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GEMMELL MULTI-PURPOSE ROOM

CLARION UNIVERSITY

Abstracts

ADAMS, K.A. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Motor Speech Disorders Associated with Stroke*.

See BURNS, N.M.

AHRENS, A.B., EASTLICK, T.L., KROESEN, J.E., STOHON, L.N., and **WALLS, J.L.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Wilson's Disease*.

This research reviews characteristics associated with Wilson's Disease (WD) a genetic and progressive disorder caused by the body's inability to dispose of excess amounts of copper. WD is an inherited disorder, passed down via autosomal recessive genes. In order to develop WD a child must receive one mutated gene from each parent. If a child receives only one defective gene, he/she will not experience symptoms of the disease. Wilson's is found in one out of every 30,000 people worldwide. Symptoms may include jaundice, swelling and pain in the abdomen, vomiting of blood, difficulties walking, swallowing and talking, and irregular menstrual cycles and/or infertility and miscarriages in women. Motor speech disorders, such as hypokinetic dysarthria, spastic dysarthria and ataxic dysarthria, are also frequently associated with WD. Dysarthria is often marked by slurred, irregular or slowed speech that may be difficult to understand. Symptoms of WD appear in the age range of 6-20 years old, but typically in the later years of adolescence. Once the disease is suspected, the physician will administer specialized tests to diagnose. The tests include examination of blood, urine, and/or eyes as well as a liver biopsy. Treatment includes the use of prescription drugs such as Penicillamine, Trientine, and Zinc acetate, which are chelating agents. These medications promote the release of copper from the organs to the bloodstream. In severe cases, when liver damage is significant, a transplant may be required. Treatment is usually lifelong and very individualized; therefore, patients may benefit from educational resources and support groups.

Faculty Sponsor: Dr. Janis Jarecki-Liu

AIELLO, L.M., BRUMMITT, B.M., KARG, B.J., and **SEIBEL, B.L.** Department of Biology and Geosciences (Biology). 2017. *Qualitative Observations of Behavior and Quantitative Measurements of Iron in Lithobates catesbeianus Collected from Water Impacted by Acid Mine Drainage*.

Western Pennsylvania has a history of coal extraction, which has led to significant impacts in local tributaries. The acidic content in acid mine drainage changes the water chemistry and quality in its impacted areas - making it difficult for organisms to survive. The American Bullfrog (*L. catesbeianus*) was chosen as the subject due to its complex life cycle and dependence on aquatic systems. Living in water that is affected with high levels of iron can cause health problems such as liver failure, liver disease or even heart disease. This experiment was designed to determine and compare iron levels of Bullfrogs from a known AMD-impacted site and a clean pond with low dissolved solid content. Water samples and macroinvertebrates from each site were also collected to test iron levels and biomagnification respectively. Collected *L. catesbeianus* (n=30) were observed for differences in behavior between the two sites for one week. Acidic liquefaction of tadpole tissues yielded a solution that was analyzed using atomic absorption spectroscopy (AAS) to determine iron levels. We hypothesize that there will be significant differences in behavior between both AMD-impacted and clean sites. Tadpoles from the AMD-impacted site are also hypothesized to carry higher statistically significant amounts of iron compared to the clean water tadpoles. Data will be statistically analyzed and reported in the results section.

Faculty Sponsor: Dr. Andrew Keth

ALLEMANG, C.M., and **WYANT, R.B.** Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Preparation of Quasicrystalline Nanoparticles*.

This project aims at preparing icosahedral quasicrystalline grains that are large enough to be examined by unaided eyes and handled by hand. Based on previous report, grains of pentagonal dodecahedron morphology of millimeter order can be expected to be found on certain Aluminum-based alloys, which, is also the goal of the present study. The samples used are to be taken from a larger alloy that has a composition of $Al_{75}Pd_{20}Re_5$ and $Al_{59}Cu_{37}Fe_3Si_1$. These alloys have previously been reported to form pure icosahedral quasicrystalline phases to the scale as high as a centimeter. The samples of alloy are placed into an alumina crucible inside of an evacuated quartz tube and then pumped with Argon gas to essentially provide a non-reactive Argon atmosphere. This apparatus is then placed into a furnace which is programmed to various temperatures to anneal the metal to grow the crystals. The alloys are then prepared for examination by Scanning Electron Microscopy (SEM).

Faculty Sponsor: Dr. Chunfei Li

ALLEMANG, L.N., BOSSERT, E.N., STONER, D.J., ZIMMERMAN, H.L., and **LYNCH, A.** T*he Influence of Voice Disorders on College Students' Perceptions of an Individual's Socio-communicative Abilities*.

This study investigated how college students perceived individuals who have voice disorders as based solely on their audible vocal attributes. Of particular interest were the perceptions of undergraduate students in Communication Sciences and Disorders (CSD) as compared to those in other majors. Participants listened to an audio file of an individual with a mild-to-moderate voice disorder, characterized by a strained-strangled quality, as she read aloud. They then completed a researcher-developed survey derived from the Voice Handicap Index (Jacobson, et al., 1997) to sample their perceptions of the speaker's functional abilities, feelings/emotions, and vocal/physical health. All student groups "somewhat agreed" that the individual they heard experienced an OVERALL vocal handicap, though the rating of CSD students was significantly lower than those in Health and Human Services (HHS). No significant differences were noted for this parameter when CSD students were compared to those enrolled in Business and Information Sciences (BIS) and Arts and Sciences (AS) major. All student groups "somewhat agreed" that the individual experienced EMOTIONAL and FUNCTIONAL handicaps because of her voice disorder, with no significant differences noted between participants. Students in all groups "somewhat agreed" that the individual they heard experienced a PHYSICAL handicap as the result of her voice, though the rating of CSD students was significantly lower than BIS and HHS majors.

Faculty Sponsors: Dr. Kenneth J. Staub and Dr. Kristina Dworek

ANDERSON, C.T., MILLER, T.M., and **RAMSEY, A.D.** Department of Biology and Geosciences (Biology). 2017. *Effects of Prey Biodiversity on Fish Growth*.

Biodiversity losses are among the most pressing concerns for those interested in conservation; this issue is primarily associated with habitat loss and alteration, which can limit the variety of organisms capable of surviving in various environments. The aim of this study is to determine whether the biodiversity of food items influences the growth and development of fish. This information can be used to guide decision-making in the field of Conservation Biology, where it is crucial to understand the interactions between predators and their prey. This study uses goldfish as a laboratory analog for fish species that would be present in other freshwater or marine environments. In this study, the fish were fed a diet consisting of wingless fruit flies, brine shrimp eggs, and bloodworms. Three additional groups were used as a control. The fish in these tanks were only fed a single type of the food items listed. Greater growth and development among the fish in the biodiverse tank, beyond that of the control tanks would indicate that biodiverse prey options are favorable to single prey types. This study was conducted in a laboratory setting, where unnecessary variables could be limited, and replication was used to ensure the accuracy

of our findings. This experiment is considered a pilot study in which materials and methods are tested in advance of a more comprehensive analysis of a similar research question.

Faculty Sponsor: Dr. Andrew Keth

ANKNEY, S.R. Department of Biology and Geosciences (Biology). 2017. *Flying with Microbes: The Effects of Microban Disinfectant Spray and UV Light on Opportunistic Pathogens and the Benefits with Regards to Emergency Air Transportation Vehicles*.

