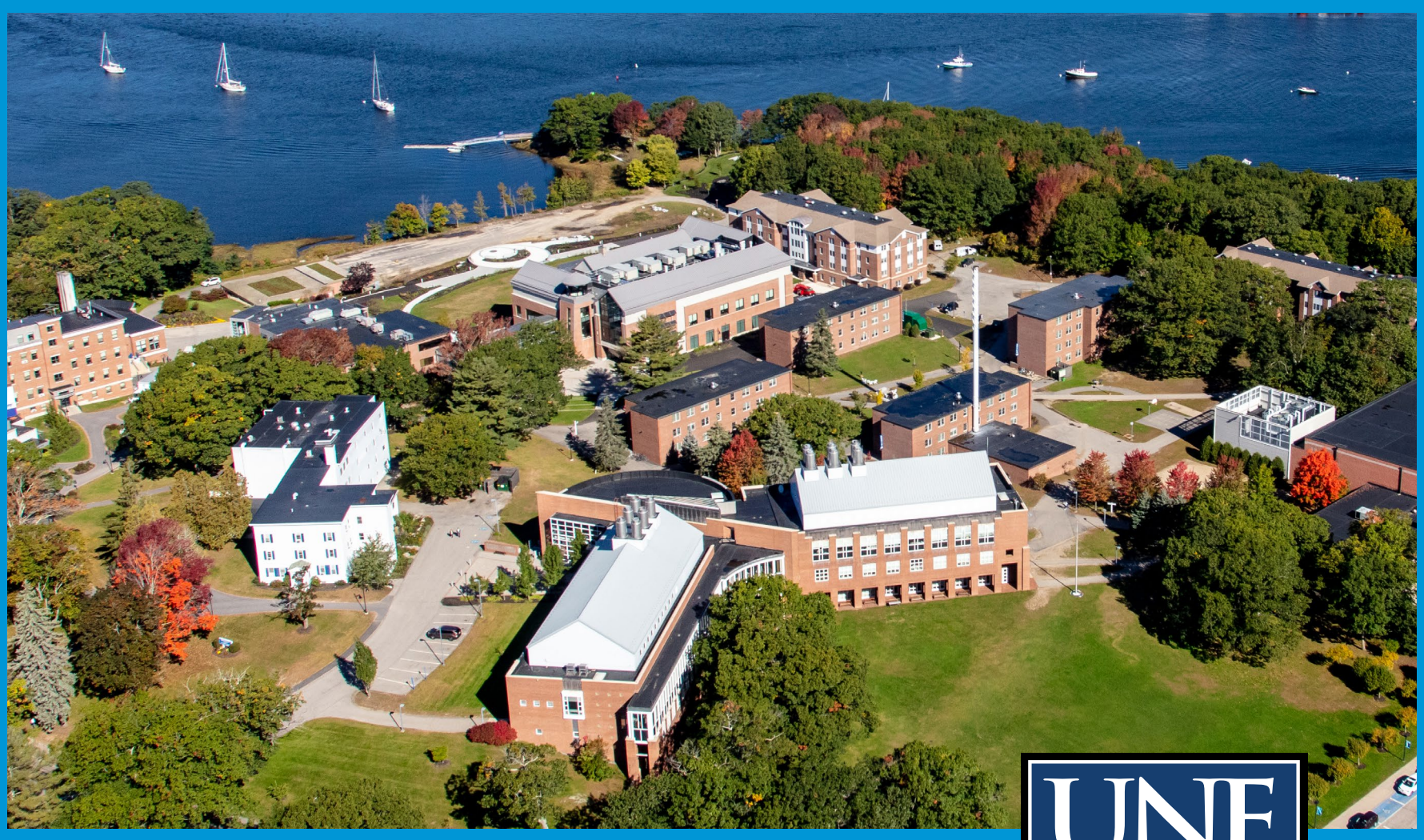
University of New England
**College of Arts and Sciences**

# 22ND ANNUAL SPRING RESEARCH SYMPOSIUM



UNIVERSITY OF NEW ENGLAND

INNOVATION FOR A HEALTHIER PLANET

Friday • May 6, 2022

# CONTENTS

# RESEARCH AT UNE

On behalf of the UNE College of Arts and Sciences (CAS) Dean's Office, welcome to the 2021-22 CAS Spring Research Symposium! This event, now in its 22nd year, showcases the scholarly and creative endeavors of our students through posters, displays of artwork, and oral discussions and represents the outcomes of over 130 talented students working under the direction of dedicated faculty.

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

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

# SCHEDULE

**Friday, May 6, 2022 | 9:30 a.m. – 4 p.m.**

**9:30 – 11:30 a.m.** | Poster Presentations | *Campus Center Gym*

**11:30 a.m. – 12:30 p.m.** | Lunch and Speakers | *Campus Center Gym*

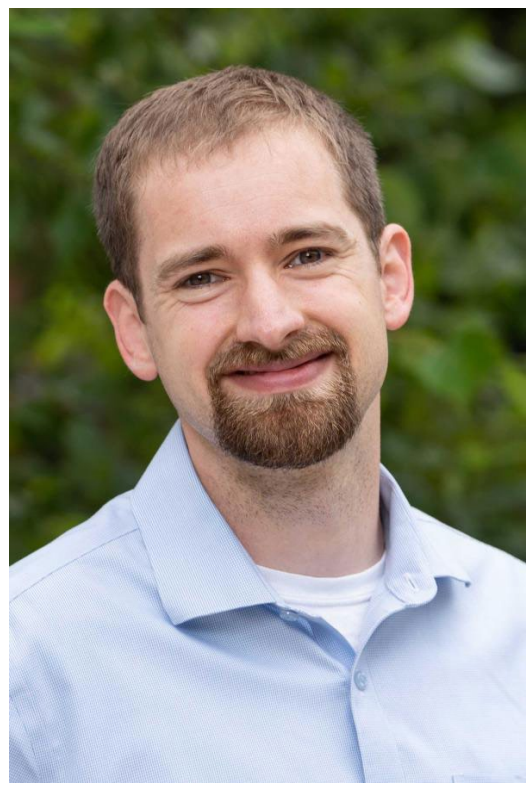
Jonathan Millen, Ph.D.
*Dean, College of Arts and Sciences*

Nathan Furey, Ph.D., '09 (Environmental Science and Marine Science)
*Keynote Speaker*

**1 – 4 p.m.** | Oral Presentations | *Decary Hall, Second Floor*

# KEYNOTE SPEAKER

## Nathan Furey, Ph.D., ’09



Nathan Furey, Ph.D., is an Assistant Professor in the Department of Biological Sciences at the University of New Hampshire where he directs the Fish and Movement Ecology Lab. Following his Bachelor of Science (double major in Environmental Science and Marine Science) from UNE in 2009, Furey attended Texas A&M University where he earned his M.S. in Wildlife and Fisheries Science in 2012. Furey then moved to the University of British Columbia where he earned his Ph.D. in Forestry as a Vanier Scholar.

Furey joined the faculty at the University of New Hampshire in 2018, where his research program investigates fish ecology and animal movements across ecosystems, including salmon-bearing systems in British Columbia, the high Arctic, New England streams, and the Gulf of Maine. In 2021, Furey was awarded his College’s inaugural Community of Teaching and Research Scholars Award, and in 2022 he received the “Class of 1937 Professorship in Marine Biology” from UNH’s School of Marine Science and Engineering. While a student at UNE, Furey engaged in undergraduate research with Markus Frederich, Ph.D., (focused on temperature stress of the rock crab) and James Sulikowski, Ph.D., on a variety of fisheries biology projects including the fish community of the Saco River estuary. Furey was also UNE’s first Barry Goldwater Scholar in 2008.

# 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. Romantic Connection, Mate Preferences, and Risk Perceptions During Late COVID

Mia Morgan ’23, Sara Authier ’22, Emily Williams ’22 |
*Julie Longua Peterson, Ph.D.*

This project explores how the potential for romantic connection during late COVID affects mate preferences and COVID-related risk perceptions and behavior, such as mask wearing and social distancing, for single/romantically unattached participants. We further hypothesized that the effect of romantic connection (vs. control connection) would be moderated by differences in self and personality.

