# 2018 Summer Teaching Assistants Fellowship (STAF)

## Awardees, Information and Abstracts

**Belknap, Kaitlyn**
**Program/Dept: Genetics, MS**
**Chair/Advisor/Coordinator: Brian Barth, Subhash Minocha**

*Abstract*:
Many new therapies have been developed against the blood cancer Leukemia, however almost 25,000 people died from the disease last year. Antileukemic compounds are produced as metabolites by bacteria and plants; these are called natural products. In this project, we propose the generation of a novel antileukemic natural product, by biotransforming the plant Devil's club with an Alaskan bear gut bacterium. Devil's club has been used in traditional Alaskan medicine for hundreds of years to treat cancer. Streptomyces is a bacteria found in animal intestines, including bears, that produces compounds used in cancer drugs. This project contributes to the disciplines of cancer pharmacology, microbiology, and the connection between them. This novel take on the marriage of microbiology and cancer pharmacology could insight a new method of drug discovery. Based on the results of this study, my master's thesis is to explore the novel anti-leukemic compounds generated from Streptomyces.

**Bender, Oliver**
**Program/Dept: BSCI: Marine Biology, MS**
**Chair/Advisor/Coordinator: David Berlinsky, Jessica Bolker**

*Abstract*:
Brown bullhead catfish, Ameiurus nebulosus, are a potential sustainable aquaculture species which require little protein to survive. A first step in producing fish is obtaining larvae lab spawning. A. nebulosus are currently being held at 4°C at the Aquaculture Research Center at UNH. Females will be injected with hormones to induce spawning and have them produce eggs. Males will be used to fertilize the eggs. Eggs will be cared for in MacDonald jars with high oxygen and water movement to prevent fungus. After they hatch they will be moved to a recirculating aquaculture system for the remainder fed a larval fish diet. Growth and development will be monitored. Future research in bullhead aquaculture will require a naïve population of juvenile fish produced by this project. This will lead to a better understanding of their protein requirements, growth rates, and their viability as an aquaculture species.

**Borghei, Seyed Amin**
**Program/Dept: Civil Engineering, PHD**
**Chair/Advisor/Coordinator: Majid Ghayoomi, Ricardo Medina**

*Abstract*: Earthquakes are natural hazards which can threaten people's lives and belongings. To design earthquake resistance structures, it is crucial to estimate loads imposed by the earthquakes. As the earthquake motions travel from the seismic source to the ground surface, they change due to properties of Earth's crust. The fluctuation of the groundwater table influences properties of the soil beneath a structure, which in turn, affects the earthquake motions and the seismic response of the structure. In my Ph.D. research, the effect of the groundwater table fluctuation on the seismic behavior of structures is investigated. The research includes testing sets of scaled physical models inside a geotechnical centrifuge and implementing analytical methods to interpret the results. This research would improve our ability to predict the seismic behavior of structures during earthquakes. During the summer, I would perform the sets of experiments and write a draft journal paper.

**Briggs, Jessica**
**Program/Dept: BSCI:Integrative&Organismal, PHD**
**Chair/Advisor/Coordinator: Leslie Curren, Jessica Bolker**

*Abstract*: Noise pollution is a pervasive issue that impacts even the most protected areas. The impact of noise on animals has been well documented and has the potential to impact individuals and community interactions. While behavioral shifts have been well documented in many taxa, little is understood about the physiological and genetic influence on development due to acoustic stress. I plan to undergo training during the summer in endocrinology, neurophysiology, and genetics to identify how acoustic environments during development impact behavioral shifts in adult black field crickets, Teleogryllus commodus. I hope to contribute further insight into the underlying physiological and genetic mechanisms driving the alteration of behavior when exposed to noise. As the human population continues to grow, so does noise pollution. In order to properly mitigate the impacts of noise, we need to understand the complexities driving animal behavior in a noisy environment.

**Cadigan, Ryan**
**Program/Dept: Writing, MFA**
**Chair/Advisor/Coordinator: Ann Williams, Cris Beemer**

*Abstract*: In 2011, I spent a month traveling through India. I noticed that the backpackers I met along the way all seemed to share a story: the search for personal healing. Later, I turned to yoga and meditation to help treat my anxiety and depression, and this narrative became my own. With the help of a STAF grant, I want to return to India to capture the stories of travelers in search of healing. My goal is to create a collage of voices through essays and interviews, published as a literary blog and a conventional non-fiction book. By shifting the focus of the narrative from the writer to a community and culture, this project would be an important addition to the canon of travel-health writing. This body of work will give me an invaluable foothold in professional travel writing, critical experience working with emerging digital platforms, and support for my thesis.

**Cao, Guoqiang**
**Program/Dept: Chemical Engineering, PHD**
**Chair/Advisor/Coordinator: Russell Carr, Nan Yi**

*Abstract*: The proton exchange membrane fuel cell relies on the reaction of preferential carbon monoxide oxidation in hydrogen (PROX) to reduce the carbon monoxide concentration to less than 10 ppm, in order to protect the platinum anode from carbon monoxide poisoning and deactivation. My research project aims at developing low-cost but robust catalysts to decrease the concentration of carbon monoxide. My proposal will prepare copper on nitrogen modified titanium dioxide (Cu-N-TiO2) as the catalyst, which focuses on optimizing synthesis parameters to maximize the reaction rate. With the aid of spectroscopy (particularly, X-ray Photoelectron Spectroscopy and Infrared spectrometer), temperature programmed reaction and activity tests, I will be able to gain mechanistic insights for PROX reaction. My research progress will guide the future study on designing cost-effective but efficient catalysts and enable me to present in national conferences and publish one journal paper.