One in 25 patients that are hospitalized or in long term health care facilities will contract a nosocomial infection. Billions of dollars are spent annually on these infections and while significant progress has been made to control these infections in hospitals, little research has been conducted when it comes to emergency air transport vehicles. Although staff clean the helicopters between each patient, products such as alcohols, bleach, peroxide, and Quats have many disadvantages. As a potential new way to disinfect the helicopters, Microban Disinfectant spray and UV light were tested against common opportunistic pathogens such as *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus cereus*, and *Salmonella typhimurium*. The minimum inhibitory concentration and the minimum bactericidal concentration were determined for each of these bacterial types. The maximum height from the pathogen that the UV light could be placed and still inhibit the growth of the bacteria was also determined for each species. These findings demonstrate that Microban and UV light are effective against these organisms. This method of sanitation could also be applied to the cleaning of other transport vehicles such as ambulances, police cars, and school buses.

Faculty Sponsor: Dr. Helen Hampikian

ARMER, L., JOHNSON, E., and **SOLLICK, A.** Department of Biology and Geosciences (Biology). 2017. *Everything is Oaky*.

This project was done as a survey of the composition and structure of trees currently found in Clear Creek State Park, with a focus on the different species of oaks present. Oaks are a historically important tree, valued for their beauty, wood, and wildlife habitat. Our objective was to compare the relative density and size of red, white, and chestnut oaks on north versus south facing slopes and flat bottom-lands to understand the role of physiography in tree growth. This was accomplished by using a wedge prism, clinometer, and a DBH tape. Our survey revealed clear differences in heights and diameters among species despite the fact that all the oaks are the same age. Red oaks have larger diameters, while white oaks get taller, on average. Chestnut oaks are a smaller species overall. All species were bigger on the southern than the northern aspect, suggesting light and temperature is important. They are also significantly taller on the slopes than the flats, due to greater competition. Our study shows differences between the species themselves, as well as important site difference, in terms of growth ability.

Faculty Sponsor: Dr. Suzie Boyden

BAIR, M.R. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *200-kW Solar Electric Propulsion Tug for Transfers of Payloads for LEO and LDRO*.

See DENMARK, R.V.

BALLIET, L. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Electron Beam Lithography*.

See MCMILLEN, M.

BARCHAK, G.L., and **SAVITSKY, D.A.** Department of Communication Sciences and Disorders. (Graduate Program). 2017. *Lee Silverman Voice Treatment and the Effects on Individuals with Parkinson's Disease*.

Parkinson's disease is a progressive motor disorder associated with hypokinetic dysarthria. It is characterized by reduced loudness and slow breathy or harsh voice quality. The Lee Silverman Voice Treatment (LSVT) LOUD has been a widely used and scientifically studied method designed to improve the vocal quality for individuals with Parkinson's disease. LSVT LOUD focuses on creating healthy vocal loudness and increased speech intelligibility by improving the mechanisms involved with speech production. This comprehensive literature review will analyze studies that investigate the effects of LSVT LOUD on individuals with Parkinson's Disease. It aims to support LSVT LOUD as an effective form of treatment to improve the communicative abilities that are compromised by this disease. It will also explore any evidence of positive changes on quality of life.

Faculty Sponsor: Dr. Janis Jarecki-Liu

BARRON, R., BENES, L., FOSTER, A., and **SIPE, A.** 2017. Department of Communication Science and Disorders. (Graduate Program). 2017. *A Comparison of Apraxia of Speech Treatment Options*.

This study evaluates the efficacy of different methods for treating acquired apraxia of speech. Apraxia of speech is a neurologic motor speech disorder resulting in deficits in the planning and programming of sensory motor control directing the phonetic and prosodic aspects of normal speech. Apraxia of speech is also known as verbal apraxia, dyspraxia, and acquired apraxia of speech. Acquired Apraxia of speech occurs when the portion of the brain that controls muscle coordination is damaged. It can be caused by stroke, traumatic brain injury, dementia, progressive neurologic disorders, and brain tumors. Acquired apraxia of speech leads to frequent articulation errors, a slower speech rate, and abnormal prosody and fluency. In addition, apraxic individuals may have a small phonetic inventory and may observably struggle or grope to perform the correct movements for accurate speech production. Apraxia treatment should prioritize tasks that contribute to the speed of improvement and long lasting benefits. Treatment methods include keyword techniques, biofeedback, articulatory kinematic approaches, and rate/rhythm approaches. This research study examines the efficacy of script training, electropalatography, sound production treatment, and rate/rhythm approaches while treating apraxia of speech. This research study seeks to answer the question: which treatment method tends to have the most benefit for an individual who has apraxia of speech?

Faculty Sponsor: Janis Jarecki-Liu

BECKEY, J.L., Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Mapping the Heiles Supershell GSH 90-28-17*.

Roughly 30 years ago, massive shells of gas called superbubbles were discovered using radio telescopes. Theoretical models indicate two likely sources of energy for the expansion of these bubbles of gas: stellar winds or supernovae explosions. While we have known for several decades that these bubbles exist, neither the distance to the bubbles nor their expansion rates have been accurately determined. Luckily, we can often determine a supperbubble's distance and expansion rate by carefully studying the light from stars that lie within or beyond the superbubble. The goal of this project was to observe the light from several stars, located in the direction of the superbubble called GSH 90-28-17, to more accurately determine the distance, size, energy, and temperature of the gaseous shell. Our results indicate that stellar winds would be insufficient to drive the expansion of this bubble, which points towards one or more large stellar explosions as the energy source for this expanding bubble. More data will be collected this summer to refine the results.

Faculty Sponsor: Dr. Sharon Montgomery

BENES, L. Department of Communication Science and Disorders. (Graduate Program). 2017. *A Comparison of Apraxia of Speech Treatment Options*.

See BARRON, R.

BENSON, L. Department of Biology and Geosciences (Biology). 2017. *Comparison of Aquatic Macroinvertebrates in Seeps of Old Growth and Secondary Growth Forests in Cook Forest State Park.*

See SOLLICK, A.

BENTON, S.A. Department of Social Sciences (History). 2017. *Caligula: Mad Man Or Damaged Child?*

Can you imagine being born into imprisonment, betrayal, broken family, misery, and violence? Having to conceal your feelings because you have no time to truly mourn and work through them, which could cause an internal uprising of violent tendencies and self-destruction. This describes the life of Roman emperor Caligula. When one hears his name, one instantly thinks of insanity, lustful actions, and violence. Historians have portrayed the emperor as a mad man. However, this lunacy did not come to Caligula as a 'brain-fever'. Through the examination of sources on the life of Caligula, one will see that his 'madness' was due to traumatic life events, not an actual ailment.

Faculty Sponsor: Dr. Robert Frakes

BERRY, R.G. Department of Biology and Geosciences (Biology). 2017. *Oak Regeneration at Callen Run Research Area*.

See HUMES, A.

