2017 Summer Teaching Assistants Fellowship (STAF)
Awardees, Information, and Abstracts

Bauer, Melissa
Program/Dept: NatRsrc:Wildlife&Cons Biology, MS
Chair/Advisor/Coordinator: Russell Congalton, Thomas Lee

Abstract: Habitat loss and fragmentation from land use change reduce connectivity and dispersal among wildlife populations. Isolated populations are at greater risk of extinction due to small population sizes and decreased genetic diversity. The New England cottontail has experienced extensive loss of population connectivity due to fragmentation of shrubland habitat. I will use landscape genetic tools and a novel simulation modeling approach to identify specific landscape influences on cottontail gene flow. I will work directly with managers to predict the impacts of restoration scenarios on cottontail population connectivity and growth and will identify dispersal corridors and release sites for captive-bred cottontails. This summer, I will genotype new samples, build resistance surface models of gene flow in diverse landscapes, and simulate restoration scenarios. This research will allow me to present preliminary findings to managers at a conference in January 2018 and to make significant progress toward completing my thesis the summer thereafter.

Blandina, Alexander
Program/Dept: Psychology, PHD
Chair/Advisor/Coordinator: Ellen Cohn, Robert Ross

Abstract: Trust between consumers and businesses is a dynamic process that leads to both positive and negative outcomes. Therefore, it is imperative to identify factors that maximize consumer trust and minimize consumer trust reduction. To this end, previous researchers examined either fair treatment towards consumers or their relationships with brands. However, researchers have overlooked the potential combined effects these factors have towards facilitating consumer trust. The proposed research will be the first to explore perceptions of fairness and consumer-brand relationships as interacting factors that influence and change consumer trust. To accomplish this, my goals for the 2017 summer semester are two-fold. First, I plan to submit a manuscript for publication which will provide a novel addition to the empirical understanding of consumer trust predictors through consumer-brand relationships and perceptions of justice. Second, I plan to develop the experimental materials required for an experimental paradigm to be used in future experiments.

Breton, Connor
Program/Dept: NatRsrc:Forestry, MS
Chair/Advisor/Coordinator: Peter Pekins, Russell Congalton

Abstract: My project will assess the utility and efficiency of distance sampling, a forest inventory method capable of sampling unique, sparse, and clustered forest components such as large trees (trees ≥18 in. diameter). Current sampling methods for these types of forest components require substantial effort to acquire reliable population estimates and are therefore prohibitively time-consuming and expensive. Distance sampling may provide a simple and cost effective method for quantitatively accounting for forest components such as large trees, which maintain high ecological and economic value. Distance sampling may not only produce reliable population estimates of a given forest component, but also the ability to note and track population changes over time. These data are crucial for improved forest planning and management. The academic purpose of this study is a master's thesis and publication in a peer-reviewed journal relating to forest management.

Bright, Elizabeth
Program/Dept: Chemistry, PHD
Chair/Advisor/Coordinator: Gonghu Li, Erik Berda

Abstract: Single-chain nanoparticles (SCNP) are nature-inspired polymeric chains which have been "folded" with cross-links into nano-sized particles that can perform specialty tasks in biotechnology, medicine, and beyond. Atom-transfer radical coupling (ATRC) chemistry can be used to form cross-links to achieve SCNP. Unlike previous methods of SCNP synthesis, the ATRC reaction is scalable and occurs under mild conditions, and therefore holds the potential to markedly improve the synthetic flexibility and industrial feasibility of SCNP. Widespread adoption of the ATRC reaction to SCNP is currently limited by multiple unexplored variables—especially substrates and catalysts—in the reaction mechanism. To address these limitations, I propose to conduct a systematic study of reaction conditions for classes of industrially relevant substrates. In so doing, I will progress in my program while furthering ongoing work in the laboratory of UNH Professor Erik Berda to understand and begin to replicate the complex macromolecular architectures seen in nature.

Burke, Sophia
Program/Dept: Earth&Environmental Sci, PHD
Chair/Advisor/Coordinator: Steve Frolking, Ruth Varner

Abstract: My PhD research involves the study of methane emissions from shallow ponds in Stordalen Mire located in the permafrost region of Sweden. Peatlands are a large natural sink of organic carbon (OC) due to their slow decomposition rates. Ponds form in permafrost peatlands during thaw due to atmosphere warming and are significant sources of the greenhouse gas methane. Initial results from annual measurements (2012-2016) suggest that emissions are spatially and temporally variable. This summer I will continue this fieldwork by redeploying instrumentation and incorporating the use of unmanned aerial systems (UAS) to monitor temporal changes in pond size. With the STAF fellowship I will be able complete my dissertation proposal and in addition to training a fellow graduate student to assist in sampling at my sites. I plan to submit my proposal to my advisor by the Fall 2017 semester, with the intent of defending it by mid semester.

Calawa, Jennifer
Program/Dept: Microbiology, MS
Chair/Advisor/Coordinator: Cheryl Whistler, Kelley Thomas

Abstract: The overall purpose of my thesis is to research how genomic history affects future evolutionary adaptation, using the model organism Vibrio fischeri and its mutualistic symbiosis with the squid Euprymna scolopes. Over the summer, I will characterize V. fischeri strains H905 and MJ11 phenotypes to describe the structure of regulon mutations after passaging through squid. Observing and explaining the difference in mutations under the same adaptive pressures will contribute both to knowledge of the evolution of mutualism in microbial ecology as well as to my thesis, to describe the genomic context of mutualistic evolution in V. fischeri strains H905 and MJ11.