**Cheyne, Jonathan**
**Program/Dept: Physics, PHD**
**Chair/Advisor/Coordinator: David Mattingly, Per Berglund**

*Abstract*: Extending holographic calculation of the viscosity/entropy ratio to Lifshitz field theories:
Calculation of the ratio of shear viscosity to entropy density provides a clear example of the application of gauge gravity duality to produce phenomenological results. Extending this tool to Lifshitz field theories would link what has largely been theoretical research to active areas of interest in condensed matter experimental physics.
This will further my studies into phenomenological applications of holography in Lifshitz regimes, the likely subject of my future doctoral research.

**Cho, Eunsang**
**Program/Dept: Civil Engineering, PHD**
**Chair/Advisor/Coordinator: Jennifer Jacobs, Ricardo Medina**

*Abstract*: As a key part of my Ph.D. dissertation, my proposed research is to detect agricultural tile drainage systems using satellite-based soil moisture and land surface temperature measurements in the Red River of the North Basin (RRB) in parts of western Minnesota and eastern North Dakota. The proposed work will contribute to the field in the following two ways. First, a new tile drainage detection method will be developed using satellite soil moisture and land surface temperature dynamics. Second, this work will provide policy decision-makers with scientific evidence to understand how tile drainage expansion impacts regional hydrologic changes and why it should be documented. Through this summer support, I will advance a key part of my Ph.D. dissertation needed to answer my Ph.D. research question “What is the relative and combined impact of climate and land use change, and tile drainage expansion to hydrological changes in RRB?"

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

*Abstract*: My dissertation, "Mules, Fuels, and Fission: Crossing the Panamanian Transit Zone," will argue that historians cannot understand attempts to traverse the Isthmus of Panama without recognizing the importance of energy, a concept that historian Richard White has defined simply as "the capacity to do work." I intend to examine the connection between energy and the environmental history of the isthmus by emphasizing the dynamic relationships between muscles, motors, and movers, and the environmental alteration they enabled in the Panamanian Transit Zone from the early 1800's to the late 20th century. Energy studies have exploded over the last several years, challenging historians to revise their understandings of the connections between people and the material world. The STAF will provide funding for a final research trip to the National Archives and grant me the financial support necessary to dedicate my summer to writing dissertation chapters.

**DeFlitch, Samantha**
**Program/Dept: Writing, MFA**
**Chair/Advisor/Coordinator: Ann Williams, David Rivard**

*Abstract*: In 2013, linguist Barbara Johnstone published Speaking Pittsburghese: The Story of a Dialect, groundbreaking research that sought to understand an iconic feature of Pittsburgh – the Pittsburgh dialect. In the same year, Pittsburghers won the dubious honor of "America's Ugliest Accent," and "Pittsburgh Dad," a comedic representation of Pittsburghese, achieved fame in the city. As a Pittsburgh native, I'm intrigued by recent academic and cultural interest in Pittsburghese as a marker of social class, so in summer 2018, I will travel to Pittsburgh, completing observational research where the Pittsburgh dialect still thrives. Through writing poems that reflect this research, I plan to create authentic artistic representations that preserve the dialect and explore relationships between Pittsburghese and perception of class. This opportunity will enrich my work, already deeply rooted in Pittsburgh and its unique dialect. I hope to to authentically represent Pittsburghese, and those who speak it.

**Dimitrov, Nikolay**
**Program/Dept: Psychology, PHD**
**Chair/Advisor/Coordinator: Robert Ross, Michelle Leichtman**

*Abstract*: Previous studies have documented an association between elaborative parent-child "memory-talk" about lessons in children's classrooms, and children's subsequent recall of the information and event details that were part of those lessons. Throughout the upcoming summer, Dr. Michelle Leichtman and I plan on extending these findings in a study examining the effects of training parents in elaborative conversation on children's memory for science lessons. Support from the Summer T.A. fellowship will assist me with completing the data collection, complex narrative coding, statistical analysis, and writeup of the study. This would allow me to proceed on to the next study in this series during the 2018-2019 academic year, while simultaneously providing me with training for my master's project. Overall, this work has the potential to shed light on factors that may improve young children's ability to recall and utilize material they learn in school.

**Eaton, Claire**
**Program/Dept: NatRsrc:Environmental Consrvtn, MS**
**Chair/Advisor/Coordinator: Thomas Lee, Catherine Ashcraft**

*Abstract*: The main objective of my research is to conduct a stakeholder assessment of relevant actors engaged in cooperative international scientific research, with a case study focus on the Distributed Biological Observatory (DBO). This research seeks to characterize the parties involved, the key issues they find important, and their interests related to these issues in order to facilitate future expansions to new areas of the circumpolar system, such as the Baffin Bay-Davis Strait area. STAF funding would allow me the time and financial support to analyze my research and write my thesis over the summer in order to produce an excellent research contribution to both science diplomacy theory and practice. I intend to continue to participate in events related to developing UNH's Arctic research vision. STAF funding would also support development of a Carsey Brief based on my thesis to ensure my findings are shared with a broader audience.