BERRY, R.G., and **BRAUNAGEL, T.M.** Department of Biology and Geosciences (Biology). 2017. *Quantitative Food Webs Associated With Recently Metamorphosed Fowler's Toads (Anaxyrus fowleri) in Four Habitat Types.*

Fowler's Toad (Bufonidae: *Anaxyrus fowleri*) is a broadly distributed, generalist amphibian in eastern North America. Although recently metamorphosed individuals are a numerically dominant component of many habitat types, particularly during seasonal emergences, few studies have examined the diets of toadlets or assessed their importance in terrestrial food webs. In this study, we quantified the diets of toadlets inhabiting four habitat types (riparian, pond-edge, wetland-edge, and beach) and constructed quantitative food webs using estimates of energy flow. During June and July of 2016, we collected and preserved toadlets (n=60) from six sites distributed throughout northwestern Pennsylvania and then dissected stomachs in the lab. We identified all prey items to taxonomic order, and then photographed and measured each prey item for total length (n ~ 1000) using a microscope and digital image processing software. Our results will include statistical comparisons of toadlet diet across habitat types, including analyses of the abundance and occurrence of each prey type. Published allometric relationships will be used to estimate energy content of individual prey items based on body size measurements. These data will provide the basis for constructing a quantitative food web associated with recently metamorphosed Fowler's Toads and prey taxa for each habitat type. Our findings will provide novel insights into the ecological roles of toads in the terrestrial habitats adjacent to freshwater breeding sites. Conclusions from our study will be valuable for elucidating the multiple roles of amphibians in freshwater and terrestrial systems and assessing their importance relative to other taxonomic groups.

Faculty Sponsor: Dr. Kurt J. Regester

BESSETTI, R.N. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

BICKEL, G. Department of Biology and Geosciences (Biology). 2017. *Comparative Permethrin Concentration and Distribution Methods on Mealworm (Tenebrio molitor) Populations.*

See COFFMAN, K.

BLASHFORD, M.E., GANNON, K.H., and **ZIMMERMAN, H.L.** Honors Program. *The Impact of an Honors Program on Academic Performance of Speech Pathology Students*.

The speech pathology major at Clarion University has experienced significant growth over the past two decades in terms of student enrollment and academic reputation. It is currently one of the top majors recruited each year by the university admissions office based on an increase in applicants interested in the discipline. A similar pattern has been observed among students entering the Honors Program and among those taking leadership positions in the program and across the university. Casual observation at recruitment fairs and orientation functions support the notion that a presentation of the major among high school juniors and seniors creates a greater degree of interest by those students and their parents. The effect this has on the Honors Program has not been adequately quantified; a task that could provide significant benefits as to how future recruitment and retention initiatives are developed. As such, this research project will seek to conduct a time series analysis of the pattern observed for students majoring in speech pathology during the last twenty years at the university level and in the Honors Program. Since one important function of any Honors College or Program is to instill an enjoyment of life-long learning and academic growth, this project will also study the impact the Honors Program has had on the academic performance on Speech Pathology Students. This research project is highly significant in that results will be used by the university administration and the Honors Program leaders to shape future recruiting initiative. The project also incorporates a relatively advanced empirical technique not often used in undergraduate research on a large data set to provide robust statistical results.

Faculty Sponsor: Dr. Rod Raehsler

BLASHFORD, M.E., HAMMOND, K., and **MCCLAY, T.** Honors Program. 2017. *Challenges and Solutions in Recruiting Students Majoring in the Health Care Professions into an Honors Program*.

A major challenge of any advanced academic program involves the notion of how to include some of the top students on campus; those students choosing to major in a medical field. Students choosing to major in nursing or those pursuing an undergraduate degree with the goal of attending medical school are very often some of the best in any cohort. These same students typically have such difficult course and laboratory schedules that adding a curriculum within an honors college or program is often too much to incorporate. This study looks at ways in which the current curriculum we have in the Honors Program at Clarion University, which is similar to many other institutions, might be changed to accommodate students majoring in the medical disciplines. In addition to looking at surveys of various university curricula, we will also focus on results from a survey given to campus faculty in these fields across universities and existing student enrollment data.

Faculty Sponsor: Dr. Rod Raehsler

BLIMLINE, M. Department of Biology and Geosciences (Biology). 2017. *The Effects of Shoal Size on the Shoaling Behavior of Zebra Fish (Danio rerio)*.

See ECKMAN, C.

BOLDT, K.R., and **MYERS, S.B.** Department of Biology and Geosciences (Biology). 2017. *Understanding the Relationship and the Affinity of the Hac1p Transcription Factor to a Novel UPRE*.

The aggregation of aberrant proteins within the Endoplasmic Reticulum (ER) of eukaryotic cells is the physiological cause of many diseases, such as Cystic Fibrosis and Antitrypsin Disease. In diseases such as this, the cell becomes overwhelmed by the accumulation of protein aggregates, inducing programmed cell death. The cell has various mechanisms to clear aberrant proteins, such as retro-translocation out of the ER via ER-Associated Degradation (ERAD), a constitutive protein quality control pathway. If ERAD becomes overwhelmed with misfolded proteins, the Unfolded Protein Response (UPR) is initiated to expand the ER and increase the synthesis of cellular components necessary for expedited ERAD function. The UPR is induced through a cascade pathway which results in the translation of the transcription factor Hac1p, which binds to a UPR-Element (UPRE) present in the promoter region of some UPR target genes. In a previous study, a novel UPRE was identified and the putative UPRE was shown to be necessary for gene expression during times of cellular stress. In this project, we hope to expand on initial findings and examine the putative UPRE in its ability to be recognized by Hac1p. Previously, via a β-galactosidase assay, Hac1p affinity to the classical UPRE was defined. In an effort to characterize the novel UPRE, a β-gal assay will be used to quantify the affinity for Hac1p to the novel UPRE in the presence and absence of cell stress induced with established chemical agents in two yeast strains. We strive to determine the affinity of Hac1p to the novel UPRE and are interested in providing further support that the putative UPRE is a *bona-fide* UPRE.

Faculty Sponsor: Dr. Craig Scott

BONIFAY, K. Department of Biology and Geosciences (Biology). 2017. *Eastern Deciduous Forest Symposium*.

See MCGLONE, D.M.

BONIFAY, K. Department of Biology and Geosciences (Biology). 2017. *Effects of Fire Disturbance and Hay-scented Fern on Understory Regeneration*.

See GEYER, S.R.

BOSSERT, E.N. T*he Influence of Voice Disorders on College Students' Perceptions of an Individual's Socio-communicative Abilities*.

See ALLEMANG, L.N.

BOUCH, R.J., KENYON, C.M., MASON, J.P., BESSETTI, R.N., SHEEHAN, P., WILSON, D.M., SMITH, J.R., CLAY, M., SMITH, D.M., and **KETH, A.C.** Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

Batrachochytrium dendrobatidis (Bd) is a pathogenic chytrid fungus that is largely responsible for the rapid decline in amphibian populations among the globe. This highly infectious pathogen can penetrate the keratinized skin of many amphibian species, quickly leading to an electrolyte imbalance, sloughing of the skin, disorder of osmoregulation, and eventually causing the animal to undergo cardiac arrest. These symptoms are collectively termed chytridiomycosis. We have developed an Enzyme-Linked Immunosorbent Assay (ELISA) engineered to rapidly detect the presence of Bd using highly specific antibodies. Currently, the method of choice for detecting the pathogen is by amplifying Bd DNA from collected swab samples using polymerase chain reaction (PCR). While PCR is accurate and can detect even the smallest traces of DNA, it is a test which requires specialized laboratory equipment, expensive reagents, and access to electricity. Our ELISA field kit gives ecologists, conservation biologists, zoologists, or any researcher the ability to receive on-site quantitative results in the samples or area being tested. The ELISA can also directly help control the transmission of Bd by being used in settings such as zoos and research facilities that commonly hold amphibians in containment to detect and quarantine infected

species. Currently, we are working to increase the sensitivity of the kit to yield faster and more accurate results.