## 2. Social Experiences and the Self: Perceived Discrimination and Resiliency in LGBTQIA+ College Students

Emily Williams ’22, Mia Morgan ’24, Sara Authier ’22 |
*Julie Longua Peterson, Ph.D.*

This research project examines the ways in which college LGBTQIA+ students are affected by perceived discrimination. We hypothesized that participants in the discrimination condition will report greater closeness with friends when compared to participants in the control condition. This was also believed to be moderated by identity centrality. Additionally, we hypothesized that the effect of the discrimination condition on self-esteem will be greater for those who score higher (compared to low) in stigma consciousness.

## 3. The Prevalence and Representation of LGBTQ+ Individuals in Human Trafficking

Stephanie Ruff '22 | *Alicia Peters, Ph.D.*

*ANT 312: Human Trafficking*

Literature review conducted in order to determine the prevalence of LGBTQ+ individuals in human trafficking and how the ratios within sex trafficking and labor trafficking differ.

## 4. The Role of Immigration/Immigration Policies on Human Trafficking

Kiara Walker '22 | *Alicia Peters, Ph.D.*

*ANT 312: Human Trafficking*

How does the immigration policy play a role in silencing victims, limiting their access to resources, and helping fuel unintentional biases towards victims who are undocumented? I want to know more about the immigration policy, to understand what it is, how it is structured and whether it offers protections to those who are undocumented. I want to know if there are biases towards specific individuals and the amount of weight it carries in deciding factors regarding a case.

## 5. Cognitive Factors That Lead to 'Zoom Fatigue'

Haley Enos '23, Gracie Ouellette '24 | *Jennifer Stiegler-Balfour, Ph.D.*

Interacting with colleagues and peers on video chat platforms instead of in-person has lead many people to experience 'Zoom fatigue.' The current study investigated which factors increase or decrease the cognitive load that participants of Zoom calls experience, and sheds new light on best practices for reducing mind wandering and feeling more socially connected with others during Zoom calls.

## 6. Who is Approachable? Assessing the Influence of Clothing Color and Context on Individual Perceptions of Women

Gracie Ouellette ’24, Tori Robichaud ’24, Peyton Gaudette ’24, Elaina Stearns ’24 | *Jennifer Stiegler-Balfour, Ph.D.*

*PSY 285: Research Methods*

The purpose of this study was to examine the effect of perceptions of females’ approachability when wearing either red or black in a professional or casual setting. Undergraduate students were randomly assigned to view a photo of a woman wearing a black shirt, black dress, red shirt, or red dress. Perceptions of approachability, respectability, confidence, and intelligence were measured using a seven-point approachability scale and various survey questions.

## 7. Influence of Music Preference on Person’s Perception

Katelyn Smith ’23, Bridget McIntyre ’24, Nicholas Geren ’23 | *Julie Longua Peterson, Ph.D.*

*PSY 285: Research Methods*

This research project was designed to explore how music preferences (rap vs. country) influence participants’ perceptions of another person’s attributes/qualities/characteristics. We hypothesized that, consistent with the literature on stereotypes, participants would evaluate the profile of the person who listens to country (vs. rap) as more friendly.

## 8. Do People Judge Others by Their Pets? The Effects of Cats or Dogs on Perceived Attractiveness of the Owner

Jennifer Hubbard ’24, Reegan Boucher ’24, Rachel Kaplan ’24, Yami Morales ’24 | *Jennifer Stiegler-Balfour, Ph.D.*

*PSY 285: Research Methods*

A common stereotype is that men who have cats are perceived as less masculine and attractive. To test this hypothesis, and other common stereotypes, we created a study that included four conditions: a man holding either a cat or a dog and a woman holding either a cat or dog. After viewing one of the four pictures, participants were asked to complete surveys about their perceptions of the people in the picture (attractiveness, approachability, datability etc.) and whether the participant identifies as a cat or dog person. Subsequently, participants also completed the Big Five Personality Test to see whether participants’ personality influences their perceptions of others.

## 9. Influence of Background Color on Information Retention and Altruism

Gwen Wallingford ’24, Chloe Remillard ’23, Jackie LaBarre ’24, Adeline Leifer ’24 | *Julie Longua Peterson, Ph.D.*

*PSY 285: Research Methods*

This project explores the effect of background color on memory and altruism. We hypothesized that when presented with volunteering opportunities on a blue (vs. white) background, participants would show greater recall and be more likely to volunteer. We further hypothesized that gender would moderate this effect, such that females would have higher recall rates and altruism overall, and that background color would impact males’ scores on both dependent variables more than females’ scores.

## 10. The Effects of Movie Media on Romantic Perceptions

Cammy Justic ’24, Cassidy Pacheco ’24, Olivia Lauricella ’24, Sadie Cross ’24 | *Julie Longua Peterson, Ph.D.*

*PSY 285: Research Methods*

This project explores the effects of exposure to different movie genres on an individual’s romantic perception. We hypothesize that those who are exposed to romantic (vs. neutral) movie clips will show greater endorsement of idealistic love and relationship scenarios. We further hypothesize that gender will moderate this effect. We hypothesize that women will endorse idealistic love across condition, but that men will be less likely to endorse idealistic love in the neutral (vs. romantic) clip condition.

## 11. The Effect of Negative Information on Intentions To Reduce Screen Usage

Charlotte King ’24 , Fenya Grew ’23, Gregory Tsisar ’22, Brian Kennedy ’24 | *Julie Longua Peterson, Ph.D.*

*PSY 285: Research Methods*

Past research has shown that spending more time on screens has adverse physiological and psychological effects (Lissak, 2018). This study’s goal was to assess whether presenting information on the negative effects of screen usage will result in participants reporting greater intentions to reduce time on screens when compared to the control condition. We hypothesized that those who spent more time on screens will report the greatest intentions to reduce screen usage in the experimental condition.

## 12. Stereotypes of Dog Breeds and Their Adoptability

Elizabeth Soule ’24, Korianne Moore ’24, Mary Haley ’24, Cameron Capachietti ’23 | *Jennifer Stiegler-Balfour, Ph.D.*

*PSY 285: Research Methods*

The goal of our study was to assess if educating people about different breeds might remove the negative stereotypes associated with pitbulls. To answer this question, participants watched either a neutral or educational video about pitbulls and saw either a picture of a golden retriever or pitbull. Subsequently, we asked participants to rate the dog they viewed in the picture on several variables (e.g., friendliness, aggression, adoptability).

## 13. Mid-Stage and Advanced Osteoarthritis Pain: Comparing Pathology and Pain

Tyler Vesey ’23 | *Tamara King, Ph.D., Victoria Eaton, M.S.*

Patients with osteoarthritis can develop different pain phenotypes. Many patients report mid-stage osteoarthritis pain occurring with joint use that abates during rest and that can be managed with non-steroidal anti-inflammatory agents (NSAIDs). Some patients report persistent ongoing pain that is resistant to NSAIDs, termed advanced OA. We will present data on potential neural mechanisms that underlie this difference.

*Kahn Family Foundation, Histology and Imaging done in COBRE Histology and Imaging Core supported by P20GM103643, Institutional Development Award (IDeA) from the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH)*

## 14. Procedural Resources ORCCA (Online Reasoning Chain Construction Assessment)

Alexa Koenig ’23, Nathan Brown ’22 | *John Caleb Speirs, Ph.D.*

An algebraic ORCCA composed of procedural, gestural, and symbolic elements was sent out to students of varying confidence and mathematical capacity to determine if there were viable trends within the order and type of elements used. Analysis of these trends may have the potential to solidify a method of assessment educators can use to design a curriculum that could better suit the cognitive needs of their students based on their personal results of the task.

## 15. Investigating Student Conceptual Resources About Waves

Nathan Brown ’22, Alexa Koenig ’23 | *John Caleb Speirs, Ph.D.*

When solving physics problems, it is theorized that students draw on cognitive structures called conceptual resources. These resources are cued by task features and can explain common misconceptions. To more adequately meet the conceptual problem-solving needs of physics students, identifying common trends in student use of resources is an important goal. In this study, we investigate a novel method of examining student resources wherein written responses are broken down into independent reasoning elements.

## 16. Is There a Difference? An Investigation of How Reading Comprehension Tests Predict Performance on Expository or Narrative Texts

Emily Newborough ’23, Aubrey Sahouria ’22 | *Jennifer Stiegler-Balfour, Ph.D.*

It is well documented that reading expository text is more challenging than narrative text because informational density is high with new concepts and relations being introduced. The current study sought to determine which standardized comprehension tests, metacognitive, and working memory assessments are the best predictors of reading comprehension success. The results are discussed within the context of reading comprehension being highly related to academic success.