**Eggert, Sarah**
**Program/Dept: Microbiology, MS**
**Chair/Advisor/Coordinator: Cheryl Whistler, Kelley Thomas**

*Abstract*: Emergent strains of Vibrio parahaemolyticus are causing increased infections in the United States. I am identifying the toxins that are produced by these strains by employing comparative genomics, genetic knockouts/restoration, and testing in tissue culture for disease emulation. The results of my study will fill the critical gap on knowledge of V. parahaemolyticus virulence genetics and lead to development of targeted therapeutics, detection, and quantification of these pathogens. The work performed this summer will identify the potential toxins that will be used in evolutionary/comparative genomics analysis to determine where the toxins came from, how they evolved, and if they are in other bacteria. The toxins identified will be used in collaboration this fall to perform animal pathogenicity testing to confirm the pathogenic genes as the final experiments necessary for my Master's thesis.

**Elliott, Mary Grace**
**Program/Dept: English, PhD**
**Chair/Advisor/Coordinator: Robin Hackett**

*Abstract:* My summer research will concentrate on archival research for my dissertation, "Teaching and Learning in Shakespeare and Milton." I will conduct this research at The Morgan Library in New York City, which houses a first edition of John Milton's pamphlet Areopagitica as well as a collection of the 17th-century poet's correspondences. Areopagitica, an argument against censorship in book publishing, argues that people should be allowed to read a great variety of texts so that they might discover, through a wider accumulation of knowledge, a closer relationship with God. By looking at Milton's pamphlet and letters, I hope to discover more detail about his renaissance readership. My dissertation explores how renaissance poets taught their readers through literary works using and subverting common grammar school practices. Determining Milton's readership population will help me to quantitatively define who might be learning the lessons contained in his poetry.

**Ewert, Anne**
**Program/Dept: BSCI:Integrative&Organismal, MS**
**Chair/Advisor/Coordinator: Jessica Bolker, James Haney**

*Abstract*: Cyanobacteria are ubiquitous, photosynthetic prokaryotes found in most open freshwater systems. Microcystin (MC) and β-N-methylamino-L-alanine (BMAA) are two common toxins produced by cyanobacteria. MC is a potent liver toxin and tumor promoter, where BMAA is a neurotoxin linked to neurodegenerative diseases like ALS and Parkinson's. My research focuses on the exposure of food plants to these cyanotoxins via water and aerosols from a New England lake. The goal is to investigate the accumulation of toxins in food plants that are exposed to a natural cyanobacteria community directly at the roots using lake water itself, and indirectly at exposed surfaces via aerosolized toxins from the lake. As cyanobacteria become more prevalent due to nutrient pollution and rising global temperatures, understanding routes of exposure to cyanotoxins is essential to reduce and prevent negative impacts on humans and wildlife.

**Fifty, David**
**Program/Dept: Mathematics Education, PHD**
**Chair/Advisor/Coordinator: Rita Hibschweiler, Sharon McCrone**

*Abstract*: My investigation of sociomathematical norms and mathematical beliefs forms the central part of my study of the development of mathematical practices of a remedial post-secondary mathematics class (MATH 418, Precalculus). By better understanding this development, mathematics departments and faculty will be better able to construct curricula and course structures to support remedial and struggling students. My results will be applied to ease the path for many into joining STEM related fields. My summer project will contribute to the development of my PhD Major project. With the guidance of my advisors, Dr. Buchbinder and Dr. McCrone, this semester and this upcoming summer I will be starting a pilot study, analyzing the resulting data, working on my dissertation proposal, and preparing my first submission for publication, tentatively titled "The Development of Mathematical Practices of a Precalculus Class."

**Forner, Nicole**
**Program/Dept: Psychology, PHD**
**Chair/Advisor/Coordinator: Robert Ross, Robert Mair**

*Abstract*: This summer I will be starting a project on oscillatory brain activity in individuals with differing tendencies for rumination. In depression and anxiety, ruminative thoughts can be problematic. Studies show that high rumination is correlated with deficits in cognitive control. Brain oscillations in the alpha band are associated with cognitive control. No work has been done to assess the role of oscillations in cognitive control tasks as a function of ruminative tendencies. I plan to have participants perform a source memory task while being monitored through electroencephalography. I hypothesize that participants who have a higher tendency to ruminate will show deficits in alpha activity during the task. If this is the case, we might be able to craft an intervention for overactive rumination that focuses on oscillatory activity. The STAF would allow me to focus all my efforts on getting this project started this summer.

**Giannotti, Allison**
**Program/Dept: English, PHD**
**Chair/Advisor/Coordinator: Robin Hackett, Alecia Magnifico**

*Abstract*: Operating from the assumption that the study of writing in the disciplines should consider the material conditions that influence a text's composition, my research will examine how students' physical interactions in a university chemistry laboratory contribute to their post-laboratory responses. Situated within the intersection of scientific literacy and composition studies, often disparately conceived fields, this study unites that territory by re-envisioning the interplay between doing science and writing science. By shedding light upon the students' experiential processes reflected in laboratory writing, composition instructors, particularly first-year writing instructors who instruct pre-science students, will be able to adapt their writing pedagogies to respond to those material experiences that guide science students' inquiry. This study will serve as the foundation for my experimental dissertation which will pilot a more interactive—more material—first-year writing course at the University of New Hampshire.

**Harris, Alina**
**Program/Dept: Biological Sci:Agricultural, MS**
**Chair/Advisor/Coordinator: Jessica Bolker, Becky Sideman**
*Abstract*: Growers in New England have reported economically damaging populations of cabbage aphid in Brussels sprouts. My research aims to find an integrated approach to managing cabbage aphid on Brussels sprouts, using biological and chemical pest management strategies in conjunction. Preliminary data was collected in 2017.
For chemical pest management, I evaluated organic pesticides. I compared three pesticides ('M-Pede', 'Azaguard', and 'Azera') as different treatments with an untreated control. For biological pest management, I planted flowering insectary plants to establish and host a population of natural predators and parasitoids of the cabbage aphid. I monitored insect populations on Brussels sprouts leaves and insectary plants. Another year of research is critical to analyze meaningful statistics and publish this information that growers are eager to utilize. Two years of consecutive publishable data will allow me to write my thesis and complete my Masters in Agricultural Science in the designated two-year period.