Faculty Sponsor: Dr. Andrew Keth

BOYDEN, S. Department of Biology and Geosciences (Biology). 2017. *An Analysis of Understory Composition in Clarion Woods.*

See BRAUNAGEL, T.

BRAUNAGEL, T.M. Department of Biology and Geosciences. 2017. *Study Abroad in Madagascar Lead to Research on Invasive Species.*

My study abroad experience in Madagascar, Africa, is divided into two sections: research of invasive species in Ranomafana National Park (RNP), and a comparative observational analysis of different ecological compositions on the island. Research in the national park was centered on habitat disturbance and the presence of invasive species in proximity to fragmentation. The black rat (*Rattus rattus*) is known to carry and spread diseases including Toxoplasma and the Bubonic Plague throughout the rainforest and surrounding villages. Strawberry Guava, (*Psidium cattleianium*) is an invasive species that lacks seasonality, and outcompetes native vegetation. A 1000 m transect was run through RNP from an edge of habitat into denser vegetation. Two Sherman traps were set every 25 m, one terrestrial and one arboreal, and were checked daily for rodents. Tail length, body length, sex, and species were recorded for all native and invasive rodents. DNA extractions from blood and spleen samples were taken from invasive species. Data supports that there is a higher incidence of invasive species in regions of fragmentation, and as distance from the edge increases, the number of invasive species decreases. Botany plots (23 m diameter) were constructed along the transect every 25 meters. The plant family abundance and distribution, DBH, tree height, and canopy volume were recorded per plot as well as the percent cover of the invasive Strawberry Guava. The number of small stems, guava basal area, presence of strawberry guava, and percent cover of strawberry guava has increased in the last two years.

Faculty Sponsor: Dr. Summer Arrigo-Nelson, California University of Pennsylvania

BRAUNAGEL, T.M. Department of Biology and Geosciences (Biology). 2017. *Quantitative Food Webs Associated With Recently Metamorphosed Fowler's Toads (Anaxyrus fowleri) in Four Habitat Types.*

See BERRY, R.G.

BRAUNAGEL, T.M., and **BOYDEN, S.** Department of Biology and Geosciences (Biology). 2017. *An Analysis of Understory Composition in Clarion Woods.*

In the world of forest ecology, disturbance and regeneration patterns are crucial to understanding the complex mechanisms of how forests actually work. The Clarion Woods is a hemlock-dominated forest with large, old oaks that also make an appearance. The understory composition of these woods has been affected by invasive species and grazing by deer. The relationships of herbaceous plants with fern, pH, species richness, and soil moisture all yield information on how the forest regenerates. Our survey revealed an increase in non-fern herbaceous cover when there was more fern cover present and less herbaceous cover when there was a greater diversity of trees present. There was more herbaceous cover at a higher pH and with more soil moisture. Further studies could be continued testing the effects that both fern and deer grazing have on seedlings and other herbaceous plants.

Faculty Sponsor: Dr. Suzie Boyden

BRIDEGAM, C.L. Department of English and Modern Languages. 2017. *Study Abroad in Spain*.

My presentation is about the value of studying abroad. Studying abroad is when a student attends classes in a university in a foreign country while immersing him- or herself in a new language and culture. Studying abroad has many advantages, such as making connections with native students in the same field of study, broadening one's views of the world, and personally growing stronger through living within a culture not one's own. I traveled to Murcia, Spain to spend a semester studying the Spanish language and culture. I attended the *Universidad de Murcia* (University of Murcia) where I studied the history of the Spanish language, Latin-American literature, Spanish literature of the Middle Age, and Spanish policy (a grammar course). The courses were a lot more difficult than I had anticipated, but I learned so much about the Spanish language. I was using my Spanish skills constantly in listening to lectures, reading the literature, and conversing with friends. Overall, my time abroad greatly increased my conversation skills, and I was able to attend many cultural events in Murcia and surrounding cities. I hope to one day return to Spain and further increase my knowledge of the Spanish language and culture.

Faculty Sponsor: Dr. Katy O'Donnell

BRUMMITT, B.M. Department of Biology and Geosciences (Biology). 2017. *Qualitative Observations of Behavior and Quantitative Measurements of Iron in Lithobates catesbeianus Collected from Water Impacted by Acid Mine Drainage*.

See AIELLO, L.M.

BUCHAN, M., JACKSON, T., LIDEY, M., and **GROFF, S.** Rehabilitation and Human Services. 2017. *Take 5*.

The Clarion University Rehabilitation Club applied for and received a grant to start up a respite care program for parents of children who have a disability. The Take 5 program was designed by Temple University in Philadelphia. The Take 5 program consists of a two-hour-long training, that includes "what if scenarios," knowing what a mandated report is, and several other guidelines. The rehab club trained over 30 students to provide the respite care for any child with a disability. The club provided informational sessions for the parents to attend and an introduction to the program along with interviews and questionnaires about their child. After meeting with the parents and discussing their child's needs as a club, we were able to put together a schedule of events for the kids. The Rehab Club then provided services for those who signed up their children. At these events, we made crafts, worked on fine motor skills, and played games. The success of the Take 5 program was presented at several professional conferences, including the Rehabilitation Community Advisory Board meeting and at the Pennsylvania Rehabilitation Association in Harrisburg in March.

Faculty Sponsor: Dr. Mark Lepore

BURNS, A.N., HAGAN, A.E., and **MAGRINI, R.R.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Spasmodic Dysphonia: An Overview of Etiologies, Assessment, and Treatment*.

Spasmodic dysphonia (SD) is a long-term voice disorder that affects laryngeal muscle control and causes involuntary movements or spasms during phonation. The research pertains mainly to adductor spasmodic dysphonia, which is characterized by the vocal folds being forced together resulting in a strained, strangled, and unsteady vocal quality. This comprehensive literature review expands on the disorder by presenting other types, associated speech characteristics, and prevalence of SD. It investigates the etiologies of the disorder, and reveals findings of differences found in brain structures among individuals with SD. The research also looks at using syntactically complex voiced sentences for assessment, and compares differentiating factors between SD, amyotrophic lateral sclerosis (ALS), and voice tremor. The review explores the efficacy of Botulinum toxin (Botox) injections, which is the most widely used method of treatment for the management of SD, and presents successful surgical procedures. In addition, it compares and contrasts Botox to surgical findings. The objective of this literature review is to gather

the most pertinent research regarding SD to contribute to a better overall understanding of the disorder through etiology, assessment, and treatment.

Faculty Sponsor: Dr. Janis Jarecki-Liu

BURNS, N.M., SANDERS, L.J., and **ADAMS, K.A.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Motor Speech Disorders Associated with Stroke*.

Stroke occurs when blood flow to a certain part of the brain is stopped by a blockage or a broken blood vessel. Damage to the brain can cause motor speech disorders such as; Apraxia of Speech, Unilateral Upper Motor Neuron dysarthria, Spastic Dysarthria, Ataxic Dysarthria, Hyperkinetic Dysarthria, Hypokinetic Dysarthria, and Mixed Dysarthria. Symptomatology is dependent on the type of disorder. Treatment for these disorders varies. It is based on the location of damage and the skills lost by the client. Some of the treatment includes making movements relaxed and slow, facilitating breath supply, and articulation therapy. All of these treatments are dependent on the type of disorder and the specific needs for the client.