Coulombe, Jordan
Program/Dept: History, PHD
Chair/Advisor/Coordinator: Kurk Dorsey, Jeff Bolster

Abstract: The Panama Canal remains one of the most iconic landscapes ever created. Despite this, historians have yet to research the energy regimes that enabled its creation. My dissertation, "Asses, Atoms and Energies in Between: Crossing the Panamanian Transit Zone" will argue that historians cannot understand the Canal, nor other attempts to traverse the Isthmus without emphasizing the importance of energy, a concept that historian Richard White has defined simply as "the capacity to do work." Specifically, my project will help the energy and environmental history of Panama gain steam by suggesting that energy catalyzed the human creation of a hybrid landscape in Panama. I intend to use the Summer TA Fellowship to travel to the National Archives in Washington D.C. and the George A. Smathers Library in Gainesville, Florida which house substantial records on Panama and the ways energy sources reshaped it.

Dalpe, Allisa
Program/Dept: Ocean Engineering, PHD
Chair/Advisor/Coordinator: Diane Foster, May-Win Thein

Abstract: As a Ph.D. student in the Ocean Engineering department, my research involves Autonomous Surface Vehicles (ASV), Unmanned Underwater Vehicles (UUV), and Remotely Operated Vehicles (ROV). Proposed work for the summer includes the development of simulation and testing techniques for autonomy and control systems of ASVs. Development in autonomous systems is important for a variety of marine uses such as oceanographic data collection, underwater exploration, and ocean mapping. Addressing and succeeding with autonomous control of an ASV will be a breakthrough for this research. Once a single surface vehicle is made autonomous, the methods can be applied to a single UUV, multivehicle platforms, and the long term goal of a combined ASV-UUV platform. Therefore, testing and simulation of developed ASV autonomy strategies during the summer will make for a critical research stage, and will lay the foundation for the rest of my academic program.

Dean, Sarah
Program/Dept: Psychology, PHD
Chair/Advisor/Coordinator: Robert Ross, Edward O'Brien

Abstract: My proposed project, "Text Elements and Perspective During Reading," will systematically explore the text conditions under which readers adopt the perspective of the protagonist. No studies to date within the discourse processing literature have explored the impact of literary points of view upon online reading comprehension. These experiments will contribute to the comprehension literature by expanding our knowledge of how and when reader's incorporate perspectives into their representation of the text. Further, understanding reader's ability to take perspectives, or place themselves in the protagonist's shoes, has implications for using narratives to explore the social skills involved in Theory of Mind— the ability to understand that other people have their own thoughts, ideas, and intentions driving their behavior. This research is critical to my academic plan because it extends my previous work, will be incorporated into my dissertation, and establishes pathways for future lines of research.

Demers, Jennifer
Program/Dept: Psychology, PHD
Chair/Advisor/Coordinator: Victoria Banyard, Robert Ross

Abstract: My dissertation adds to the subfield of social psychology by examining activism in light of new understandings about identity and changing definitions of community. Psychologists know that social identity (e.g., female) is one factor that drives individuals to participate in activist activities. However, past studies ignored that individuals hold multiple, intersecting, social identities. This study aims to build on recent findings that suggest that having a greater awareness of issues related to the intersectionality of these social identities may be associated with participating in activist activities. This study will also explore the potential relationship between awareness of intersectionality and activism within a new community context, social media, and examine a wide range of low- to high impact activist activities that can originate online. The work I complete on this research over the upcoming summer will advance my dissertation, ensuring that I remain on schedule to graduate in May of 2018.

Disenhof, Corinne
Program/Dept: Civil Engineering, MS
Chair/Advisor/Coordinator: Jean Benoit, Ricardo Medina

Abstract: Rock fall is a hazard to New Hampshire's roadways from rock cuts around the state. I propose to use high-resolution data from light detection and ranging (LIDAR) technology for rock cut hazard assessments in New Hampshire, in order to compare the quality of this technique to existing methodologies and to aid in hazard preparation by expanding the number of modeled rock cuts. If feasible, this technique could decrease the need for individual site surveys where airborne LIDAR is available. This project examines the application of airborne LIDAR data, geographic information systems, and critical geologic and engineering data to classic geotechnical engineering analyses. The work during the summer of 2017 will use the results of a spring semester independent study of geospatial analysis methods, and it will form the basis for analyses planned for the fall 2017 semester.

Dittrich, Meaghan
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Cristy Beemer, Robin Hackett

Abstract: My dissertation will focus on the rhetoric of feminist food activism. This research will examine how language and communication surrounding food access/ food justice/ food security brings about positive change (and how it sometimes also falls short). This summer I plan to do archival research to set up my historical and contextual chapter of the dissertation. That chapter will illustrate precedent for food protests in the past, such as examples of food activism in early years at Harvard and in historical cookbooks located at the Bowdoin College archives, respectively.