*University of New England Summer Undergraduate Research Experience Grant provided by the UNE CAS*

## 17. Investigating the Impact of Grading Scheme on Student Performance

Aubrey Sahouria ’22 | *John Caleb Speirs, Ph.D.*

Student performance on physics tasks may be influenced by the way in which the task is assessed. This study investigated the effects of different grading schemes on physics students’ susceptibility to salient distracting features in multiple choice questions as well as their anxiety, motivation, and willingness to approach problems in multiple ways. Results suggest that allowing students to self-evaluate and suggest a grade for themselves leads to fewer SDF-related errors and higher motivation during assessments.

## 18. Differences in Experiences and Perceptions of Stigma and Discrimination Among Bisexual Men, Women, and Nonbinary Individuals

Hannah Luscomb ’23, Sophia Simeone ’23, Mary Lavallee ’23 | *Hillary Powell, Ph.D.*

We analyzed literature on minority stress, nonmonosexuality and gender differences to investigate how these variables influenced discrimination experiences. Following the PRISMA checklist, several major themes emerged: gender differences and similarities, internalized binegativity, health impacts, resilience factors, and limitations in sample demographics. This study highlights the importance of personal identities in individuals’ perceptions of their sexuality and experiences of discrimination. Further research should specify the moderating roles of resilience factors and gender similarities on health.

## 19. Benefits of Martial Arts Amongst the Youth

Julian Connerton ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

An in depth analysis of the benefits of children who compete in martial arts at the ages 9-15 developing a strong physical literacy, controlled mental cognition, and emotional clarity.

## 20. Microplastics as Vectors for Pathogen Contamination of Seaweed

Lyle Massoia ’22, Justin Dixson ’22 | *Kristin Burkholder, Ph.D.*

Microplastics are abundant ocean pollutants and are ingested by marine organisms, including those used for human consumption. There is concern that pathogenic microbes can bind to microplastics. The project goal was to optimize bacterial binding to microplastics in the laboratory setting. Greatest binding of E. coli occurred when microplastics were first physically abraded and pre-treated with a conditioning solution. Future work will test whether microplastics can aid in pathogen transfer into zebrafish or bivalve shellfish.

## 21. Applied Cryptography Using Number Theory

Julia Gordon ’22 | *Weizheng Gao, Ph.D., Jennifer Fatula, M.A.*

*MAT 480: Mathematics Research Seminar*

As sensitive information is being transmitted over different networks and stored in different locations globally, it becomes essential to protect data through the process of encryption and decryption in Cryptography. We’re working with an encryption system called ElGamal in our study. This system allows us to securely communicate between different parties even with a malicious eavesdropper in a network. We focus on the underlying mathematical theory for the system, and the implementations of the system.

## 22. Data Mining Twitter

Caleb Bowles ’23 | *James Quinlan, Ph.D.*

*DSC 325: Programming II*

Data mining Twitter to perform a sentiment analysis on a tweet about something or someone in a specific location.

## 23. Using Twitter Data Mining To Analyze National Football League (NFL) Draft Prospects

Stephen Sims ’23 | *James Quinlan, Ph.D.*

*DSC 325: Programming II*

By data mining tweets of NFL Draft prospects on Twitter, an analysis can be performed using the geolocation and sentiment analysis of these tweets. Using this data, we can possibly predict who NFL teams will draft or should draft based on what their fan base's positivity is on the prospects and the location of where these tweets are coming from.

## 24. Predicting Stock Market Index Movement Using Twitter Sentiment

Rebecca Baert ’23 | *James Quinlan, Ph.D.*

*DSC 325: Programming II*

Sentiment analysis of tweets is a useful insight to the public’s attitude towards a specific discussion. This project will consider sentiment analysis of tweets to predict the general movements of the stock market through Twitter mining and machine learning techniques.

## 25. Covid Effects on NFL Attendance

Matthew Remavich ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

COVID had a large impact on in-person attendance in major sports in the United States; based off the strategies the Patriots’ and Steelers’ management have implemented, they have tried to combat COVID and keep their numbers as consistent as possible.

## 26. Division 3 Football Players Spend More of Their Day on Football-focused Activities as Opposed to Academically Focused Activities

Jeremy Diaz ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

My study is focused on whether or not Division III college football players spend more of their time on football-focused activities or on academically focused activities. This idea stemmed from personal experiences that I have endured as well as what I’ve heard from teammates and friends about their experiences in Division III football.

## 27. WNBA: A League That Never Wins

Jack Piller ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

For my research I will be looking at the struggles that the WNBA faces as a league and what they are trying to do to fix these issues.

## 28. Diversity in Ice Hockey

Aaron Aragon ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

This research study will focus on American college and professional hockey players ages 18-25, gaining their insight, experiences, and knowledge of why they think hockey is the least diverse sport.

## 29. Engagement With Rugby

Colin Nee ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

Rugby is an international interest and the engagement with the sport is growing within the United States. The formation of professional leagues, new governing bodies, and connecting with fans has helped grow the sport.

## 30. Psychological Challenges and Effects of College Sports

Franco H. Abbatessa ’22 | *Aimee Vlachos, M.S., Ed.D., CPRP*

*SPT 420: Research Methods in Sport and Recreation Management*

Talking about the mental challenges that athletes face during their sport and after their sport and short term and long term effects.

## 31. Effects of Glucocorticoid Receptor Loss-of-Function Mutation on Skeletal Muscle Development in *Danio Rerio*

Galen Arnold ’22 | *Deena Small, Ph.D., Michael Burman Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

Skeletal muscle development during the embryonic and fetal stages is a highly regulated process. Glucocorticoids (GCs) are a class of stress hormones with influences on gene transcription in target tissues including skeletal muscle. Despite characterization of the hormone with respect to stress related pathophysiologies, the role of GCs on skeletal muscle during the early stages of development is not well known. This research aims to provide new insights into the physiological and biochemical role of GCs during early development.

## 32. Measuring the Metabolic Impact of the Atypical Antipsychotic Risperidone in the Liver of the Model Organism *Danio rerio*

Riley Frost ’23, Jeffery Waters ’22 | *Deena Small, Ph.D., Karen Houseknecht Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

Risperidone is an atypical antipsychotic used to treat schizophrenia, bipolar disorder, autism, and other mental illnesses. In recent research, risperidone has been found to induce metabolic abnormalities within the liver of mice, including those relating to non-alcoholic fatty liver disease. The goal of this project was to identify the impact of risperidone on metabolic enzymatic activity and gene expression in the liver of the model organism *Danio rerio*, zebrafish.

## 33. Determining the Effects of the Antipsychotic Medication "Risperidone" on the Immune System in the Model Organism *Danio rerio*

Jeffery Waters '22, Riley Frost '23 | *Deena Small, Ph.D., Karen Houseknecht, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

Risperidone is an antipsychotic medication often used to treat schizophrenia. Although some immediate side effects such as nausea are well known, there are some underlying negative consequences that may occur. The focus of this project was to identify Risperidone's repercussions on the immune system in the model organism *D. rerio*, aka zebrafish. In these studies, we utilized multiple biochemical techniques to identify key molecular changes to T-lymphocyte markers induced by Risperidone.

## 34. Investigating How the "Forever Chemical", Perfluorooctanoic Acid (PFOA), Influences the Development of Neurological Disorders in *Danio rerio* (Zebrafish) Via Oxidative Stress Mechanisms at Dopaminergic Neurons

Hunter St. Pierre '22 | *Deena Small, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

PFOA is a forever chemical that now contaminates our food, water, bodies, and potentially our brains. PFOA may generate an excess of reactive oxygen species and lead to damage in the nervous system. The goal of this project was to determine if PFOA has an impact on the degeneration of dopaminergic neurons via oxidative stress in zebrafish, which can resultantly lead to the development of neurological disorders such as Parkinson's disease in humans.

## 35. 3D Models of Hydrogen Orbitals Through 3D Printing

Zahraa Alsilawi '22, | *Timothy Robbins, Ph.D.*

*CHE 327: Applied Physical Chemistry*

The hydrogen atomic orbitals are a principal topic first introduced to general chemistry students and are further grasped by physical chemistry students. Understanding hydrogen orbitals is a rewarding opportunity for students given the topic's explanation of many phenomena in chemistry. In this project, knowledge gained from the physical chemistry curriculum, literature, and the resources of the UNE Makerspace laboratory, are used to create mathematically accurate 3-dimensional representations of hydrogen orbitals.