Faculty Sponsor: Dr. Janis Jarecki-Liu

BURNS, S., HARANCHER, K., PARK, B., and **SMITH, D.M.** Department of Biology and Geosciences (Biology). 2017. *Analysis of the Toxicity of Analgesic A1 on Primary Neuronal Cell Cultures.*

Analgesic A1, available over-the counter and widely used, is a drug that is most often used as a pain reliever and fever reducer. Although A1 is found in over 600 types of drugs, little is known about its mechanism of action as an effective analgesic. The drugs containing A1 are used to treat various symptoms including headaches, muscle aches, toothaches, and arthritis. Evidence based medicine tells us that A1 has the capability to be used therapeutically as an analgesic within the context of anesthesia. Lack of research on the mechanism of action of A1 as an analgesic precludes this in the United States but has prompted European anesthesiologists to begin investigating A1's use therein. Our experiments examine the toxicity of A1 used at pharmacological doses on cultured trigeminal ganglia nerve cells from Sprague Dawley *Rattus norvegicus*. These cells are highly branched and elongated as they are found in the trigeminal nerve. They are involved in processing sensory information from the face and body, easy to obtain in relative purity, which makes them a perfect cell type with which to test A1 toxicity. Using trypan blue to stain dead cells, the percentage of viable cells was determined when the cells were exposed to different concentrations of A1 for various times. The understanding of how A1 works and its toxicity towards mammalian cell lines can allow us to possibly incorporate this drug with various components of anesthetics to produce a more efficient anesthetic response.

Faculty Sponsor: Dr. Doug M. Smith

CHAPMAN, H.A. Department of Biology and Geosciences (Biology). 2017. *Influence of Climate and Water Levels on Long-Term Population Dynamics of Largemouth Bass (Micropterus salmoides) in Kahle Lake.*

See MCKENZIE, L.J.

CHAPMAN, S.L. Department of Psychology. 2017. *Community Literacy Needs Assessment for Clarion Learning Workshop*.

See KAUFNANN, A.D.

CLARK, D. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

CLAY, M. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

COFFMAN, K., BICKEL, G., and **HELGERT, H.** Department of Biology and Geosciences (Biology). 2017. *Comparative Permethrin Concentration and Distribution Methods on Mealworm (Tenebrio molitor) Populations.*

Mealworms are considered a pest within poultry industry and as such many farmers turn to pesticides to control nuisance populations. Permethrin is a highly toxic insecticide that is extremely toxic to fish, highly toxic to bees, and poisons to humans. Due to the toxic nature of permethrin, we are testing to see if lower than recommended concentrations and or differing distribution methods result in enhanced effectiveness. We are studying this with eight groups of mealworms being exposed to two different distribution methods and four different permethrin concentrations. Each consists of 12 populations of mealworms containing 20 mealworms per population. We hypothesize that using lower concentrations of permethrin in conjunction with different distribution methods will produce results comparative to recommended methods.

Faculty Sponsor: Dr. Andrew Keth

COUDRIET, Z.A., DEEN, A.L., ELIAS, A.J., GUYTON, D.M., HILBERT, T.A., HOUSTON, A., and **MCCOOL, K.A.** Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

As the focus of social studies shifts to informed action, teacher preparation programs need to strategically allow their candidates to put theoretical knowledge into practical application using university councils. Through the implementation of said councils, we can increase student engagement of teacher candidates to prepare them for the reality of teaching. These councils can further university-high school relations through the usage of beneficial activities that further student engagement for secondary students. Some activities that have already been implemented to increase student engagement are Geography Bees, Model UNs, and Writing Contests.

Faculty Sponsor: Dr. Jesse Haight

CRAIG, J.M. School of Education. 2017. *Instruction Isn't Enough.*

During my student teaching placements, I worked to build a culture that motivated students to take ownership in their learning. This type of motivation is not extrinsic. Students who take ownership in their learning care about more than the grade. These students take pride in their work, enjoy and embrace the process of each lesson. This culture is not born overnight; it takes practice and constant effort. Teachers must dedicate themselves 100 percent to their students and engage their students on a daily basis. Instruction does not motivate students to learn. In order to motivate students, teachers must share why they care, provide outside opportunities, and push students to reach high expectations. Instruction isn't enough! As part of my student teaching, I worked with eighth grade students to create a college level research paper. My cooperating teacher and I set high expectations for these students. My cooperating teacher, the students, and I would not be satisfied with anything less than their best. The students' research ranges from art in Ancient Egypt, women's treatment in Ancient Greece, and/or Pennsylvania's impact on our nation.

Faculty Sponsor: Dr. Jesse Haight

CRATE, J.M., and **PRICE, J.C.** Department of Biology and Geosciences. 2017. *The Effects of Fire on Forest Regeneration*.

This research project was done to evaluate the effects of fire on forest regeneration in Northwestern Pennsylvania hardwood forests. With the ever-changing climate and the increasing amount of manmade disturbances it is important to take care of the regeneration to ensure a healthy forest for years to come. Data was collected in the fenced research area located near Callen Run in Clear Creek State Park, where deer had been fenced out for 11 years. This allowed the research to express only the regeneration without the influence of an overpopulation of white-tailed deer. The experimental site was set up so that the entire site had been thinned but only one-half of that site had been control burned. This allowed us to evaluate differences in regeneration between a burned and an unburned forest. Transects ran from one end of the fence to the other, passing through both treated sites and at every 10m the closest tree was flagged as the plot center, for 50 total plots. A 1m2 area around the plot center was surveyed for the number of woody seedlings, their species, and the light availability. The results showed that in both the burned and the unburned area there was still a significant amount of red maple saplings compared to any other sapling present. However, there was a significantly lower percentage of red maple in the burned area when compared to the unburned area, supporting the theory that fire suppresses the red maple's regeneration.

Faculty Sponsor: Dr. Suzie Boyden

CROYLE, K.D. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Intelligent Tutoring Systems for Physics Education*.

Students in a freshmen introductory physics class often have trouble grasping the large number of topics ranging from Newton's laws to thermodynamics to electricity and magnetism. Due to the high course load, instructors often do not have the luxury of spending time explaining every little detail. This presents a problem, especially to the underprepared students from disadvantaged backgrounds. In this project, we explore the possibility of using computer programs to provide individualized training to students to bridge the learning gap. We used a computer-based tutor to train freshmen introductory physics students in the concept of rotational dynamics. Patterns in student performance on the tutor show that this assignment provided good learning experience to students. We identify gaps in student performance on this tutor, which can serve to improve the instructor's lecture and suggest changes for the next version of this tutor.

Faculty Sponsor: Dr. Vasudeva Rao Aravind

CURFMAN, E. Department of Biology and Geosciences (Biology). 2017. *Oak Regeneration at Callen Run Research Area*.

See HUMES, A.

DADDARIO, T.C. Department of Social Sciences (History). 2017 *Influence of Christianity in the American University*.

There is a substantial history of Christianity in the American Higher Education system. Christianity has had and continues to have a palpable influence on the American University. Research into this topic will examine the history of Ivy League colleges originally being founded as seminaries for the Puritan and Episcopalian denominations, the rise of Catholic private institutions that still exist today and are some of the most prestigious universities in America (Villanova, Xavier, etc.), the Mormon Church's Brigham Young University, and, finally, the influence of student organizations such as Campus Crusade for Christ, Newman Association, Catholic Campus Ministry, and C.R.E.W. on American Higher Education. By examining primary sources such as John Henry Newman's The Idea of a University, the development of Ivy

League schools (as well as Clarion University's own history), and interviews with local clergy and university faculty, it becomes clear that Christianity's role in American Higher Education is more than just student organizations and Catholic colleges.