Duback, Victoria
Program/Dept: BSCI:Integrative&Organismal, MS
Chair/Advisor/Coordinator: Jessica Bolker, Winsor Watson

Abstract: There are many human diseases that are influenced by altered circadian rhythms, such as seasonal affective disorder. Subsequently, there is ample knowledge about the molecular mechanism of clocks that drive behavior, but little is known about how clocks influence the expression of specific behaviors. I am investigating this question with a marine mollusk (Melibe leonina) for my graduate research. I plan to identify the clock neurons using immunohistochemistry and in June, I will stimulate the clock neurons intracellularly while simultaneously recording from the neurons that produce rhythmic behaviors. Once we learn how circadian clocks influence specific behaviors in this model system, we will be able to apply this knowledge to humans and perhaps improve the treatment of certain ailments. If my summer project is successful, I hope to defend my Master's thesis in August and continue investigating circadian clocks as I pursue a PhD in the Fall.

Elliott, Mary
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Dennis Britton, Robin Hackett

Abstract: My summer research project will focus on archival research into John Milton's college writings at Christ's College, Cambridge to enrich my PhD dissertation, tentatively entitled, "Adolescent Becoming: Shifts in Grammar School Pedagogy in the Works of Shakespeare and Milton." My dissertation examines early modern pedagogical shifts in grammar school education between the time of Shakespeare (late-1500s) and Milton (mid-1600s). As Milton's alma mater, Christ's College as well as the Cambridge University Library provide a wealth of original printings of the poet's works, from college writings to his later masterpieces. By tracking changes in his rhetoric, I can better discover how changes in prominent pedagogies of the age manifest in his works. I also plan to visit the Milton Cottage, which holds first editions of Paradise Lost and Paradise Regained and is the site at which Milton first began composing his great epic.

Ennis, Nathaniel
Program/Dept: Microbiology, PHD
Chair/Advisor/Coordinator: Louis Tisa, Cheryl Whistler

Abstract: Ecological studies on bacterial populations under extreme environments are focused on understanding how these organisms survive and function under inhospitable conditions. The unexplored stone-dwelling bacteria, Geodermatophilaceae, are linked to stone degradation in ruins around the world and can survive in such extreme environments. In this project I will perform metagenomic analyses of bacterial DNA isolated from stone ruins of Tunisian, Indian, and Mayan sites to determine the bacterial profiles present. I expect that these ruins will host distinct bacterial communities based on differing environmental factors, but the Geodermatophilaceae should be present as core community members. By exploring these distinct sites, we may determine specific environmental factors that influence similar extremophile biology. This project will provide insight for further studies into the population distribution of bacteria living in extreme environments. The data obtained from this study is instrumental to future research on the ecological and functional properties of stone-dwelling bacteria.

Fifty, David
Program/Dept: Mathematics Education, PHD
Chair/Advisor/Coordinator: Edward Hinson, Rita Hibschweiler

Abstract: I will study operators on function spaces, an area of analysis in pure mathematics, which constitutes my Minor Project. By furthering my analysis background, I will be more qualified to research undergraduate analysis courses from an educational standpoint. This is rarely studied in mathematics education. Since I passed two comprehensive exams last summer, I will be taking my last two this summer, so this is a natural time to complete my minor project. By continuing my studies this spring and into the summer with Professor Hibschweiler, I will be able to finish my project and my Minor Presentation by the Fall 2017 Semester. After completing this project, I will be able to start my dissertation research in Math Education. This work will better qualify me to teach upper-level undergraduate math classes, as I envision myself working in a math education program situated within a math department.

Fischer, Fernanda
Program/Dept: Civil Engineering, MS
Chair/Advisor/Coordinator: Ricardo Medina, Raymond Cook
Abstract: The purpose of the summer research is to analyze the fatigue performance of the welds at the connections used in the Memorial Bridge located between Portsmouth, NH and Kittery, ME. The bridge has an innovative and unique gussetless connection design, avoiding problems with gusset plate connections, such as the ones associated with the collapse of the I-35W Mississippi River Bridge. Using fatigue testing, the welds in specimens representative of the gussetless connections of the Memorial Bridge will be tested. These tests will be conducted with connections with different bend radii using measured data from instrumentation currently in place at the bridge. Increasing our understanding of the behavior of the gussetless connection will help focus bridge inspections on critical locations, and, more importantly, increase the safety of the bridge. Moreover, data obtained from the abovementioned fatigue tests will provide valuable information for future bridge designs that utilize similar gussetless connections.

Fornauf, Beth
Program/Dept: Education, PHD
Chair/Advisor/Coordinator: Georgia Kerns, Hadley Solomon
Abstract: Self-efficacy is the perception of one's ability to successfully carry out a task in order to meet a particular goal (Bandura, 1977). Teachers' self-efficacy can affect their motivation, practices, and beliefs about their students. This qualitative study explores the development of prospective teachers' self-efficacy for teaching students labeled with disabilities. Because self-efficacy is more malleable early in the learning process, the initial experiences of prospective teachers during their student teaching field experience (internship) may have a strong impact on their perceptions of competence. Yet research on this topic is sparse, and mostly quantitative. I will interview teaching interns, and analyze data this summer. My results will inform the development of an instrument to measure self-efficacy of early career teachers for teaching students labeled with disabilities. This research will contribute to my dissertation, in order to better understand how elements of the internship influence self-efficacy for teaching this population.