**Horruitiner, Christopher**
**Program/Dept: Earth Sciences, MS**
**Chair/Advisor/Coordinator: Ruth Varner, James Pringle**

*Abstract*: My Master's research project addresses a key gap in understanding the predominant carbon (C) source for methane production in post glacial lakes, an underrepresented contributor of the potent greenhouse gas methane. I have collected sediment samples from lakes in the Stordalen Mire region in Abisko, Sweden, 200 km north of the Arctic Circle in 2015 and 2017. I have developed a story of downcore porewater methane concentration, production pathways, and redox chemistry and plan to complete my analyses of these samples and data, write and defend my thesis by end of summer 2018. My preliminary research has shown that aquatic vegetation are a major contributor to sedimentary organic-C, which feeds methane-producing bacteria. A novel finding. However, this funding, and my proposed summer research: running and relating 13C and 15N isotopes of sedimentary organic-C to that of the tissues of aquatic vegetation is all that is lacking to say so definitively.

**Hunter, Gordon**
**Program/Dept: Chem:Chemistry Education, PHD**
**Chair/Advisor/Coordinator: Samuel Pazicni, Howard Mayne**
*Abstract*: Studies have shown that self-efficacy can be a good predictor of achievement in introductory chemistry courses. My research will expand upon that relationship by including prior chemistry knowledge as a potential mediating variable in the ability of self-efficacy to predict the first midterm exam scores of a general chemistry course. The goal will be to evaluate whether high self-efficacy can effectively compensate for a low level of prior knowledge in chemistry, suggesting that an affective variable may have the ability to partially offset a deficit in a cognitive variable. Course performance will also be linked to other affective traits (i.e. test anxiety) to further elucidate connections between the affective and cognitive domains in first-year chemistry students. This research will be submitted for publication and will contribute to my doctoral dissertation.

**Ineson, Katherine**
**Program/Dept: Nat Resrces & Envirn Stdy, PHD**
**Chair/Advisor/Coordinator: Rebecca Rowe, Lynne Cooper**

*Abstract*: Bat populations in North America are currently experiencing rapid declines due to an emerging fungal disease known as white-nose syndrome (WNS). 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 colonies of bats. My research will fill in the gaps in our knowledge by using a mark-recapture design to estimate demographic rates such as survival, reproduction, and recruitment. This will be my third summer of fieldwork and is important for my research, as three years is the minimum necessary to gather enough data to begin mark-recapture analyses. Results from my study will be used to better understand the impacts of WNS on survival, predict population trajectories based on the calculated demographic rates, and develop conservation strategies that promote recovery, which will help restore the valuable ecosystem services bats provide.

**Jovic, Katarina**
**Program/Dept: Biochemistry, PHD**
**Chair/Advisor/Coordinator: Krisztina Varga, Feixia Chu**
*Abstract*: Antifreeze proteins (AFPs) serve as cryoprotectants in animals and plants acclimated to the cold environment by preventing the ice growth and recrystallization. The Varga lab aims to develop a protein/peptide-polymer based hybrid material, which would prevent surface freezing (roads, pipelines).
The aim of my proposed project is to successfully express and purify AsAFP from winter oat, Avena sativa that will be later subjected to Nuclear Magnetic Resonance spectroscopy (NMR) for structural and functional analysis. The plant AFPs have different properties in comparison to other AFPs – low to moderate thermal hysteresis activity and high levels of ice recrystallization inhibition. Shedding light on AsAFP structure would help us to understand the origin of these properties, which will in turn enable us to assess the best AFP candidate for developing the above-mentioned hybrid material.
I have recently joined the Varga lab and AsAFP will be the subject of my doctoral research.

**Kanaskie, Caroline**
**Program/Dept: Natural Resources, MS**
**Chair/Advisor/Coordinator: Pete Pekins, Jeff Garnas**

*Abstract*: My research focuses on the southern pine beetle (SPB), a native pine-killing insect in the Southeastern United States. There, SPB is associated with a diverse community of fungi, mites, and insects that act as competitors, predators, and parasitoids. The range of SPB is now expanding northward due to climate change. I hypothesize that the SPB community may be regionally specific, and that the community impacts SPB attack success. My research seeks to quantify the reproductive success of SPB, as well as richness and abundance of members of the community, and then compare these results to historical data from southern attacks. SPB is predicted to continue moving north to New England. Understanding the behavior of this pest in the north will help lessen ecological destruction, minimize economic impacts to landowners and inform forest management practices. This work is the foundation of my thesis and future conference presentations and publications.

**Lasley, Scott**
**Program/Dept: English, PHD**
**Chair/Advisor/Coordinator: Robin Hackett, Christina Ortmeier-Hooper**

*Abstract*: This summer project will conduct archival research at the University of Rhode Island and Harvard University, in order to investigate how concerns around students' abilities to evaluate and use information in their writing have historically manifested in composition classrooms. Examining textbooks, syllabi, and writing program correspondence, this project will trace the history of this problem so that composition scholars and instructors may better understand and theorize approaches for dealing with the current problem of students struggling with becoming critical consumers of information after they graduate. This project is a part of my continuing work around information literacy and research writing pedagogy and will lead toward drafting the first chapter of my dissertation. It will also be the basis for a conference proposal next year at the Conference on College Composition and Communication.