## 36. The Biochemical Impact of Nanoplastics on Zebrafish *(Danio rerio)* Dopaminergic System

Zahraa Alsilawi '22 | *Deena Small, Ph.D., Chakravarthy Marx Sadacharan, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

Given the global abundance of nanoplastics (NP) in the environment, human and aquatic animal exposure to NP is inevitable. Current evidence suggests that NP can be taken up by aquatic animals and humans through ingestion and inhalation of food and water. Upon uptake, the NP can travel to the brain and may affect neurodevelopment. The goal of this project was to identify biochemical impacts of NP exposure on the dopaminergic system.

## 37. In Vitro Modeling the Role of RNA-binding Protein CELF4 in Neuronal Plasticity and Trophic Sensitivity

Peter Neufeld '22 | *Benjamin Harrison, Ph.D., Eliza Grlickova-Duzevik, M.D., Ph.D.*

CELF4 is an RNA-binding protein and negative regulator of neural excitability implicated as a causal agent in both peripheral and central nervous system neurological disease. In this experiment, PC12 cells are transformed using electroporation techniques to effect the upregulation of CELF4. Protein analyses, including immunohistochemistry and Western blotting, are used to measure the influence of the CELF4 on regulatory and differentiation pathways during neuronal development, including neurite outgrowth and sensitization to growth factors.

*Kahn Family Foundation*

## 38. In Vitro Modeling of Microplastic Contamination on Neuronal Growth and Neurite Development

Peter Neufeld '22 | *Deena Small, Ph.D., Benjamin Harrison, Ph.D., Chakravarthy Sadacharan, PT, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

As microplastics become a ubiquitous environmental contaminant that cannot naturally degrade completely, an understanding of their effect on mammalian cells and tissues grows more important in predicting the long-term health impacts they may have. This project uses an in-vitro model of microplastic contamination to study the potential impact of microplastic bioaccumulation on the viability, growth and differentiation of neuron tissue using both morphological and biochemical frames of analysis.

## 39. An Analysis of the Neurotoxicity and Oxidative Stress Characteristics of a Pyrogallol Derivative on the Zebrafish Model Organisms, *Danio rerio*

Carolyn Curley '23 | *Deena J. Small, Ph.D., Amy M. Deveau, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

Antimicrobial resistance is an apparent global issue. Derivatives of polyphenols have been identified to be potent antimicrobial compounds with potential as scaffolds for drug discovery. A novel, hybrid compound featuring a polyphenol core, ketone linker, and hydrocarbon chain has been synthetically optimized, characterized, and found to exhibit antimicrobial activity. Neurotoxicity and oxidative stress characteristics of the synthesized compound on the dat-eGFP zebrafish model organism *Danio rerio* were tested using biochemical and molecular methods.

## 40. The Adjuvant Effect of Pyrogallol-based Hybrid Compounds With Antibiotics on *Staphylococci*

Lauren Cooper '23, Afnan Yahya '22, Sarah Padellaro '23, Carolyn Curley '23 | *Kristin Burkholder, Ph.D., Amy Deveau Ph.D.*

Previous work in our lab showed that pyrogallol increased the efficacy of the antibiotic linezolid against *Staphylococcus* bacteria. This project examined the effect of novel pyrogallol-based hybrid compounds, that contain hydrocarbon chains of varying lengths, on the susceptibility of *Staphylococci* to existing antibiotics. Checkerboard minimum inhibitory concentration (MIC) assays were used to evaluate potential antimicrobial adjuvant effects of the hybrid compounds.

*This project was supported by a UNE faculty mini-grant award to K. Burkholder.*

## 41. Toxicology and Oxidative Stress Analysis of a Pyrogallol Derivative on the Cardiovascular Development and Function in dat-eGFP Zebrafish

Sarah Padellaro ’23 | *Deena J. Small, Ph.D.*

*CHE 450: Advanced Biochemistry Lab*

With antibiotic resistance a serious challenge for modern medicine, new compounds with structural diversity and novel mechanisms are urgently needed. Prior investigation supports a hybrid compound featuring a polyphenol core, ketone linker, and hydrocarbon chain that exhibits significant antimicrobial activity. In this research, preliminary data on the toxicology and oxidative stress characteristics of a polyphenolic ketone was assessed on markers of cardiovascular development and function using the *Danio rerio* (Zebrafish) toxicology model.

## 42. Pyrogallol Increases Efficacy of Antibiotics Against *Staphylococcus aureus* and *Staphylococcus epidermidis*

Katharina Roese ’22 , Lauren Cooper ’23, Afnan Yahya ’22 | *Kristin Burkholder, Ph.D.*

With the increasing incidence of antibiotic-resistant bacterial infections, novel treatment approaches are needed. Antibiotic adjuvants are compounds that boost efficacy of existing drugs and show promise for combating drug resistance. We show that the phenolic compound pyrogallol exhibits adjuvant properties by increasing efficacy of the antibiotics linezolid and cefoxitin against *Staphylococci*, in a manner likely dependent on pyrogallol-induced bacterial oxidative stress. Ongoing studies aim to identify the mechanism by which pyrogallol enhances antibiotic activity against *Staphylococci*.

*This research is funded by a faculty minigrant to K.M.B. and CAS M.S. Graduate Program funds to K.R.*

## 43. Exploring Greener Approaches to Cyclohexene Synthesis and Derivatization

Michael Darby ’24, Eddy Kutter ’24, April Warner ’24 |
*Amy Deveau, Ph.D.*

*CHE 251: University Organic Chemistry II*

In an organic chemistry semester research project, a two-step green synthesis was executed by our research team. First, the impact of three different acid catalysts on the dehydration of 2-methylcyclohexanol was studied using gas-chromatography-mass spectrometry. Data suggest that a unique cyclohexene product profile was obtained when the Amberlyst 15 catalyst was used. Second, cyclohexene and related alkenes were functionalized via environmentally friendly, carbon-carbon bond-forming processes.

## 44. Synthesis of Antimicrobial Polyphenol Derivatives: Studies of Ortho Carbon Acylation and Ketone Reduction

Cal Murray ’24, Evie Nott ’24, Peter Swanson ’24 |
*Amy Deveau, Ph.D.*

*CHE 251: University Organic Chemistry II*

Ortho substituted polyphenols are of interest for their antimicrobial properties. In this research, we compare literature methods for the ortho carbon acylation of pyrogallol with decanoic acid. Efforts to reduce the target polyhydroxylated phenone to an alcohol are also reported.

## 45. Multistep Synthesis of a Novel β-carboline Heterocycle: Exploring the Effects of Base Choice and Greener Catalysts

Jessica Slachta ’24 , Michael Schulitz ’24, Michael White ’23 | *Amy Deveau, Ph.D.*

*CHE 251: University Organic Chemistry II*

Expanding on prior research that studied anticancer properties of synthetic β-carbolines, we hypothesized that Amberlyst resin would catalyze formation of the key nitrogen ring core via a Pictet-Spengler reaction. We executed a three-step synthesis to test the hypothesis. The synthesis included benzylation, desalting, and condensation of this resulting aldehyde product with L-tryptophan methyl ester via a Pictet-Spengler cyclization testing three different catalysts.

## 46. Impact of Exotic Sulfonate Ester Leaving Group Ability on the Percent Conversion of (-)-Menthol to Menthene

Connor Crawford ’24, Savannah Wakita ’24, Shannon Alvino ’24 | *Amy Deveau, Ph.D.*

*CHE 251: University Organic Chemistry II*

This presentation will be on experimental results of the formation of menthene from an exotic tosylate-like leaving group with a starting material of L-menthol. It will explore the mechanisms of the reactions, the characterization methods used throughout each step, and ultimately how the exotic leaving group acted as a facilitator in an E2 mechanism by examining percent conversion of the sulfonate ester to the menthene product.