Ghorbanpour, Saeede
Program/Dept: Mechanical Engineering, PHD
Chair/Advisor/Coordinator: Marko knezevic, Brad Kinsey

Abstract: Recently additive manufacturing processes have been considered as replacements for the conventional methods of building complicated geometries. Among these novel methods direct metal laser sintering (DMLS) has been attracted especial attention since it provides greater flexibility in geometries of products which leads to a reduction in the secondary machining time and costs. In this study, we intend to introduce a new manufacturing method for a cobalt base superally which requires making sure that the parts perform satisfactory. For this purpose, experimental procedures followed by the modeling parts will be performed. Tension, compression, fatigue, and creep tests as well as EBSD and SEM scans give us an accurate insight into the mechanical behavior of the material. Besides, the mentioned tests provide us the data for the modeling part. After accomplishing the experimental procedures, simulating the yield stress is considered for the summer and the rest will be done during the fall.

Gray, Kyle
Program/Dept: Mathematics, PHD
Chair/Advisor/Coordinator: Maria Basterra, Rita Hibschweiler

Abstract: Some of the most powerful tools in mathematics are mechanisms called cohomology theories: machines that convert geometric shapes into algebraic structures. Unfortunately, cohomology theories are often very difficult to compute, and therefore much of their potential is still untapped. In an effort to better utilize cohomology theories, mathematicians study closely related objects called spectra. If a cohomology theory is a machine, then a spectrum is an assembly kit; it tells us how the machine is constructed. Moreover, if a spectrum admits an additional structure called an E-n operad action, its corresponding cohomology theory becomes much more manageable. This summer, I will familiarize myself with two fundamental strategies for determining when a spectrum admits an E-n operad action. This work will serve as an important stepping stone towards the completion of my dissertation, the goal of which is to unify these strategies and develop stronger tools for calculating cohomology theories.

Green, Jason
Program/Dept: Mathematics, PHD
Chair/Advisor/Coordinator: Rita Hibschweiler, Dmitri Nikshych

Abstract: I plan to research Hopf algebras and category theory in order to add to the working knowledge on when finite-dimensional representation categories of semi-simple Hopf algebras are weakly group-theoretical. At this time, it is known that these categories are weakly group-theoretical when the dimension is p^(a)q^(b), for primes p and q, and for non-negative integers a and b. My goal is to study these categories with square-free dimension. This research will aid in the classification of finite-dimensional representation categories of semi-simple Hopf algebras and will support my goal of studying tensor categories.

Hartwick, Meghan
Program/Dept: Molec & Evol Systems Biology, PHD
Chair/Advisor/Coordinator: David Plachetzki, Stephen Jones

Abstract: The emergence of Vibrio parahaemolyticus disease in New England, acquired from the consumption of locally harvested shellfish, has raised important questions about the current dynamics of local ecosystems. We have developed ecological models using times series and non-parametric statistical methods to identify conditions and temporal trends to characterize the ecology of V. parahaemolyticus in the Great Bay Estuary. The results of these analyses highlight important relationships for this region between V. parahaemolyticus, phytoplankton and seasonality. Using established collaborations and data analysis methods, I will investigate the interactions between V. parahaemolyticus and these environmental conditions to improve our understanding of the trends and patterns that contribute to V. parahaemolyticus concentration variation here in the Northeast. The completion of these analyses will ultimately provide the knowledge needed to produce effective forecasting systems aimed at the prevention of future local disease outbreak, which is the goal of my research at UNH.

Hill, Jennifer
Program/Dept: Genetics, PHD
Chair/Advisor/Coordinator: Adrienne Kovach, Subhash Minocha

Abstract: The tidally-influenced saltmarshes of the eastern United States are extreme environments, and organisms who live there must be equipped to contend with fluctuating salt levels, high risks from predators, and the twice daily flooding of their habitat. Because of these conditions, the species who live in saltmarshes tend to be highly specialized, with traits that allow them to survive and reproduce despite the harsh conditions. This study will examine adaptation and evolutionary divergence between six species of sparrow that each use the saltmarsh ecosystem in different ways and show different levels of specialization to it. This summer, during the breeding season, I will finish sample collection and begin the process of genomic analysis of each of these tidal marsh-dwelling birds. My project will provide insight into the adaptations and evolution of these sparrows specifically, and the genomic signatures of divergence between species and populations more broadly.

Holt, Carter
Program/Dept: Chemistry, PHD
Chair/Advisor/Coordinator: Richard Johnson, Glen Miller

Abstract: Graphene derivatives are a highly sought after class of molecules due to their unique structural and electronic properties. They possess the potential to be used as qubits in quantum computers which could revolutionize the field of computer engineering, something becoming more and more prevalent in today's electronic world. One such molecule in this class is Triangulene, which has been theorized, but never synthesized. The goal of this project is to synthesize triangulene in 6 steps from readily available starting materials and monitor its unique electronic properties for the first time. This research will provide valuable lab experience and allow me to hone my proficiency in the use of instrumental equipment.

Ineson, Katherine
Program/Dept: Nat Resrces & Envirn Stdy, PHD
Chair/Advisor/Coordinator: Jeff Foster, Lynne Cooper

Abstract: Bat populations in North America are currently experiencing rapid declines due to an emerging infectious disease known as white-nose syndrome (WNS), which is caused by a fungus. Little brown bats are one of the hardest hit species, losing over 90% of the population in the Northeast, yet little is known about the impacts of WNS on summer maternity colonies. My research will fill in these gaps by using a mark-recapture design to estimate survival and reproductive rates and whether juveniles are being recruited into the adult population. This summer will be the second of a minimum of three years of fieldwork necessary to gather enough data to perform mark-recapture analyses. The results will be used to predict population trajectories and to develop conservation strategies that promote the recovery of the species, which will also restore the valuable ecosystem services that these bats provide, such as insect suppression.