Faculty Sponsor: Dr. Robert Frakes

DEEN, A.L. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

DEEN, A.L., and **HILBERT, T.A.** Department of Education. 2017. *Bridging The Gap Between Fantasy and Reality: Bringing Fantasy into the UN.*

Zombies taking over entire countries. The moon entering the Earth's gravitational field and impacting the magnetic fields. An electromagnetic pulse that renders all technologies useless, resulting in another Dark Age. These topics are all from Science Fiction. However, what if they were not? This presentation will discuss the topic of bringing these topics, including others, into the Model UN environment by combining the forces of college organizations and local teachers. These topics will engage student's critical thinking skills in the fields of science, geography, and history, while providing teacher candidates with the skills to blossom into better educators.

Faculty Sponsor: Dr. Jesse Haight

DEEN, A.L., and **MCCOOL, K.A.** Department of Education. 2017. *The American Government: Really American?*

By examining primary sources, teachers and students can explore all the ways that other past and present civilizations including Roman, USSR, and others affected the government system we have today.

Faculty Sponsor: Dr. Jessie Haight

DEAN, M.A. Department of Biology and Geosciences (Biology). 2017. *Toxicity of Copper Sulfate to Gastropods.*

See MILLER, T.M.

DEMARK, R.V., STACK, B.M., BAIR, M.R., and **KROUSE, R.M.** Department of Chemistry, Mathematics, and Physics (Physics). 2017. *200-kW Solar Electric Propulsion Tug for Transfers of Payloads for LEO and LDRO*.

The use of solar electric propulsion (SEP) for a tug spacecraft poses a significant cost reduction benefit to payload transfers from low earth orbit to lunar distant retrograde orbit and even transit to deep space locations such as Mars. These benefits are represented by an overall reduction in system mass and increased mission flexibility. To achieve these benefits, power generation from large, flexible solar arrays must be capable of reaching levels of 100's of kW and must be extensible to larger power levels through system modularity. The SEP tug must also be capable to storing and processing tens of thousands of kilograms of xenon propellant. This paper proposes a unique design concept of a robotic self-assembled 200-kW class SEP tug spacecraft that is capable of storing 40,000 kg of xenon propellant and transfer payloads via modular attachment

Faculty Sponsor: Dr. John Heard

DGIEN, J., KRAUS, J., and **WALSH, T.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Huntington's Disease*.

The disease in review can be identified as degenerative and devastating, otherwise known as Huntington's disease (HD). Thirty thousand Americans are impacted by HD every single day and 200,000 are at risk for inheriting the disease. The article will provide a thorough background of the disease as well

as its stages, symptoms, etiology and effects on daily life. Furthermore, the following paragraphs will introduce genetic testing and the doors it opens for people at-risk for HD.

Faculty Sponsor: Dr. Janis Jarecki-Liu

DONALDSON, S. Department of Social Sciences (History). 2017. *The Seven Sisters: Women's Fight for Equality in College Education.*

This paper endeavors to provide a clarification of the inception of the Seven Sister Colleges, and their subsequent influence on 19th century American women with their controversial curriculums and extracurricular activities that were predominantly considered male territory. My research includes a plethora of secondary historical and analytical documents, newspaper, and journal articles written from the allotted period of the Seven Sister Colleges, and written sources from the 19th century regarding female education and its necessity such as the writings of Catharine Beecher, and Reverend Joseph Emerson. In addition to this, my paper includes original research conducted at the archives of the founding Seven Sister College, Mount Holyoke College, and analyzes the impact of such curriculum as Astronomy, Mathematics, and Chemistry, and extracurricular activities such as baseball on the deconstruction of 19th century gender norms. My paper demonstrates and exhibits the cruciality of the Seven Sister Colleges on the deconstruction of 19th century gender norms for women using higher-level education that equated men's, and that emphasized such curriculum and extracurricular activities deemed masculine in nature.

Faculty Sponsor: Dr. Kathleen McIntyre

DONELSON, R.L., and **SCHLAFHAUSER, A.L.** Department of Nursing (Graduate Program). 2017. *Barriers to the Use of Low-Dose Chest Tomography.*

Several evidenced-based practice guidelines are available to primary care providers for the purpose of providing recommendations of care for their patients. Even with established guidelines, some do not always apply them to their practice. Lung cancer is the leading cause of cancer-related death among men and women. Our research question is, "In the primary care setting, what do primary care providers in Pennsylvania identify as barriers to utilizing low-dose computed tomography in patients high risk for lung cancer?" The framework for this study is Nola Pender's Health Promotion Model. Pender's focus is improving quality of life by preventing health problems, which is possible through identification of behaviors that make patients high risk of lung cancer and utilizing low dose computed tomography to identify lung cancer at early stages. This will improve patient outcomes and quality of life. Our methodology has been critically planned to guide us and is the foundation of our research. Our research study is quantitative, descriptive, and non-experimental and will identify, explain, and describe barriers. This study will be conducted in Pennsylvania through the use of internet email invitations to participate in our research survey. Participants will include primary care physicians, certified registered nurse practitioners, and physician assistants within our exclusion/inclusion criteria. Our research instrument will be a well-recognized established and published instrument called the *Appraisal of Guidelines for Research & Evaluation Instrument*. It is a generic instrument, in the form of a survey, which can be used to appraise the quality of clinical guidelines. Due to changes in our nursing program requirements, our research study was not conducted. Our presentation is intended to fulfill our last requirement determined by the Department of Nursing.

Faculty Sponsor: Dr. Meg Larson

DUDEK, R.L. Department of Biology and Geosciences (Biology). 2017. *The Discovery, Isolation, and Propagation of a Lytic Bacteriophage for Medically Significant Bacteria*.

See DUKATE, L.R.

DUGAN, K. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

DUKATE, L.R., and **DUDEK, R.L.** Department of Biology and Geosciences (Biology). 2017. *The Discovery, Isolation, and Propagation of a Lytic Bacteriophage for Medically Significant Bacteria*.

We are rapidly approaching an era of antibiotic resistance, where organisms once easily treated, will again become deadly. The use of highly specific viruses known as a bacteriophage is a viable alternative for treating infections caused by antibiotic resistant bacteria. Bacteriophage are found readily in the environment (soil in particular) and will infect, replicate within, and subsequently burst upon exit, bacterial cells therefore killing the organism. Applying bacteriophage to the treatment of bacterial infections in humans, a process known as "phage therapy", is beneficial since bacteriophage are highly species specific and will only kill the bacteria causing the infection. This is preferable over traditional antibiotics, which can affect and disrupt the natural beneficial microbiota present in the body. Furthermore, bacteria are unable to develop resistance to bacteriophage. This project aims to discover, isolate, and propagate bacteriophage present in environmental soil samples that can potentially be used as a treatment for medically significant bacteria. We used standard microbiology techniques to isolate bacteriophage from soil samples collected from Cook Forest, Pennsylvania and Whispering Pines, North Carolina. We tested our extracts for the presence of bacteriophage against a variety of bacteria that are significant as antibiotic resistant organisms. These included *Pseudomonas aeruginosa*, *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, and *Chromobacterium violaceum*. We have thus far been successful in isolating a phage that kills P. aeruginosa, a multi-drug resistant organism that is the leading cause of death in cystic fibrosis patients.

Faculty Sponsor: Dr. Helen Hampikian

DUNGAN, K., and **NAKHATA, C.** Department of Management and Marketing. 2017. *Social Influence and Post-Consumption Satisfaction*.