## 47. Chemogenetic Silencing of Amygdlar CRF Neurons in Rats Reverses Hypersensitivity Due to Neonatal Pain

Skyler McComas '22, Ella DiTomaso '23 | *Michael Burman, Ph.D.*

Neonatal pain causes anxiety and depression later in life. We have shown that CRF-containing cells in the amygdala are responsible. Rats experience neonatal paw pricks and adolescent fear conditioning, inducing a tactile hypersensitivity. We use a DREADD approach in transgenic rats, testing the hypothesis that silencing CRF cells diminishes hypersensitivity. Previous results didn't observe hypersensitivity, so now the groups are separated by either AAV surgery or not, to determine what is responsible for diminished hypersensitivity.

*The Khan Family Fellowship*

## 48. Using GIS To Streamline Citizen Science Recruitment in Amphibian Conservation

Dean L. Hernandez '22 | *Marcia Moreno-Baez Ph.D., Gregory LeClair M.S., Jeffery Parmelee Ph.D.*

During the first major precipitation event of spring, amphibians migrate from overwintering habitats to breeding sites (e.g. vernal pools, wetlands) often being forced to cross roadways along the way. In effort to collect data on road mortality during migration, The Big Night employs citizen scientists to monitor road segments across the state. Through GIS derived tools, a dynamic map-based registration system was developed to increase project accessibility, proper allocation of resources, and streamline recruitment.

## 49. Elemental Analysis and Differentiation of Age and Growth in Two Species of Salmonids; Atlantic salmon *(Salmo salar)*, and Lake Trout *(Salvelinus namaycush)*

Kai Ludden ’22 | *John Mohan, Ph.D.*

Atlantic salmon *(Salmo salar)*, and lake trout *(Salvelinus namaycush)* were collected from Big Spectacle Pond, MA, and the Saco River hatchery. Sagittal otoliths were removed, and laser ablation was performed across otolith growth bands to compare trace element variations between species. Analyzing elemental data is important for habitat analysis in salmonids, particularly in protected species such as *S.salar* for future management and regulations.

## 50. Effects of low pH on the Growth Rate of the Dinoflagellate *Dunaliella salina*

Nathan Kofroth ’23, Kai Ludden ’22, Tyler Ferrin ’23, Mason Mallet ’23 | *Carrie Bryon, Ph.D.*

*MAR 350: Marine Ecology*

A study was conducted looking at the effects of lowering pH on the dinoflagellate *Dunaliella salina* which has a high acidic tolerance. Population growth rate in *D. salina* was observed over the course of 3 weeks. Flasks were exposed to a pH of five or left in a control group. It was hypothesized that *D.salinia’s* growth rate would not be affected by the change in acidity. Results found did not support the hypothesis.

## 51. The Effect of Oxybenzone on the Growth Rate of Phytoplankton

Marc Millette ’23, Hunter LaBrode ’23, Richard Szumita ’23, Michael Kucky ’23 | *Carrie Bryon, Ph.D.*

*MAR 350: Marine Ecology*

Oxybenzone is a common ingredient found in most sunscreen that acts as a UV blocker. Oxybenzone poses potential harm to marine phytoplankton as it may prevent them from properly photosynthesizing. We measured its effect on the population growth of the dinoflagellate *Dunaliella salina*. Our findings showed that there is a strong negative correlation between the concentration of oxybenzone and the growth rate of the phytoplankton population.

## 52. Differing Biodiversity and Zonation at East Point Audubon Sanctuary Through the Years

Julia Popson ’23, Emily Schur ’23, Mara Geisler ’23, Doyle Proto ’22 | *Carrie Bryon, Ph.D.*

*MAR 350: Marine Ecology*

When comparing biodiversity data across the East Point Audubon Sanctuary from 2017 to 2022 we hypothesized that the mid-zone will have the highest biodiversity compared to the low and high zones. We looked at the small organisms that reside in intertidal zones such as the total species of Gastropods, Barnacles, Molluscs, Polychaete, and Amphipods. Our hypothesis is that there has been a negative shift of biodiversity in the intertidal zonation at East Point Audubon Sanctuary over the past 5 years.

## 53. The Effects of Varying Wavelengths of Light on Phytoplankton Population Growth Dynamics

Andy Gaboury ’23, Natalie Guertin ’22, Giovanni Aulizio ’23, Jessica Vorse ’22 | *Carrie Bryon, Ph.D.*

*MAR 350: Marine Ecology*

Textiles mills often dump chemical dye into rivers which can influence the wavelengths of light available to aquatic organisms in the polluted area. This can negatively impact individual species and entire ecosystems. We used model phytoplankton organism *Cyclotella* to investigate how phytoplankton populations respond when exposed to different wavelengths of light.

## 54. Effect of Post-harvest Storage Temperature and Drying Method on Pathogen Load of Edible Seaweed

Colleen Moody ’22, Jessica Vorse ’22 | *Kristin Burkholder, Ph.D., Carrie Byron, Ph.D.*

The FDA does not currently regulate seaweed as a food product. It is important to provide industry members, regulators, and consumers with data to maintain safe post-harvest handling of edible seaweed with regard to food pathogens. The purpose of this study was to investigate post-harvest storage temperature and drying method’s impact on the pathogen load associated with edible seaweed. We worked with six common food pathogens and two species of edible seaweed.

*Maine Sea Grant*

## 55. Applying Satellite Imaging of the Indonesian Throughflow Region To Measure Monthly Primary Productivity

Ruth Pelletier ’22, Jennifer Lutes ‘18 | *Stephan Zeeman, Ph.D.*

Primary production was analyzed in the Indonesian Throughflow Region (ITF) from 2002 to 2021 monthly using satellite imagery and a carbon-based production model (CbPM). The hypothesis tested if primary production in the ITF changes from El Niño-Southern Oscillation and Monsoonal seasons. The results show significant changes induced by Monsoons ($p = 0.004$) and that La Niña lowered primary production relative to El Niño ($p = 0.003$), likely caused by the strength of the ITF.

## 56. The Role of the Salmon Lab in Atlantic Salmon *(Salmo salar)* Restoration

Nicholas Esposito ’22, Morgan Segrest ’23, Brittney Bull ’24 | *Michael Galloway, M.S.*

Through its partnership with the Saco Salmon Restoration Club & Hatchery, the Salmon lab plays a vital role in fish care and fish spawning to restore a healthy Atlantic salmon population to the Saco River. This is an overview of the multi-year project this lab and the SSRC&H are undertaking.

*Brookfield-White Pine Hydro, LLC*

## 57. Changes in Macroalgae (*Ulva lactuca* and *Chondrus crispus)* Biodiversity in the Maine Intertidal Zone Dependent on Location.

Aimee Lemieux ’23, Billy Curtin ’22, Jordan Corbett ’23, Maddy Conway ’23 | *Carrie Byron, Ph.D.*

*MAR 350: Marine Ecology*

The Maine coast, which spans over 200 miles, encompasses a variety of conditions that can affect the biodiversity of macroalgae and other marine organisms. Data compiled from over a 3 year period, that consists of population counts at numerous sites along Maine’s coast, allows for the analysis of how the specific sampling sites reflect the dominance of macroalgae such as *Ulva lactuca* and *Chondrus crispus*.

## 58. Population Growth of Phytoplankton *Cyclotella sp*. Under Varying Light Conditions

Samantha Cobuzzi-Luecke ’23, Teresa Baker ’23, Liam Flynn ’23, Sean Breen ’22 | *Carrie Bryon, Ph.D.*

*MAR 350: Marine Ecology*

We expect the highest population growth from the control group with no color filter due to its access to the whole color spectrum. Blue would have the second-highest population growth because it is the most effective wavelength in photosynthesis and is the most abundant in the ocean. Red will have average growth rates as it is useful in photosynthesis, but less so than blue. Green would perform similarly or lower because green is not abundantly used in photosynthesis due to chlorophyll reflecting the green wavelengths.

## 59. *Symbiodiniaceae* Culturing and Inoculation

Liam Flynn ’23 | *Jeri Fox, Ph.D.*

This project is designed to identify how biologists can influence thermal stress tolerance in the anemone, *Exaptasia pallida*, by culturing certain strains of *Symbiodiniaceae* that exhibit superior tolerances to thermal stress and resistance to disassociation from host tissue. This presentation will cover the early discoveries and methods found during development.

## 60. Post-harvest Time and Temperature Exposure of Edible Seaweed for Promotion of Food Safety

Hannah Korper ’22 | *Carrie Byron, Ph.D.*

Seaweed is considered a “raw agricultural commodity” by the FDA and is, therefore, not well regulated. Storage temperature and duration can impact the microbial load and, thus, the food safety of edible seaweed. In this study, we record the temperature of the seaweed from the time of harvest to processing using data loggers. Preliminary data suggests that harvested seaweed exhibits a consistently warmer temperature than the ambient air temperature during transport and storage.