Kenter, Linas
Program/Dept: Zoology, PHD
Chair/Advisor/Coordinator: Larry Harris, David Berlinsky

Abstract: Most of the world's wild fisheries are currently overexploited and failing to meet the global demand for seafood. The growth and development of the aquaculture industry has now become essential for meeting these global needs. One major obstacle to progress, however, is the lack of species domestication considered common practice in terrestrial animal farming. The farming of fish is still most often dependent on wild or unselected populations for juvenile production. The objective of my research is to compare distinct, geographic strains of striped bass from the Atlantic and Gulf coasts for superior aquaculture performance. Growth rate and stress response comparisons among strains will provide the initial information necessary to implement selective breeding practices on a species that demonstrates great potential for farming. During the summer of 2017, I will conclude the final lab work, analysis, and prepare publications with a goal of graduating by the 2018-2019 academic year.

Khatiwada, Sital
Program/Dept: Mechanical Engineering, MS
Chair/Advisor/Coordinator: Brad Kinsey, May-Win Thein

Abstract: This research explores the implementation of fault-tolerant control systems on a UAV platform which allows for safe recovery and/or mission completion despite subsystem failures. Specifically, scenarios will be explored to observe the response of a fault-tolerant control system upon various combinations of motor failures induced on a quadrotor and/or twinrotor platform midflight. The controller would engage once the onboard computer detects the motor(s) at fault, and proceeds to stabilize the quadrotor with the remaining operational rotors. The goal is to implement, test, and stabilize the platform with the controller embedded upon the conclusion of the summer. Due to lack of motor failure fault tolerant quadrotors available commercially, the proposed design would significantly improve quadrotor function, safety, and longevity. The implementation, once completed over the summer, will allow for fine-tuning fault-tolerant algorithms and testing upon more sophisticated rotor-based UAVs, in addition to sensor-fault tolerant controller integration into UAVs.

Knecht, Richard
Program/Dept: Earth Sciences: Geology, MS
Chair/Advisor/Coordinator: James Pringle, William Clyde

Abstract: My research is a 'resurrection ecology' study that synthesizes traditional paleontological techniques with analytical genomics using the freshwater microcrustacean genus Daphnia as a means to study the processes of speciation and evolution. Using established methods subfossil eggs will be recovered and revived from lake sediment to compare historical and modern populations. This summer I will core three ponds that are separated by distance and elevation but that are hydrologically related. The cores will be dated using 210Pb and 137Cs isotope dating methods. Sedimentological analysis of the lake cores will also be conducted in an effort to identify allocthonous and autochthnous events to determine whether abiotic changes coincide with changes in genetic diversification. This master's project shows great promise to not only answer questions about Daphnia but larger questions about evolution as well and perhaps give us insight into the future effects on species in a rapidly changing world.

Koetje, Kara
Program/Dept: Ocean Engineering, MS
Chair/Advisor/Coordinator: Thomas Lippmann, Diane Foster
Abstract: Coastal zones are globally vital regions that undergo constant change through dynamic interactions between the land and the sea. With a changing climate, predicted sea level rise, and increase in frequency and strength of extreme weather events, it will only become more critical to understand the dynamics that impact our coasts. Despite this, there is a significant lack of understanding of the coupled physical and geochemical interactions that take place at the water-sediment interface within coastal zones. The goal of my research is to transform our understanding of how and when nutrients are released from the sediments in surf zones and tidal estuaries due to sediment mobilization and resuspension. In the summer of 2017, I plan to complete all necessary field observations and write my Master's thesis. My research will further our understanding of fluid-sediment interactions and nutrient release so that we can better manage and protect our coasts and estuaries.

Langley, Katharine
Program/Dept: BSCI:Integrative&Organismal, MS
Chair/Advisor/Coordinator: Jessica Bolker, Jim Haney

Abstract: Cyanobacteria in lakes produce microcystins (hepatotoxins), and BMAA (neurotoxin) that are harmful to wildlife and linked to liver disease and ALS in humans. Recently, it was discovered that toxins may become aerosolized, and are more toxic through this route of exposure. In the first part of my Master's research last summer I examined cyanotoxins in the aerosols emitted from a range of lakes with differing cyanobacteria abundance. During the summer of 2017, I will investigate factors regulating aerosolization by performing a series of controlled lake mesocosm experiments to manipulate physical factors (temperature and evaporation) and biological factors (zooplankton grazing and fish predation). The results of my research will contribute to a better understanding of factors regulating lake aerosols, their toxicity, and the potential risks of their inhalation. This research must be conducted during the summer when there is an abundance of cyanobacteria in New Hampshire lakes.

Lavendier, Danielle
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Robin Hackett, Cristy Beemer

Abstract: The effects of fat bias in the classroom are hard to measure, but are surely damaging, both to the teacher being judged and the class as a whole. Bias can result in lower teacher evaluations as well as create a negative classroom environment, unsuitable for learning, and may leave students feeling alienated and frustrated. Moving towards writing my dissertation, which will focus on bodily rhetorics, I see that one of my chapters will focus on fat bias in the classroom and for the writing of that chapter I intend to interview teachers of size about their experiences teaching with a large body. Ultimately, I hope to articulate ways teachers can counter bias in the class. This work will contribute to the growing interest in fat studies which is crossing over into Composition and Rhetoric.