The present research proposes and empirically examines how social influence, specifically online consumer reviews (OCRs) that occurred prior to consumers' purchase decision, impacts consumer satisfaction after actual experience with the product. This is important as an increasing number of retailers aim to build a long-term relationship with their customers (e.g., consumer loyalty). Hence, retailers need to understand the potential impact of OCRs on consumer satisfaction, which serves as an important foundation for long-term relationships. The authors conducted a 3 (OCRs: positive versus negative versus control) x 2 (consumption goal: hedonic versus utilitarian) x 2 (actual experience: positive versus negative) between-subject design. Four hundred and eleven participants (M_{Age} = 35.3; 57.4% male) recruited from M-Turk panel were randomly assigned to one of the 12 conditions. The results show that when consumers are exposed to positive OCRs prior to purchase, it enhances their satisfaction level after their actual experience with the product. In contrast, when consumers are exposed to negative OCRs prior to purchase, they experience less satisfaction after their experience with the product. The biasing impact of OCRs is shown to be stronger when the consumption goal is hedonic versus utilitarian. However, when there is incongruent information (e.g., negative OCRs but positive experience), the effect of OCRs becomes stronger for utilitarian consumption.

Faculty Sponsor: Dr. Chinintorn Nakhata

DUNKEL, C.A. Department of Biology and Geosciences (Geosciences). 2017. *Determining the Utility of Diatoms as Environmental Proxies in Submerged Caves, Yucatan, Mexico.*

See STORER, N.D.

EASTLICK, T.L. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Wilson's Disease*.

See AHRENS, A.B.

ECKMAN, C., KUMETIS, T.J., SALLACK, K.L., and **BLIMLINE, M.** Department of Biology and Geosciences (Biology). 2017. *The Effects of Shoal Size on the Shoaling Behavior of Zebra Fish (Danio rerio)*.

Danio rerio, commonly known as zebrafish, are a tropical freshwater fish often found in the Himalayan region. Zebrafish can be an aquarium fish for aesthetic purposes and they are commonly used in scientific research. Zebrafish shoal, which is the grouping of fish, but unlike schooling, they do not need to be swimming in the same direction; they simply shoal for social reasons and predator defense. We used three tanks of two zebrafish per tank, three tanks of four zebrafish per tank, and three tanks of six zebrafish per tank. We hypothesize that the tanks containing two zebrafish will shoal for a longer period than the tanks with more than two zebrafish.

Faculty Sponsor: Dr. Andrew Keth

ELIAS, A.J. Department of Social Sciences (History). 2017. *King Ludwig II of Bavaria: Mental Illness of Political Maneuvering?*

The research I conducted was on King Ludwig II of Bavaria and the question of his sanity. I looked into his family background, personal life, his peers thought of him, and his doctor's research. There was much speculation at the time that King Ludwig was insane, and that he had possibly committed suicide because of it. My research was to try to find evidence that the king was not mentally ill, but that his removal from power was a strategic move by his government, and that there is much more to his death than many people realized at the time. I reached the conclusion that cannot fully prove his mental stability, but supports that there is a strong argument to revisit this historical mystery.

Faculty Sponsor: Dr. Kathleen McIntyre

ELIAS, A.J., and **GUYTON, D.** Department of Education. 2017. *Crime and Punishment in American Media and Television*.

By examining popular crime dramas, teachers and students can discover how media distorts and changes views of criminal justice, giving a false sense of how the judicial system truly works.

Faculty Sponsor: Dr. Jesse Haight

ELIAS, A.J. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

FOSTER, A. 2017. Department of Communication Science and Disorders. (Graduate Program). 2017. *A Comparison of Apraxia of Speech Treatment Options*.

See BARRON, R.

FOSTER, C.E. Department of Biology and Geosciences (Biology). 2017. *Phytoestrogen Effects on Regulating Bone Remodeling in Postmenopausal Women to Prevent Bone Disorders.*

See GOYAK, C.R.

FRANCETTE, A.M., HARANCHER, M., HATCH, M., WILLIAMS L., and **HARMON, C.** Department of Biology and Geosciences (Biology). 2017. *Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro*.

Hematopoietic Stem Cells (HSCs) are multipotent cells found in the bone marrow of all mammals. All blood cells, including erythrocytes, thrombocytes, and leukocytes, originate from a self-renewing pool of HSCs that is regulated by a complex combination of surrounding physical and biochemical interactions. One factor impacting the microenvironment of HSCs is the composition of the bone marrow extracellular matrix (ECM). The ECM is largely composed of multiple proteins and polysaccharides, the purpose of which is to physically and biochemically support the functions of nearby cells by providing a scaffold and facilitating cellular signaling. Because the proliferation and differentiation patterns of HSCs are dependent on their microenvironment, a greater understanding of these interactions will allow for better manipulation of HSC fate. While there has already been documentation that HSCs produce ECM sensitive receptors such as CD44, there are no reports of how these interactions effect HSC differentiation and proliferation. Evidence gathered through this project suggests that ECM proteins collagen II and fibronectin promote the adhesion of HSCs and direct differentiation towards large adherent-cell-based colonies that act as a feeder-layer to smaller colonies of a granulocyte morphology. The results of this project will further our understanding of HSC-ECM interactions and can possibly provide a tool to expand a patient's HSC and specific differentiated populations in vitro for more fine tuned autologous bone marrow transplantation techniques that accompany personalized medicine.

Faculty Sponsor: Dr. Doug Smith

FRANKFORT, E. Department of Biology and Geoscience (Biology). 2017. *The Effects of Positive and Negative Handling On Mark and Recapture Surveys of Mice.*

See GEORGE, C.

GANNON, K.H. Honors Program. *The Impact of an Honors Program on Academic Performance of Speech Pathology Students*.

See BLASHFORD, M.E.

GEORGE, C., FRANKFORT, E., GOOD, J., and **HARLAN, S.** Department of Biology and Geoscience (Biology). 2017. *The Effects of Positive and Negative Handling On Mark and Recapture Surveys of Mice.*

The mark-recapture method is a method commonly used to estimate animal population size. However, animals can become susceptible to what we call being "trap happy." This term is commonly used to refer to animals who deliberately enter a trap despite what may be done to them just to get the food inside. They look at it as an easy way to get the resources they need with minimal energy use. This can negatively affect the results of the census and can slow down the survey process. We wanted to know if the handling treatment or trap type would affect the return of previously captured mice. For this, the mice were separated into three different treatments. The control, which received no special treatment, the positive that was given treats and play items, and the negative which was exposed to rapid flashing lights while in the trap. We hypothesized that positively treated mice would return more often than negatively treated mice, and that the screen trap would be favored more than the closed trap.

Faculty Sponsor: Dr. Andrew Keth

GEYER, S.R. Department of Biology and Geosciences (Biology). 2017. *Eastern Deciduous Forest Symposium*.

See MCGLONE, D.M.

GEYER, S.R., BONIFAY, K., and **KOLECK, R.** Department of Biology and Geosciences (Biology). 2017. *Effects of Fire Disturbance and Hay-scented Fern on Understory Regeneration*.