**Lee, Jin**
**Program/Dept: English, PHD**
**Chair/Advisor/Coordinator: Monica Chiu, Robin Hackett**

*Abstract*: While historical narratives are often silent about the oppressed, scholars find literary and graphic arts giving voice to the voiceless. My summer plan is to complete two chapters of my dissertation on how Asian American novels and graphic narratives strategically communicate silenced historical trauma. Despite many comics scholars' defensive position against the supposed privilege of words over images, I will probe how literary forms 'visualize' silenced history, pushing the limits of the linguistic. I will also theorize what I call "graphic nonsense," a unique phenomenon in graphic narratives to highlight underrepresented historical trauma. My research will thus contribute to comics studies. The STAF Award will fund my projects in the International Graphic Novel and Comics Conference at Bournemouth University in Poole, UK, Heneage Library, the British Library, and Forbidden Planet, carrying the UK's largest stock in comics and graphic novels. It will also help me assist UNH's Cambridge Program.

**Liu, Yiming**
**Program/Dept: Statistics, PHD**
**Chair/Advisor/Coordinator: Rita Hibschweiler, Ernst Linder**

*Abstract*: My research project relates to the modeling of daily rainfall and related weather generators for projecting the daily rainfall into the future by using statistical downscaling methods applied to climate model outputs. The focus is on developing variance propagation techniques for these models and the related downscaling, as well as applying these models and methods at the local scale for certain regions such as New England. The findings in this research will be the core part of my dissertation. My results will contribute a crucial portion to the understanding of future climate projections, and thus will facilitate the decision makers to incorporate climate change scenarios for devising sustainable strategies, including: agricultural irrigation, water resources management, and for the design, maintenance and control of hydraulic infrastructure.

**Lush, William**
**Program/Dept: Oceanography, MS**
**Chair/Advisor/Coordinator: James Pringle, Mark Lyon**

*Abstract*: Most coastal marine organisms have a free-floating, or planktonic, stage of development that is responsible for the majority of these species' dispersal. While ocean currents play an important role in the dispersal of these species, the degree to which these currents influence the establishment of geographical species boundaries is still not well understood. Over the course of the summer, I will model the current-driven dispersal of larvae on a global scale to determine if and where currents set species boundaries. I expect that this modeling effort will take the majority of the summer. I will then analyze my data against observed biogeographical ranges using multivariate logistic regression to understand the impact of larval dispersal on the establishment these range boundaries. Understanding these boundaries will provide insight into how species ranges will shift in response to climate change.

**McGeehan, Duncan**
**Program/Dept: Civil Engineering, MS**
**Chair/Advisor/Coordinator: Erin Bell, Eshan Dave**

*Abstract*: This focus of this research is to apply Digital Image Correlation (DIC) to an ongoing fatigue test on a structural connection. DIC will be used to obtain the stress across the entire connection during fatigue testing. The images will be processed through various DIC software packages to explore the limitations of different computational methods with regards to accuracy and precision. The stresses calculated using DIC will also be compared to those of obtained using strain gauges and finally a computational model of the connection. This is an important task because to properly apply DIC in structural inspections, the limitations of the method must be known. If the summer testing goes as planned, a large portion of the research towards this thesis will be completed. This research will also help to serve to guide future research regarding DIC and the limitations associated with different software packages and computational methods.

**McGinnis, Ian**
**Program/Dept: NatRsrc:EnvironmentalEcon, MS**
**Chair/Advisor/Coordinator: Shadi Atallah, Tom Lee**

*Abstract*: Hydrological services are an ecosystem service that is crucial to the sustainability of our society by providing clean water to consumers. Payments for hydrological services are used as a way to connect agents 'upstream' whose land use decisions ensure clean water provision to agents 'downstream' willing to pay for clean water. My thesis involves designing and implementing a discrete choice experiment (DCE) to estimate households' willingness to pay for hydrological services provided upstream. A DCE is a survey which gives respondents choice cards with a set of attributes that describe the situations from which they need to choose between or another "status quo" option with no change to their current situation. I will design the survey and conduct focus groups meetings to test the DCE survey. In the summer, I will travel to Veracruz to work with local students on administering the survey in urban parks in Coatepec, Veracruz.

**Meyer, Kelsey**
**Program/Dept: BSCI: Marine Biology, MS**
**Chair/Advisor/Coordinator: Jessica Bolker, Subhash Minocha**

*Abstract*: Marine ecosystems are vital to the biological systems on earth, yet climate change is affecting them in a devastating manner. With temperature rising, the amount of salt as well as organic nitrogen in the oceans may increase. Microalgae may be helpful in preventing or mitigating this problem; especially the use of halotolerant species like Dunaliella. A better understanding of their metabolic response to such environs may also help in industrial applications of microalgae to produce biodiesel. Another environmental problem is the excessive use of fossil fuels; one way to reduce its impact is to increase the use of biofuels. The proposed research is aimed at understanding the role in salt tolerance response of two species of the microalga Dunaliella, using the approach of metabolic engineering via transgenic manipulation. This research will contribute both to my field and plan by providing information that could help sustain marine ecosystems.