Lemkus, Trent
Program/Dept: Statistics, PHD
Chair/Advisor/Coordinator: Rita Hibschweiler, Haiying Wang

Abstract: I am currently performing research for a paper on Algorithmic Subsampling. Algorithmic Subsampling is a field with the goal to reduce inordinately large data sets into smaller data sets whilst still containing as much of the salient features of the larger data set as possible. The subsequent purpose is to fit a model to this smaller data set of which my focus is Ordinary Least Squares Regression. My research is seeking to produce a new algorithmic method that improves on the current methodology by minimizing the variance and bias of the regression estimates. This paper will contribute an improved algorithm to the repertoire of subsampling algorithms available to "Big Data" industries and the Statistics community as a whole. More importantly it will serve as the basis to my final doctoral dissertation at UNH in which the topic will be within Algorithmic Subsampling.

McCullough, Corey
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Robin Hackett, Cristy Beemer

Abstract: Collecting a Discipline: The National Archives of Composition and Rhetoric, Past, Present, and Future.
Addressing calls for increased historical research on the development of archives in the field of composition and rhetoric, the first part of my dissertation uses archival documents and oral histories to research the evolution and long-term vision of the National Archives of Composition and Rhetoric (NACR) housed jointly at UNH and URI. The second part of my project is a corpus analysis of the two major collections of publishing house documents that are part of the NACR. Focusing on textbook reviews, correspondence, and financial/circulation data, I examine how the discursive threads and pedagogical ideas at play in the evolving field of composition and rhetoric are represented in textbook reviews and correspondence by early figures in the field of composition and rhetoric who worked simultaneously in the publishing industry and in English departments.

Means, Jillian
Program/Dept: Microbiology, MS
Chair/Advisor/Coordinator: Cheryl Whistler, Kelley Thomas

Abstract: A hyper-virulent, invasive strain of Vibrio parahaemolyticus has recently established persistent populations in the Northeast. I am investigating the impact of a bacteriophage on the ecological fitness of this emergent pathogen, filling a critical gap in knowledge regarding population dynamics, virulence and transmission of environmental pathogens. This summer I will work towards determining the direct competitive impact of the phage on the bacteria, demonstrating potential mechanisms by which it effects fitness, including possible avoidance of eukaryotic predatory grazing. This will fit into my overall academic plan of characterizing the attributes of invasive V. parahaemolyticus which allow it to successfully persist despite robust local populations of V. parahaemolyticus, eventually through bioaccumulation assays in oysters, cytotoxicity testing and genomic analysis.

Miller, Kelsie
Program/Dept: BSCI: Marine Biology, MS
Chair/Advisor/Coordinator: David Berlinsky, Jessica Bolker
Abstract: Black sea bass (BSB) have been investigated as an aquaculture species due to high market demand and limited seasonal availability. BSB are sequential hermaphrodites, meaning they change sex from female to male when they are 2 to 5 years old. However, sex change occurs much earlier when in captivity making it difficult to maintain female broodstock, an obstacle to successful culture. My research is examining whether captivity-related stress is the cause for this rapid, unnatural sex change. This research will provide valuable information to help mitigate the early sex change of BSB and understand how stress impacts sex change of other hermaphroditic species in captivity and in the wild. The Summer Teaching Assistant Fellowship will contribute to my academic plan by allowing me to finish laboratory work and begin a new experiment to provide a full story of the physiology behind early sex change in BSB.

Orde, Kaitlyn
Program/Dept: Biological Sci:Agricultural, MS
Chair/Advisor/Coordinator: Jessica Bolker, Rebecca Sideman

Abstract: The future of agriculture in New England depends on the adoption of more profitable and efficient cropping systems. Currently, the strawberry plant-type most cultivated in the region limits production to 4-6 weeks each year. These "June-bearers" restrict earning potential for growers and fail to meet consumer demand beyond this fleeting season. Alternate "everbearing" varieties extend production to 5 months in the Northeast and often quadruple yields per acre. However, due to an absence of information on the performance of everbearing varieties in New England, they have not yet been widely adopted. Yield and fruit quality information is crucial before sound recommendations can be provided to growers. This variety trial aligns with my season extension research, directly reinforces the mission of COLSA to provide practical applications of scientific research, and supports local agribusiness, which contributes significantly to the character and quality of life in New Hampshire.

Patenaude, Brian
Program/Dept: Chemistry, PHD
Chair/Advisor/Coordinator: Samuel Pazicni, Glen Miller

Abstract: In order to reduce the global impact due to fossil fuel consumption, clean energy sources such as hydrogen and solar energy must be harnessed. In nature, the class of enzymes known as hydrogenases harness solar energy to produce hydrogen with great efficiency, although the mechanism of reaction is still an active field of research. Current model complexes for the hydrogenase active site lack the catalytic efficiency of the native enzyme. The proposed research aims to synthesize and characterize an artificial [FeFe]-hydrogenase enzyme via exploiting the strong binding interaction of the small molecule biotin and the protein avidin. The biotin-avidin system proposed for this research will generate a new substrate for the study of the hydrogenase mechanism. This substrate will address the issues of water solubility, binding pocket size, and allow for electronic and stearic tuning of the catalytic iron cluster to enhance hydrogen production.