*Aquaculture Research Institute*

## 61. Mature Trees in Less than a Year: Speed Breeding American Chestnuts *(Castanea dentata)* to Produce Transgenic Pollen

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

My presentation will report on my speed breeding of transgenic American chestnuts in 2021-22. I will detail my methods, challenges, solutions and results. I will also compare my findings to the previous year’s attempt at rapid pollen production. I will also situate my work relative to the whole American Chestnut Restoration Project.

*Funding support from The Cricket Foundation and the Maine Chapter of the American Chestnut Foundation is gratefully acknowledged.*

## 62. The Effects of Development on Vernal Pool Breeding Amphibians in Biddeford, Maine

Madison Harvey ’23 | *Pam Morgan, Ph.D.*

*ENV 319: Vernal Pools Practicum in Field Ecology*

The purpose of this study is to determine if University of New England developments have had significant impacts on vernal pool breeding amphibians. A database has been used since 2011 to collect data regarding egg masses of various species, presence of fairy shrimp and endangered/threatened species, etc. To determine developmental impact, we compared the impacted vernal pools F, H and I to reference pools with similar characteristics 09-VP24, 06-VP16, and 09-VP23.

## 63. Goat Island Alternative Energy Project

Cameron Indeck ’22 | *Pam Morgan, Ph.D.*

*ENV 262: Gulf of Maine Field Studies II*

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. We determined the electricity needs of the island to get it fully “off the grid,” and explored a variety of alternative energy options to achieve this. We conclude that alternative energy is a viable strategy but note that stakeholder concerns must be considered.

*Kennebunkport Conservation Trust and the Gulf of Maine Institute.*

## 64. Semi-autonomous Underwater eDNA Sampler

Hayden Cohan ’22 | *Markus Frederich, Ph.D.*

Marine eDNA sampling is vulnerable to contamination when water capture devices are positioned. This device improves on the eDNA sampling design with a sampling robot for autonomously taken sterile samples. Other improvements include a sensor for depth measurement, multiple samples can be taken, data loggers for verification, and mobile design for attachment to underwater vehicles. This device can reduce contamination at any depth and allows stratified sampling of eDNA through the water column.

*This project is funded in part by NSF grant# 1849227, the Peterson fund, and funds from the UNE MakerSpace*

## 65. Preparing a MinION Sequencer for Use in MSC Research and Teaching Labs

Kai Alger '22 | *Markus Frederich, Ph.D., Emily Rose Pierce, M.S.*

The MinION device, which utilizes nanopore genetic sequencing, can be used to sequence the DNA or RNA of single organisms or multiple organisms at once. This can be used to identify many organisms in a marine ecosystem through the use of eDNA, and help determine the structure of marine ecosystems. This project aims to determine the functionality and accuracy of a MinION sequencer for determining marine species through mock communities of known species composition.

## 66. DNA Barcoding to Investigate the Population Structure of the Common Sea Star *Asterias forbesi*

Emily Hunt '22, Kenzi Kimball '24 | *Markus Frederich, Ph.D.*

The abundance of a common sea star *A. forbesi* declined in the Gulf of Maine in recent years for unknown reasons. To test whether this decline is related to a loss in genetic diversity we use DNA barcoding. A phylogenetic analysis of the COI1 sequences shows a surprisingly homogenous population structure. Therefore, loss of genetic diversity might have made the population more vulnerable and contributed to the disappearance of A. forbesi in Gulf of Maine.

## 67. GapTracks: Using Remote Cameras to Assess the Wildlife Community on the Eastern Trail

Julia Mast ’22, Courtney McColgan ’23 Harry Wales ’22 | *Noah Perlut, Ph.D.*

*ENV 356: Terrestrial Wildlife Ecology & Conservation*

The goal of this study is to analyze the wildlife community along the Eastern Trail in Scarborough. In 2017-2022, using eight-game cameras, we collected thousands of photos and videos of wildlife and human activity ranging from moose to mice to bikers. The project aims to understand how wildlife currently uses the forest where the trail extension will be built and how they use the forest after the trail is built.

*Friends of Scarborough Marsh*

## 68. Getting Specific in the Pacific: Characterizing Pacific Bluefin Tuna Migrations Using Otolith Geochemistry

Leo Edmondson ’24 | *John Mohan, Ph.D.*

Bluefin tuna *(Thunnus orientalis)* are highly migratory, endothermic fish that are economically important. Life history and natal origin of bluefin tuna can be determined using natural tracers found in otoliths, or ear stones. Elemental concentrations over ontogeny are hypothesized to vary based on environmental or physiological processes. This study uses otolith geochemistry to explore trans-Pacific migrations of the Pacific bluefin tuna to characterize migration patterns for this important species in the eastern Pacific Ocean.

## 69. Exploring Morphometrics of Spiny Dogfish *(Squalus acanthias)* Pups

Ruhika Bhattacharya ’24 | *John Mohan, Ph.D.*

Spiny Dogfish *(Squalus acanthias)* are a viviparous, non-placental elasmobranch with extended gestation periods of 23-24 months. By collecting morphometrics, or measurements of size, it is hypothesized that the gestation stage of pups at time of preservation can be estimated. This study compares the mass and lengths of spiny dogfish pups obtained from mothers kept in captivity to explore gestation stages of the pups to enhance reproductive data on this species.

## 70. Exploring Variations in Band Deposition of Atlantic Spiny Dogfish *(Squalus acanthias)* Vertebral Centra and Second Dorsal Spines

Molly Smith ’24 | *John Mohan, Ph.D.*

Elasmobranch age determination is accomplished by analyzing annually formed growth increments in calcified structures. Methods of Atlantic Spiny Dogfish *(Squalus acanthias)* age determination commonly utilize one of two structures: the vertebral centra and second dorsal spine. However, many discrepancies exist between these two structures, resulting in varying age estimates. This study compares the vertebral centra and second dorsal spine of Atlantic Spiny dogfish for variation in band deposition.

## 71. Preliminary Age and Growth Estimation of White Hake *(Urophycis tenuis)* in the Gulf of Maine

Ben LaFreniere ’22 | *John Mohan, Ph.D.*

White Hake are one of the most understudied groundfish species found in the Gulf of Maine. This study utilizes traditional aging techniques using otoliths sampled by the Maine Department of Marine Resources. White Hake have a reputation of being a problematic species to age using traditional sampling techniques, which includes visually enumerating chronological growth bands. Understanding this species growth patterns will allow better management for future harvest of white hake in a warming Gulf.

*Maine Department of Marine Resources*

## 72. Large Scale Thinking: The Viability of Fish Scales in the World of Hard Structure Biogeochemistry

Brian Alper ’22 | *John Mohan, Ph.D.*

Striped Bass *(Morone saxatilis)* are a highly migratory species of diadromous fish, whose populations have declined significantly in recent years. Given their complex life history, information on their growth and movement is essential for establishing effective management strategies. Traditional extraction methods require lethal sampling of otoliths, hindering extensive research of threatened populations. In this study, we assess the viability of Striped Bass scales as a non-lethal alternative for distilling life history information.

## 73. A Comparison of Change in Air Temperature and Heat Content in the Gulf of Maine

Harrison Stern '24 | *Charles Tilburg, Ph.D.*

This study examines how air temperature in the Gulf of Maine (GOM) affects heat content of the water column. Data were taken from environmental buoys in the GOM from 2004 to 2020. Then the change in air temperature was plotted in MATLAB. The results revealed increases in both air and water temperature in the GOM. However, we are not yet able to determine the relationship between the heat content of the water and air temperature.

## 74. Using Lipidomics To Establish Differences Between Lab-reared and Wild-caught Lobster Postlarvae

Sophia Fiumano '23, Aubrey Jane, M.A. | *Markus Frederich, Ph.D.*

Lab-reared and wild-caught lobster postlarvae have been found in preliminary studies to be physiologically and morphologically different. To elucidate the underlying cause(s) or mechanisms, such as diet or temperature, we analyzed the lipidomes of these post larvae. Differential lipid profiles can reveal how different environments during the larval stage affect the phenotype. This is part of an ongoing study to establish variations between lab-reared and wild-caught lobster postlarvae.