**Moran, Kathleen**
**Program/Dept: NatRsrc:Environmental Consrvtn, MS**
**Chair/Advisor/Coordinator: Tom Lee, Russell Congalton**

*Abstract*: Efficient detection of invasive plants is becoming increasingly necessary in our changing climate due to expanding species ranges. Invasive plants can disturb native ecosystems, resulting in detrimental ecologic and economic effects. Preliminary studies have found success in using unmanned aerial vehicles (UAVs) to detect invasive plants in open spaces, but they have yet to be used for surveying forest understories. The goal of this project is to determine whether it is feasible to use UAVs to survey for understory invasive plants, and if so, what methods and timing provide the greatest accuracy. If successful, UAVs could significantly decrease the time and energy it takes to survey and manage invasive plant populations, enabling better land conservation. This research is part of a two-year master's thesis, the culmination of which will be to continue on into the natural resources field and utilize drone technology for environmental protection.

**Mousavi, Sayedmasoud**
**Program/Dept: Civil Engineering, PHD**
**Chair/Advisor/Coordinator: Majid Ghayoomi, Ricardo Medina**

*Abstract*: Liquefaction is a phenomenon occurs when cyclic loads like earthquakes are applied to soils which can lead to loss of soils' strength and many catastrophic consequences. Loose saturated sands containing cohesionless fines like silts are highly prone to liquefaction. However, current mitigation methods for these soils are restricted due to lower permeability, environmental effects, and high costs. Microbial Induced Partial Saturation (MIPS) via denitrification is a new emerging soil improvement technique that utilizes biochemical activities to increase the liquefaction resistance of fully saturated soils. Although current investigations signified the approach's effectiveness for liquefaction mitigation in clean sands (sands containing no silts), there is no study to investigate the method effectiveness for liquefaction mitigation in silty sands. The proposed research aims to examine the feasibility of the new technique to enhance earthquake resistance of silty sands by conducting a series of cyclic tests on MIPS-treated silty sands.

**Nolen, Haley**
**Program/Dept: Genetics, MS**
**Chair/Advisor/Coordinator: Subhash Minocha, Anissa Poleatewich**

*Abstract*: Quinoa, a pseudocereal crop native to South America, is highly valued for its high protein content and natural antioxidants and its ability to tolerate abiotic stress. Quinoa downy mildew, a fungal disease of quinoa and its relatives, greatly reduces crop yields in areas where it is prevalent. We are attempting to identify the sources of differential resistance to downy mildew in quinoa and its weedy relatives of the crop that readily grow in northern New England. The resulting knowledge and germplasm resources will be implemented in a breeding program at UNH aimed at developing a genetically resistant quinoa variety that is also able to grow in the northeastern climate and habitat as a new option for local commercial farmers. Once results are obtained, this study will be published and presented at a scientific conference, and the skills I gain from my experience will be applicable to a career in industry.

**Ohoueu, Marie-Josiane**
**Program/Dept: Chemistry, PHD**
**Chair/Advisor/Coordinator: Glen Miller, Marc Boudreau**

*Abstract*: People worldwide have contracted bacterial infections which have not found an appropriate treatment due to bacterial strains becoming resistant to all commercially available antibiotics, leading to death in many cases. The current research project's aim is to develop adjuvants to antibiotics to combat those infections. These compounds will target metallo-beta-lactamases, which are enzymes found in several clinically difficult to treat bacteria and are responsible for widespread beta-lactam antibiotic resistance. It has been a challenge to inhibit metallo-beta-lactamases due to their mechanism of action, and few approaches have been successful up to this day. Our target molecules, for which the initial synthesis steps have been achieved, will provide a better understanding of the enzyme mechanism and highlight future approaches to be taken to overcome antibiotic resistance. Also, it will enable me to expand various skills and autonomy in the laboratory, which will be applied to upcoming thesis projects.

**Okolie, Norbert**
**Program/Dept: Materials Science & Engr, PHD**
**Chair/Advisor/Coordinator: Howard Maybe, Gonghu Li**

*Abstract*: Sunlight can be harnessed by some materials and used to convert carbon dioxide into energy-rich fuels. This has the double advantage of meeting rising global energy demands as well as reducing carbon dioxide emissions which is chiefly responsible for global warning. While this is an active area of research, there are still issues on how to make these materials more efficient so that they can harness as much sunlight as possible. I am working on the synthesis of one of these materials that has been computationally proven to be very efficient and the results of my research will be shared with the larger scientific community and will inform the design of similar efficient materials. This study also fulfills part of the requirements of my PhD in Materials Science and Engineering and continued research in this area is what I intend to focus on for my doctoral thesis.

**Payne, Andrew**
**Program/Dept: Natural Resources, MS**
**Chair/Advisor/Coordinator: Tom Lee, David Burdick**

*Abstract*: Salt marshes, valued for ecosystem services such as flood control, carbon capture, and nutrient cycling (Costanza et al., 1998) are currently threatened with increased flooding and collapse due to sea level rise. Researchers have shown that plant productivity is reduced by increased flooding (Kirwan and Guntenspergen, 2015), but no one has shown the effect of reduced biomass on marsh-building processes. The application of sediment to the marsh surface (thin-layer deposition) is a potential mitigation tool for increased flooding, but its effects on plant growth are understudied. Using a novel application of a marsh organ experiment, I address two objectives: 1) To determine the effect of flooding duration on marsh-building processes 2) To determine the effectiveness of thin-layer deposition in strengthening resilience to sea level rise. This work will supplement coursework in wetland science and help illuminate complex marsh processes so I can learn how to better preserve these valuable habitats.