Relethford, Zane
Program/Dept: Chemistry, PHD
Chair/Advisor/Coordinator: Christine Caputo, Gonghu Li

Abstract: In order to meet growing energy demands without contributing to climate change, new catalysts are required to convert small molecules into carbon-neutral fuels. Photocatalysts which harness solar energy to drive these chemical reactions generally require expensive metals and/or are unstable, preventing implementation on an industrial scale. I intend to design and test new compounds for photocatalytic ability. Through deliberate design of compounds based on structural and functional features of leading electrocatalysts and photosensitizers, it is possible to use earth-abundant metals in place of their expensive counterparts to achieve the production of hydrogen gas or other sustainable fuels. Each new compound is variable and can be geared toward catalyzing specific reactions while remaining water-soluble and capable of absorbing visible and ultraviolet light. This project involves testing these compounds for electrocatalytic activity, a necessary step toward robust photocatalysis.

Remiszewski, Kiley
Program/Dept: Earth&Environmental Sci, PHD
Chair/Advisor/Coordinator: Steve Frolking, Julie Bryce

Abstract: Mycorrhizal fungi work with trees to form a vast network beneath the forest floor. Water, nutrients, and information can be passed along, like conversations through a telephone wire, from one tree to another via the tree roots and fungal hyphae. Mycorrhizal fungi can help their host tree gain increased access to vital nutrients by enhancing weathering but there is debate over how effective different types of fungi are at this process. Using geochemical analyses of both field and greenhouse experiments my dissertation work will increase our understanding of the impact mycorrhizal fungi have on weathering and nutrient cycling over a changing geologic gradient. Additionally my work this summer will examine the impact that vegetation changes and increased drought events will have on fungal health and weathering. This work has important implications for nutrient cycling, forest health, and management practices in the future as our climate changes.

Rothenheber, Derek
Program/Dept: Microbiology, MS
Chair/Advisor/Coordinator: Stephen Jones, Cheryl Whistler
Abstract: Each year millions of people visit the Northeast, particularly southern counties of Maine, home to the region's most popular beaches. Ensuring the water at these beaches is clean and safe for swimming is not only a major public health concern, but it also presents a multi-faceted challenge for municipalities to manage. This study seeks to implement the use of emerging technologies to study fecal pollution in recreational waters to answer a set of applied and research objectives. Over the past two summers I've collected data that has already informed beach management decisions and has provided solid evidence pertaining to my thesis work. The outcome of this study will provide new insights to old and novel dynamics of fecal pollution in recreational water ways. Work done this summer will help me publish manuscripts, present my findings, and finish my Master's thesis.

Sheckler, Elizabeth
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Robin Hackett, James Krasner
Abstract: My project explores asylums in Victorian fiction as fraught spaces of caregiving. Victorian novelists including Wilkie Collins, Charlotte Brontë, Bram Stoker, Lewis Carroll, and others include (often female) characters in their fiction that, when in proximity to asylum or "mad" spaces, lose their rights to personal identity. These literary representations, coupled with archival research, can teach us much about the often chilling reality of how bodies were controlled inside asylums. By researching and completing this fifth chapter of my dissertation, which explores a variety of Victorian caregiving spaces, my work will complement and build upon nineteenth century scholarship interested in insanity and gender, like Valerie Pedlar's work on male madness, by expanding current dialogues to include special attention to spatial dynamics. This chapter provides an important contrast to other medical spaces covered in my larger project, like homecare, in which individuals were afforded more social freedom

Short, Lauren
Program/Dept: English, PHD
Chair/Advisor/Coordinator: Robin Hackett, Cristy Beemer

Abstract: My study examines the differences between male students at Harvard and women at Radcliffe from the 1880s to the 1930s. Since Radcliffe was the only sister college to employ Harvard faculty (who also taught the men at Harvard) I am interested in the differences between the education of the men and women. Given Harvard's reputation in the field as having officially created the course in Composition apart from Oratory, I am curious to discover if the women at Radcliffe were educated in the some way as the men at Harvard or not. Either result would be interesting because it would provide insight into the development of Composition as a field that often attempts to include an understanding of all voices. It is through history that many fields come to an understanding of how we made it to where we are now and how best to move forward.

Stark, Meghan
Program/Dept: Genetics, PHD
Chair/Advisor/Coordinator: Subhash Minocha, Jeffrey Foster

Abstract: White-Nose Syndrome is one of the most important wildlife diseases in modern times, with devastating impacts on the bat populations and the ecosystem services they provide; however, very little is known about the interactions that exist between its causative agent, Pseudogymnoascus destructans, and the bat microbiome despite the potential for microbes on bats to directly affect disease outcomes. The objective of this study is to determine the potential effects of bacterial and fungal species on bat skin and their relationship to P. destructans infection and disease severity. This study is comparing bat microbiome composition while looking at biotic and abiotic factors potentially influencing bat skin microbiomes, using skin swab samples collected from 2011–2015 throughout the United States. The results from this study will aid in the understanding of White-Nose Syndrome, contribute to the field of disease ecology, and inform the design of the next steps in my dissertation research.