# 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)**

**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*

## The Painted Book: A Scholarly Extension

Sarah Smith ’22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

This oral presentation is an independent revision project to demonstrate my growth as an undergraduate student in the arts and humanities. I will explain how I took a book I created in one course and incorporated aspects of my other courses into the remaining pages. It is intended to be a reflection on the variety of knowledge I have acquired.

Decary 205 | 1:00-1:20 p.m.

## The Art of Speaking Without Speaking

John (Jack) MacMullin ’22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

For this project I will be utilizing skills and theories I learned in the intercultural communications course here at the university as well as in the other visual media communication courses I have taken both at UNE and at SMCC to construct an autoethnographic documentary about my life and journey through filmmaking.

Decary 205 | 1:25-1:45 p.m.

## Saying, Doing and Being in the Humanities and Sciences

Olivia Cram ’22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

This project will reflect on my time as a medical biology major prior to switching into the humanities, as well as evaluating the discourses among medical biology and the humanities. I will be editing and expanding on a previous paper I had written about discourses in my freshman year and reflecting on experiences in those discourses.

Decary 205 | 1:50-2:10 p.m.

## Seeing España Through a New Lens

Catreana Ellerton ’23 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

A narrative that tells of my journey about revisiting Spain and the personal growth that I have experienced from then to now.

Decary 205 | 2:15-2:35 p.m.

## Banned Books in the Classroom: How to Get Away with Teaching

Anthony “Andrew” Albano ’22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

Banned Books in the Classroom follows the controversy of books within the U.S. that have been banned in high schools. This project aims to show the ways that all novels have literary merit. Through scaffolding and lesson planning, even the most controversial novels can be taught within the classroom. Appealing to parents and school boards is the most critical part when teaching banned books: delivering information is an essential part of teaching young students.

Decary 205 | 2:40-3:00 p.m.

## ReVamping: How Victorian and Modern Vampires Reflect Beliefs About LGBTQIA+ Identities and Disease

Evelyn Belmer '22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

This presentation will cover how queer-coding in Bram Stoker's "Dracula" and Sheridan LeFanu's "Carmilla" interconnects with the vampire as a spreader of disease, which reflects how LGBTQIA+ identities were perceived during the Victorian era. The presentation will then focus on how Modern vampires who are inspired by the Victorian reflect changes (or lack thereof) in the perception of LGBTQIA+ identities and disease in the vampire, as displayed in Anne Rice's "Vampire Chronicles".

**Decary 205 | 3:05-3:25 p.m.**

## Simplicity in Chaos — My Path

Taylor Arnold '22 | *Cathrine Frank, Ph.D.*

*LIL 420: Arts and Humanities Capstone*

A book that displays my path of undergraduate life and what I learned at college.

**Decary 205 | 3:30-3:50 p.m.**

## House Cricket Foraging Behavior in the Presence of Predator and Conspecific Mortality Cues

Michael Keogh ’22, Brett Miller ’22, Megan Opsahl ’22, Connor Zrinko ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Crickets perform anti-predator behaviors based on the chemical cues they encounter. Past studies indicate that some species of crickets avoid previously favorable foraging patches in the presence of scents from deceased conspecifics. We predict that foraging behavior of house crickets *(Acheta domesticus)* will be reduced more dramatically by conspecific mortality cues compared to predator cues.

**Decary 206 | 1:00-1:20 p.m.**

## House Cricket *(Acheta domesticus)* Responses to Terrestrial Versus Aerial Predator Cues

Erica Dimmick ’22, Megan Lupinski ’22, Stephanie Ruff ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Threat sensitivity models predict that prey species should use chemical cues from metabolic by-products (e.g., feces) to ascertain threat level. Once threat level is determined, prey can engage in anti-predator behaviors, such as hiding or freezing. The house cricket *(Acheta domesticus)* is preyed upon by both terrestrial as well as aerial predators. Here, we investigate whether the presence of chemical cues from different types of predators affects the behavior of house crickets.

**Decary 206 | 1:25-1:45 p.m.**

## Food Preference and Predation Risk Assessment in Male and Female House Crickets *(Acheta domesticus)*

Lauren Cisek ’22, Abbigail Felix ’22, Emma Iddings ’22, Elizabeth Sullivan ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Previous research indicates that female crickets, more so than male crickets, account for risk of predation while foraging. Based on those results, we expect that female house crickets *(Acheta domesticus)* will choose a lower quality food source with less nutritional benefits in order to avoid predation. Conversely, males will choose the most favorable food source regardless of predation risk. Furthermore, under extreme predation risks we expect that males and females will both show delays in foraging.

**Decary 206 | 1:50-2:10 p.m.**

## Calling Behavior of Male House Crickets *(Acheta domesticus)* in the Presence of Anthropogenic Noise and Other Male Calls

Colin Birch ’22, Kamy Pooler ’23, Alexa Sarro ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Male crickets are less likely to begin calling in the presence of road sounds as it is energetically costly to call over noise. However, the impact of mixed anthropogenic noise and other male cricket calls has never been tested on a male’s latency to communicate. We predict that crickets presented with traffic noise, or with traffic noise and male cricket calls, will have a longer latency to communicate than crickets without the noise.

**Decary 206 | 2:15-2:35 p.m.**

## Habituation to Anthropogenic Noise in House Crickets *(Acheta domesticus)*

Alyssa Caradonna ’22, Sidney Lyytikainen ’22, Kelsie Schwanter ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Anthropogenic noise can influence the behavior and overall fitness of species living in its presence. For example, field crickets *(Teleogryllus oceanicus)* exposed to noise that masks their calls experience delayed maturity and a decrease in overall lifespan. That said, there is some evidence that individuals can habituate to increased noise levels. Here, we predict that female house crickets *(Acheta domesticus)* exposed to anthropogenic noise will initially exhibit reduced locomotion, but eventually habituate to the noise.

**Decary 206 | 2:40-3:00 p.m.**

## Female House Cricket *(Acheta domesticus)* Responses to Male Calls in the Presence of Different Types of Noise

Danielle Bairrington ’22, Avery Jacob ’22, Camryn Wirbal ’22 | *Maggie Stanton, Ph.D.*

*PSY 425: Advanced Methods in Animal Behavior*

Female house cricket *(Acheta domesticus)* mating behavior involves locating mates based on male calls. Anthropogenic noise may mask these calls. We hypothesize that female crickets will have a decreased response time to male signaling when there is anthropogenic noise versus other types of background noise because females may not be able to discern the male mating call from the anthropogenic noise.

**Decary 206 | 3:05-3:25 p.m.**

## Gender and Dehumanization

Emily Birdsall ’23 | *David Livingstone Smith, Ph.D.*

Dehumanization can be understood as the attitude of conceiving of others as less than human. It is particularly associated with racial oppression and the Holocaust in which people of racialized groups were described as beasts, monsters, or vermin. This project uses historical materials and psychological and philosophical work to investigate the question of whether there are gendered patterns of dehumanization, and whether the dehumanization of male and female members of racialized groups takes different forms.

Decary 207 | 1:00-1:20 p.m.

## Understanding the Republican Small Business Coalition

Lily Damon ’22 | *Brian Duff, Ph.D.*

*PSC 491: Integrative Essay*

I will be discussing how small business owners of all types are connected by similar values that typically translate into conservative policy support. By surveying small business owners and reading a number of articles on the topic, I’ve found that they are connected through a shared contempt of government interference, lack of financial support, and the liberal version of success.

Decary 207 | 1:25-1:45 p.m.

## American Exceptionalism: The Politics of Pre-College History Education and the Invisibility of American Empire

Luke Colomey '22 | *James Roche, J.D., LL.M., M.P.H., Kenneth Courtney, Ph.D., Ali Ahmida, Ph.D., Brian Duff, Ph.D.*

*PSC 491: Integrative Essay*

I investigated the effects of the selection, coverage and language of certain topics in high school history education on American citizens' feelings of their country and its policies, using primary (state education standards, student surveys and history textbooks) and secondary (revisionist history texts and political science texts) sources in relation to a case study of "American Empire" (1898-1914).