**Piet, Sarah**
**Program/Dept: Biochemistry, MS**
**Chair/Advisor/Coordinator: Paul Tsang, Fexia Chu**

*Abstract*: The ovary is the main site of progesterone production, which is essential maintaining a pregnancy. Without a blood vessel network to distribute progesterone from the ovary to the uterus, the uterine lining is not maintained and infertility can occur. Based on previous studies, the protein CCN1 may aid in the formation of these networks; however the regulation of CCN1 is not well understood. Therefore the goal of my research is to understand CCN1 regulation and to determine if growth factor proteins (like insulin-like growth factor 1) are responsible.

The formation of blood vessel networks is not unique to the ovary; tumors are also capable of this process. Therefore the results of this research will help to determine the regulation of blood vessel network formation in both the ovary and tumors. Overall this research may contribute to treating not only infertility, but cancer as well.

**Relethford, Zane**
**Program/Dept: Chemistry, PHD**
**Chair/Advisor/Coordinator: Howard Mayne, Christine Caputo**

*Abstract*: The "Clamshell" ligand, a compound with unique electron- and proton-transfer properties capable of proton-coupled electron transfer, a process which can facilitate a number of catalytic reactions, has been investigated. With the STAF award last summer I was able to test a number of reactions, and have evidence that these catalysts will be useful in achieving hydroamination, which involves adding a new N-C bond to an unsaturated molecule to produce an amine product. Amines are ubiquitous in industrial and pharmaceutical synthesis, but creating new N-C bonds typically requires multiple synthetic steps, harming yield, or expensive metal catalysts. The reaction scope of any one catalyst is limited, and selectivity of the desired product is not assured. By taking advantage of the unique properties of Clamshell complexes, we may be able to achieve selective hydroamination over a broader range of substrates, using earth-abundant metals in an atom-efficient process.

**Riley, Samantha**
**Program/Dept: English, PHD**
**Chair/Advisor/Coordinator: Alecia Magnifico, Robin Hackett**

*Abstract*: Within the field of Composition and Rhetoric embodied rhetoric has grown as instructors move toward a more inclusive understanding of language portrayed by the body. However, the field has little literature examining a group of students who mainly use their bodies for communication: student-athletes. Building upon a previous study, I will examine how student-athletes at a D1 school are taught and learn to use their body to convey meaning in their sport. By looking at the work that student-athletes do as part of their extracurricular compositions and examining their literacy practices, instructors can better understand a large population of students enrolling in our classes. Additionally, we can see what is being done at practices by coaches to make literacy effective and engaging for these bodily learners and bodily learners more generally. Collecting research is vital in gaining understanding of these embodied practices in order to provide groundwork for my dissertation.

**Spillane, Jennifer**
**Program/Dept: Molec & Evol Systems Biology, PHD**
**Chair/Advisor/Coordinator: David Plachetzki, Matthew MacManes**

*Abstract*: While organisms gaining genes has been a major focus of evolutionary genomics, relatively less attention has been paid to the loss of genes over time and how it can contribute to evolution. Recent controversies regarding the nature of the last common ancestor of all animals paint opposing views of the biology of this organism. If sponges evolved first, the first animal was likely simple, and gained complexity over time. If comb jellies evolved first, the first animal was relatively more complex, and sponges would have lost some complexity and genes over time. I plan to test these hypotheses by using a novel mathematical model to describe patterns of gene gain and loss across all animal groups. The model will allow me to explore whether gene loss has affected some animal groups more than others and these analyses will form the basis of two of the four chapters of my dissertation.

**Sterpka, Ashley**
**Program/Dept: Genetics, PHD**
**Chair/Advisor/Coordinator: Dr. Subhash Minocha, Dr. Xuanmao Chen**

*Abstract*: Astrocytes are a type glial cell which play a critical role in many neuropathologies. During reactive gliosis following traumatic brain injury, astrocytes proliferate, migrate, and change morphology to protect neighboring tissue and promote healing. To date, research on brain injury focuses on the reactivity of astrocytes and cellular signals. Little is known about the function and structural dynamic of their primary cilia. In vitro studies have established that primary cilia are a key regulator of cell division and serve to detect and transduce signals. Due to the proliferative nature of astrocytes following a traumatic brain injury, primary cilia must play a role in regulating cell division. My research aims to explore the structural dynamics of astrocytic cilia in response to such an injury, and to determine how ciliary signaling regulates recovery. This will improve our understanding of the contributions of astrocytic primary cilia to reactive gliosis under traumatic brain injury.

**Teeters, Lila**
**Program/Dept: History, PHD**
**Chair/Advisor/Coordinator: Kurk Dorsey, Lucy Salyer**

*Abstract*: In 1915, Charles and Elaine Eastman opened a summer camp by New Hampshire's Lake Granite. The camp, dubbed Camp Oahe, stood apart from its counterparts by promising to teach its young, white enrollees how to be Indian. While such an enterprise raises eyebrows today, the Eastmans saw their camp as a critical component of their activism for America's Native inhabitants. Charles Eastman (Santee Sioux), a leader in pan-Indian reform organizations, used the camp to advocate for Native citizenship. I have accumulated previously untapped sources related to the camp, and this summer, I plan on synthesizing this research into an article. This article would be my first publication and would become an essential part of my dissertation. This study not only contributes to scholarship on Native people in New Hampshire (a severely understudied topic) but also how Americans understand differences and citizenship in a pluralistic society.