Strobel, Matthew
Program/Dept: Genetics, PHD
Chair/Advisor/Coordinator: Xuanmao Chen, Subhash Minocha
Abstract: Adenylyl cyclase 3 (AC3) is an enzyme found across most vertebrate species but is only expressed in neuronal and olfactory primary cilia. While AC3 is well studied in the olfactory system very little is known about how it impacts neuronal primary cilia even though it has recently been linked to several diseases in humans. Our lab previously generated AC3 knock-out mice where all AC3 activity was silenced, which led to obesity and depression. However, we still do not understand how AC3 is interacting with the brain to cause these conditions. To uncover this we are developing mouse strains where we can silence AC3 activity in specific brain regions as well as a gain-of-function model. Over summer I will be phenotyping these different strains to determine where in the brain AC3 impacts. This is an entirely new area and will help evolve how we diagnose and treat obesity and depression patients.

Van Horn, Rebecca
Program/Dept: Writing, MFA
Chair/Advisor/Coordinator: Ann Williams, Susan Hertz

Abstract: Within the social justice movement, people turn to theater, art, protest, song, and writing in order to spread a message of transformation. However, there is another form often forgotten but extraordinarily effective: puppetry. In summer 2017 I hope to travel to Glover, Vermont; Boston, Massachusetts; Atlanta, Georgia; and Chicago, Illinois, to visit puppetry museums and interview puppeteers about the role of the puppet in both depicting and creating social change. Historically, this has included Nazi resistance, anti-war protests, and economic recovery messaging. Today, this includes anti-bullying and regime change campaigns. With this trip, I hope to write a series of essays that not only contributes to my MFA thesis but also adds to a rich and important global narrative about art and resistance—and what it means to speak from behind a mask.

Varsanyi, Petra
Program/Dept: Electrical&Comp Engineering, PHD
Chair/Advisor/Coordinator: Andrew Kun, Wayne Smith

Abstract: The research project I'm working on this summer is about discovering how to design a modern environment. In our study we will utilize a multi-touch table and collect data using eye-trackers. We would like to understand how can we use large multi-touch displays so that we make group work more effective and enjoyable. Multi-touch displays are available nowadays and large-scale displays are also likely to become ubiquitous. However, there is not enough information about how to design such environments. For this, we observe the behavior of each person in the group while they are solving a simple collaborative task using the table. Our previous solution was encouraging, but the next step is to create a more accurate system, now with an additional camera mounted above the table to get a top view of the table and the participants.

Zhang, Zhiming
Program/Dept: Electrical Engineering, MS
Chair/Advisor/Coordinator: Qiaoyan Yu, Andrew Kun

Abstract: I am working on the security for embedded system. I focus on mitigating buffer overflow attack, one of the biggest threats for embedded systems, in hardware level. Security is the most important issue for electrical engineering. Imagine a car, which is equipped with intelligence embedded systems, is running on highway. Someone with malicious intention may control it through internet, such as using WIFI. In this case, it will be very dangerous if the break is pressed suddenly by attackers. Many companies like Facebook or Intel are also planning to enroll more employees for their security group. This project is also helpful for my major study. I major in Electrical Engineering. I focus on integrated circuit, microprocessor, hardware programming, etc. Through learning the OpenRISC processor and modifying it to defeat buffer overflow attack, I can obtain good experience for my academic research.

Zhao, Meng
Program/Dept: Statistics, PHD
Chair/Advisor/Coordinator: Rita Hibschweiler, Ernst Linder

Abstract: To respond to the needs of decision makers to plan for climate change, there are a variety of climate model outputs under different greenhouse gas emission scenarios. Many statistical downscaling methods have been suggested to predict future local weather variables, such as precipitation and temperature. In my summer work, I propose a characterization of statistical downscaling that will enable uncertainty quantification related to the downscaling method, something that is currently absent from the literature, but is crucially required for engineering design. I will further examine various techniques of optimally combining multiple climate model outputs to improve precision of local impact assessment. The work proposed for this summer will form the first two parts of my dissertation and is critical for my ongoing dissertation research. The results of this work will represent a crucial part of the unifying statistical framework for statistical downscaling that I'm proposing to develop for my dissertation.

Zhou, Yuxin
Program/Dept: Biochemistry, PHD
Chair/Advisor/Coordinator: Xuanmao Chen, Feixiao Chu

Abstract: My main goal is to optogenetically manipulate ciliary cAMP levels in living mouse and study its effect of major depressive disorder. And the goal of summer is to genetically engineering photo activated adenylyl cyclases(PACs) into neuronal primary cilia, a fusion protein Arl13b-bPAC, as research tools to facilitate the study of ciliary cAMP signaling and express this protein in cells and in vivo.

Zukas, Brian
Program/Dept: Chemical Engineering, PHD
Chair/Advisor/Coordinator: Nivedita Gupta, Russell Carr

Abstract: The ability to produce zinc oxide nanoparticles with a narrow size distribution and controllable size is of interest for applications from water treatment to solar cells. The goal of this proposed work is to use microfluidic droplet reactors to synthesize zinc oxide nanoparticles. Constructing and successfully operating a microfluidic droplet reactor is not a trivial task. The advantage of using a microfluidic droplet reactor with dimensions on the order of 100μm is the decrease in the time required for mixing and heating compared to reactors with larger channels. The small channel dimensions combined with droplet volumes on the order of 1 nL should lead to narrower particle size distributions and smaller mean nanoparticles sizes. This will complement my current Ph.D. research which has been focused on millimeter scale reactors. Using micrometer scale reactors will allow me to investigate any scaling relationships that occur across a range of droplet reactor dimensions.