**Decary 207 | 1:50-2:10 p.m.**

## The Use and Abuse of 9/11

Terrence Ziccardi '22 | *Kenneth Courtney, Ph.D.*

*PSC 491: Integrative Essay*

For my research, I chose to analyze what happened to America after the 9/11 attacks. My focus is on government expansion and the public reaction. In particular, I'll explore how the American government has expanded its powers arguably farther than the constitution allows, and how they successfully convinced the public that this was necessary.

**Decary 207 | 2:15-2:35 p.m.**

## Writing Fellow Panel Discussion

Sarah Smith ’22, Elena Shippey ’22, Olivia Cram ’22, Lyle Massoia ’22 | *Jesse E. Miller, M.F.A.*

Our panel discussion will focus on sharing four long-time Writing Fellow veterans who have been with the program more than 2 years sharing insights, knowledge, and experiences from their multiple years participating in the program as writing tutors.

Decary 207 | 2:40-3:00 p.m.

## Power of the Pen: A Conversation About the Writing Experience

Alexandra Kiehnau ’23, Stephanie Ruff ’22, Peyton Sammons ’23 | *Jesse Miller, M.F.A.*

Alexandra Kiehnau, Stephanie Ruff, and Peyton Sammons will discuss how writing has helped them during their undergraduate experience. The presentation will explore the variety of creative processes, the versatility of the written word, and how writing as a skill can benefit any student. These three students are currently enrolled in the Advanced Fiction Writing Workshop course with Professor Jesse Miller and can directly tie their writing experiences to class and personal settings.

Decary 207 | 3:05-3:35 p.m.

## If We Built It, Will They Come? Stakeholder Perspectives on a Living Shoreline for UNE

Colin Grady '23, Jasmine M. Bouchard '23, Kayla M. Clark '23, Mara J. Geisler '23, Meghan A. Hanks '23, Matthew C. MacDougall '23, Samantha M. Mosier '23, Ruth A. Pelletier '22, Jessy A. Shore '22 | *Pam Morgan, Ph.D.*

*ENV 262: Gulf of Maine Field Studies II*

Climate change is causing rising seas and increasing impacts from coastal storms. Living shorelines are a green infrastructure approach to protecting shorelines from erosion. We conducted semi-structured interviews to gather input from stakeholders to help further our efforts to build a demonstration living shoreline here at UNE. We spoke to people from Maine DEP, engineering firms, contractors, regional planners, the Saco Watershed Collaborative, and a local conservation organization. Results of these interviews will be shared.

**Decary 208 | 1:00-1:20 p.m.**

## A GIS Derived Model for Determining Areas of Amphibian Migration Risk

Dean Hernandez '22 | *N/A*

Amphibians undergo an annual migration from their overwintering habitat to breeding sites during the first major precipitation event of the spring. With fragmentation of the habitat corridors between wintering and breeding sites, risk associated with amphibian migration has greatly increased as a result of road mortality. Through predictive modeling derived from spatial data (representative of habitat suitability and risk factors), GIS can be used to identify and rank road segments associated with potential migration risk.

**Decary 208 | 1:25-1:45 p.m.**

## Synthesis and Structural Characterization of Polyphenolic Ketones With Antimicrobial Properties

Sarah Padellaro ’23, Carolyn Curley ’23 | *Amy M. Deveau, Ph.D.*

Antimicrobial resistance to the gram-positive pathogen *Staphylococcus aureus* is one of the leading public health threats today. In this research, we report the synthetic optimization and characterization of hybrid compounds featuring a polyphenol core, ketone linker, and varying hydrocarbon chain lengths. These derivatives have been found to exhibit significant antimicrobial activity against the *S. aureus* strains USA 300 and Newman.

Decary 208 | 1:50-2:10 p.m.

## The Gulf of Maine: A Looking-glass Into Anthropogenic Climate Change

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

The Gulf of Maine (GoM) is warming faster than 99% of the global ocean. We selected 8 buoys throughout the GoM to represent five geographic regions. We then calculated specific heat, density, and change in temperature of seawater at each region from 2004-2020. We calculated the change in heat content integrated over a volume to quantify that of the entire GoM. Our results suggest that the heat content of the GoM has increased from 2004-2020.

Decary 208 | 2:15-2:35 p.m.

*Maine Space Grant Consortium, UNE SURE Program*

## Multidimensional Otolith Geochemistry: Enhancing Traditional Age and Growth Techniques of White Hake *(Urophycis tenuis)* Within the Gulf of Maine

Ben LaFreniere ’22 | *John Mohan, Ph.D.*

White Hake are documented as a highly problematic species for traditional age and growth techniques. Otolith geochemistry is a technique of using laser ablation inductively coupled plasma mass spectrometry to characterize elemental profiles that correlate to both environmental and physiological processes over life. This study aims to utilize multidimensional trace element maps to correlate elemental data to age profiles. We aim to utilize this technique to ease the aging process of this problematic species.

**Decary 208 | 2:40-3:00 p.m.**

*Maine Department of Marine Resources*

## Sink or Swim? Variability in Post-Release Mortality of Four Common Shark Species Captured in Shore-based Recreational Fisheries

Addie Binstock ’23 | *John Mohan, Ph.D.*

Catch and release (CR) recreational shark fishing has become “best practice” among anglers to limit deleterious effects on shark stocks. CR relies on the assumption that released sharks survive capture, but research demonstrates that the stress of CR contributes to post-release mortality (PRM). This study characterized post-release behavior and mortality of four species of beach-caught sharks with known variability in physiological sensitivity. Species-specific mortality rate estimates can then be used to improve CR fishing guidelines.

**Decary 208 | 3:05-3:25 p.m.**

*NOAA*

## Using Chemical Histories To Solve Elasmobranch Mysteries

Abigail H.P. Hayne '23 | *John Mohan, Ph.D.*

Successful management of sharks relies on accurate age estimations using vertebral band pairs, but little is understood regarding biomineralization in these bands. The blacktip shark *(Carcharhinus limbatus)* is a well studied species, but questions remain regarding the band pair mineralization and life history differences between populations in the eastern and western Gulf of Mexico. To fill in these gaps, the present study uses chemical histories of vertebrae cartilage to improve management and conservation efforts.

**Decary 208 | 3:30-3:50 p.m.**

*Cooperative Research Program*

# DIRECTORY

# POSTERS BY AUTHOR

# ORAL PRESENTATION SCHEDULE

| | Decary 205 | Decary 206 | Decary 207 | Decary 208 |
|---|---|---|---|---|
| **1:00 – 1:20 p.m.** | Smith | Keogh, Miller, Opsahl, Zrinko | Birdsall | Grady, et al. |
| **1:25 – 1:45 p.m.** | MacMullin | Dimmick, Lupinski, Ruff | Damon | Hernandez |
| **1:50 – 2:10 p.m.** | Cram | Cisek, Feliz, Iddings, Sullivan | Colomey | Padellaro, Curley |
| **2:15 – 2:35 p.m.** | Ellerton | Birch, Pooler, Sarro | Ziccardi | Pinard |
| **2:40 – 3:00 p.m.** | Albano | Caradonna, Lyytikainen, Schwanter | Smith, Shippey, Cram, Massoia | LaFreniere |
| **3:05 – 3:25 p.m.** | Belmer | Barrington, Jacob, Wirbal | Kiehnau, Ruff, Sammons | Binstock |
| **3:30 – 3:50 p.m.** | Arnold | | | Hayne |

# THANK YOU

# THANK YOU!

The 22nd 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.

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.

Thank you also to the many faculty and professional staff members who have volunteered their time and expertise to assist with today's event. Appreciation is also extended to UNE Institutional Advancement, Conference Services, the Research Experience Club, and the Office of Communications for their help executing our event.

Several agencies have sponsored the students' research through fellowships and grants, including the Kennebunkport Conservation Trust, the Gulf of Maine Institute, the UNE Makerspace, the Cooperative Research Program, the Khan Family Fellowship, UNE Office of Research and Scholarship, the UNE SURE program, the Maine Space Grant Consortium, the National Institutes for Health, the Maine Department of Marine Resources, Brookfield-White Pine Hydro, LLC, the National Oceanic and Atmospheric Administration, The Cricket Foundation, the Maine Chapter of the American Chestnut Foundation, the Aquaculture Research Institute, Maine Sea Grant, and Friends of Scarborough Marsh.

Finally, a warm thank you to Jocelyn Nerney for assistance with poster printing and Erinn Stetson for her dedication to making this symposium a success year after year.

*—Dr. Amy Keirstead*

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