**Thornton, Daniel**
**Program/Dept: Biochemistry, MS**
**Chair/Advisor/Coordinator: Laurie Westover, Feixia Chu**

*Abstract*: For my master's degree, I plan to use techniques in mass spectroscopy to characterize posttranslational modifications in a protein called heat shock protein 90 (Hsp90). Hsp90 is a chaperone protein, which helps other proteins involved in signal transduction maintain and change their shape. Hsp90 has been linked to cancer proliferation and survival, so adequate characterization of Hsp90 could lead to advances in cancer treatment. I hope to elucidate questions regarding how Hsp90 is changed by posttranslational modifications during the formation of tumors. In addition to contributing to cancer research, I will show how techniques in mass spectroscopy are effective in characterizing posttranslational modifications for the field of biochemistry. In terms of my overall academic plan, my study will teach me how to conduct independent research, and I plan to take appropriate classes to ensure I have a solid background knowledge to successfully complete the project.

**Tosiello, Lia**
**Program/Dept: NatRsrc:Environmental Consrvtn, MS**
**Chair/Advisor/Coordinator: Tom Lee, Rob Robertson**

*Abstract*: My research project will inform a new policy by NH Department of Fish and Game that regulates importation of oysters. Under the policy, oyster seed from areas that have had harvest closures caused by pathogenic strains of Vibrio parahaemolyticus bacteria cannot be imported into New Hampshire, in order to prevent this bacteria from establishing and causing illness here. My work will combine microbiological and social investigations to study how much Vibrio bacteria oyster seed can carry at different seed sizes and water temperatures, and how to best communicate my findings to key stakeholders. This will lead to more informed fishery policy and will be the basis for my master's thesis, as I learn about the research and decisions that go into managing oysters as a natural resource and fishery.

**Turner, John**
**Program/Dept: Mechanical Engineering, PHD**
**Chair/Advisor/Coordinator: Martin Wosnik, Yannis Korkolis**

*Abstract*: Large offshore windfarms are currently being proposed and installed at a high rate. These windfarms can produce energy that can be used in high population density coastal cities, however, a knowledge gap exists on how to best space or operate very large wind farm arrays. Turbines take momentum out of the wind to produce power. This momentum reduction is known as a wake, and it affects downstream turbines as they see less energy from the wind. The combine effect of wakes and the atmosphere’s wind on downstream turbines is little understood. A large array of model wind turbines (100) has been investigated in a long wind tunnel. This work will provide valuable insight to the optimization of wind farm energy production by understanding some of the basic physics of flow. The data sets obtained will serve as benchmark validations for the many numericists trying to tackle this problem computationally.

**Valbrun, Paulna**
**Program/Dept: Writing, MFA**
**Chair/Advisor/Coordinator: Ann J. Williams, Jaed Coffin**

*Abstract*: In 2009 I visited my family in Haiti for the first time and was surprised to discover that it had beautiful beaches, food, culture and people, which was a stark contrast to depictions I had seen in the media. The trip started an ongoing fascination with my father's country and the desire to understand the real Haiti instead of the stereotypes. This summer I want to spend six weeks in Bombardopolis, Haiti researching my family’s history and write a collection of essays from my experiences for my MFA thesis in 2019. I believe that this project aligns with my overall mission as a writer, which has always been to incorporate a social justice aspect into each of my projects. By providing a firsthand account of being in Haiti I will be able to thwart misconceptions and stereotypes, which is more pertinent now due to the current political climate.

**Wang, Haiyang**
**Program/Dept: Statistics, PHD**
**Chair/Advisor/Coordinator: Rita Hibschweiler, Ernst Linder**

*Abstract*: I am working on the "OSAMC" method and its python implement package. This new tool enables researchers to do logistic regression classification analysis in a significantly shorter time frame, using only a personal computer. Previously this required supercomputer or even large clusters of computers.
This summer project will put me in an excellent position for the 2018 – 2019 academic year. Completing this work in the summer will result in a first draft of a manuscript tentatively titled "Fast Subsampling-Based Method and Package for Big Data Logistic Regression".

**Whalen, Emily**
**Program/Dept: Earth&Environmental Sci, PHD**
**Chair/Advisor/Coordinator: Serita Frey, Steve Frolking**

*Abstract*: Global warming is driven by elevated atmospheric carbon dioxide concentrations. Atmospheric carbon dioxide concentrations are rising, in part, because of warming-induced changes to soil microbes, whose metabolism emits ten times more carbon than human activities each year. This soil-climate feedback could be mitigated if soils are managed to serve as carbon sinks; however, soil management practices are limited because the mechanisms controlling soil carbon storage are unresolved. Recent studies suggest that the composition (i.e., identity) of soil microbial communities plays a role. My research examines the relationships between microbial community composition and soil carbon stabilization. I seek to identity microbial traits that are positively correlated with carbon storage, with the long-term goal of developing soil management practices that mitigate climate change. This summer, I will conduct an experiment that comprises Chapter 1 of my Ph.D., and I will use my results to generate hypotheses for Chapters 2 and 3.

**Williams, Christopher**
**Program/Dept: Psychology, PHD**
**Chair/Advisor/Coordinator: Edward O'Brien, Robert Ross**
*Abstract*: Readers are routinely presented with inaccurate information, whether it is in fantasy novels, social media posts, or news reports. Unfortunately, empirical studies have consistently demonstrated that readers rely on inaccurate information to complete subsequent tasks even when they know it is not true. This inability to effectively apply what has been read poses a serious problem for everyone ranging from educators to casual news readers. The proposed experiments will examine how people process inaccurate information and attempt to improve interventions aimed at reducing reliance on inaccurate information. This information will be useful to researchers working to understand the cognitive processes that underlie reliance on inaccurate information and to educators attempting to promote critical thinking and overcome the pervasive impact of inaccurate information. The current work will advance my academic plan by providing the foundation for my dissertation.