Forest disturbances are vital to regeneration in the understory. Light understory burning helps decrease the competition of vegetation, allowing more diversity to take place on the ground. Historically, burning has been suppressed on the Allegheny Plateau, causing a shift in forest dynamics. Native-invasive hay-scented fern has been able to move into these systems and cause a selective regeneration to take place. The composition of the understory determines the future of the canopy, which currently is oak-dominated in Pennsylvania's Clear Creek experimental forest. Our understory survey suggests that eventually there will be a shift in composition to red maple dominance because of its low germination requirements. Burning had little effect on species composition. Soil moisture is highly affected by fire disturbance, even though the burn took place in 2012, with significantly higher moisture in unburned understories. These understories also had significantly higher abundances of red maple species when hay-scented fern was absent. Oak regeneration had greater abundance within burned patches, which could indicate the requirement of soft burning for species preference or the necessity of burning to create an environment favorable to red oak seedlings.

Faculty Sponsor: Dr. Suzie Boyden

GEYER, S.R., HOGG, C.E., NUSSBAUM, G.N., SHAW, M.L., and **WHITEHOUSE, S.K.** Department of Visual and Performing Arts. 2017. *Attending the 51st National Council on Education for the Ceramic Arts (Portland, Oregon).*

The National Council on the Education for the Ceramic Arts (NCECA) is held annually in a major city in the United States. The 51st annual NCECA meeting of 2017 was held in Portland, Oregon where five Clarion University students attended with the aspirations to gain knowledge of the craft and the professionalism of ceramics. By attending talks and demonstrations, information and photographs were collected to use as references when back in the studio to strengthen the development of personal work. Samantha Geyer attended demonstrations and critiqued with other ceramists to improve the craft of her work. She will share the different tools and techniques that she is now using to improve her work. Catherine Hogg attended demonstrations, galleries, and critiques to learn about different hand building techniques and criticism for her work. She will share some hand built pieces inspired by these demonstrations. Grant Nussbaum attended lectures and galleries exhibiting the multiple processes and forms of thrown pieces. He will be presenting finished products that were thrown using the same methods. Maggie Shaw attended lectures and talked with other ceramists for the professional aspect of ceramics. She will be researching different costs and materials for creating a working studio to present to the community. Shane Whitehouse attended lectures about glazes and clay bodies. He will present different glaze formulations and clay body recipes from the conference. These concepts and results will be shared with Clarion University and borough communities.

Faculty Sponsor: Dr. Gary Greenberg

GEYER, S.R., OPYRCHAL, M., and **MCELRATH, H.** Department of Biology and Geosciences (Biology). 2017. *The Effects of Hay-Scented (Dennstaedtia Punctilobula) Fern on Red Oak (Acer Rubrum) Acorn Germination.*

The Allegheny Plateau was dominated historically by oak-hickory forests. In recent decades, we have seen a shift in forest composition away from oak and towards red maple. In the years leading up to this shift, Pennsylvania saw massive deforestation, the loss of a top predator, and a steep increase in white-tailed deer. The combination of these forces has allowed native hay-scented fern (*Dennstaedtia punctilobula*) to invade and dominate the Allegheny Plateau's forest floor. Hay-scented fern negatively affects seedling regeneration because it steals many required resources from more sensitive species such as the red oak (*Quercus rubrum*). This raises the question of when fern competition is most important-from the very germination of the acorn, or during later development of the red oak seedling. An under-

standing of the mechanism of fern competition is essential to effective oak management in the future. Through laboratory and field experiments, we compare germination rates of red oak acorns in soils with and without established fern populations. Initial data suggest no effect of fern presence on acorn germination, but this could be due to the high acidity of the native soil, which was collected from a hemlock forest near Clarion University. Future work will look at early growth difference of seedlings across fern treatments.

Faculty Sponsor: Dr. Suzie Boyden

GEYER, S.R., and **RUSSEL, M.** Department of Biology and Geosciences (Biology). 2017. *Oh Dam! How River Dams Affect Biological Recovery from Pollution.*

Many of Pennsylvania streams historically suffered from severe pollution, often associated with industrialization. This pollution led to the loss of most aquatic life, but with the Clean Water Act of 1972, and the reduction of industrial pollution, the rivers have been given the opportunity to recover. The Shenango River was once badly polluted but now has much improved water quality. However, it is not known whether biological communities were able to recover. The Shenango River has a waterway barrier, the Shenango Dam, which could impede the biological recovery of fish species. We sampled both sides of the dam by electrofishing to assess biological recovery. Overall, there were 42 species above the dam and 35 species below the dam. Eleven species were found above the dam but not below the dam and three additional species found below the dam but not above. Water quality analyses indicated that total dissolved solids were higher below the dam, which could be a result of urbanization and construction. Overall, there is a slight difference in biological communities that could be a result of a historical refuge for aquatic life located above the dam. Further surveying and research is recommended so that all Shenango River species can be accounted for and that we can continue to learn more about restoring biological diversity of other waterways in the future.

Faculty Sponsor: Dr. Andrew Turner

GEYTENBEEK, S. M. Department of Biology and Geosciences (Biology). 2017. *Linking ERAD and the UPR: Developing a Genetic Screen Via the Expression of Antitrypsin*.

See STERN, R.M.

GOOD, J. Department of Biology and Geoscience (Biology). 2017. *The Effects of Positive and Negative Handling On Mark and Recapture Surveys of Mice.*

See GEORGE, C.

GORDON, B.R., and **NUSSBAUM, G.W.** Department of Biology and Geoscience (Geosciences). 2017. *Determining the Flooding History of Cueva Margarita Cave System, Cuba Using Testate Amoebae (Thecamoebians)*.

During exploration of the Cueva Margarita 1 cave network, divers discovered a human skull predating the flooding of the cave. The karstic environment of Cueva Margarita contains large cenotes (sinkholes) that provide direct access to the water table. Due to the open nature of the cenotes, sunlight and nutrients can enter the water table and provide taxa such as thecamoebians and ostracods to thrive and be transported into the cave environment for deposition after death. These cave networks tend to have minimal bioturbation or mechanical disturbances, which allows for a buildup of undisturbed sediment containing organic matter and microfossils, such as thecamoebians and ostracods. By studying the microfossil record, the flooding history of the cave was determined. This provided an environmental context for anthropological studies currently underway. To understand the flooding history of Cueva Margarita, two sediment cores were sampled and examined under a microscope to count and identify microfossils. After examination, ostracods were the most prevalent microfossil, predominantly located towards the older half of the cores. Since these ostracods inhabited freshwater, hydrology and cave

morphology controlled where deposition could occur. The Holocene sea level-curve was compared to ostracod occurrence and a radiometric age-depth model of the sediment to infer when sea level was at a point where ostracods could no longer be deposited within the study area. Thecamoebians were absent throughout both cores. Other proxies found include seeds and possible pollen spores. Analysis is ongoing and further research is required to fully understand the paleoenvironment of the cave network.

Faculty Sponsor: Dr. Shawn Collins

GOYAK C.R., and **FOSTER C.E.** Department of Biology and Geosciences (Biology). 2017. *Phytoestrogen Effects on Regulating Bone Remodeling in Postmenopausal Women to Prevent Bone Disorders.*

Estrogen deficiency is a major risk factor for osteoporosis in post-menopausal women. For decades, women have used hormone replacement therapy (HRT) to ease symptoms of menopause, such as hot flashes and sweating. HRT is effective for both prevention and therapy, but recent findings have shown that its long-term administration is not as safe as was previously thought; so alternative treatments are urgently needed. Dietary phytoestrogens are emerging as a valid alternative to estrogens in the treatment of menopause-related diseases. Quercetin and curcumin flavonoids are major phytoestrogens present in higher amounts in plants like kale and turmeric bark respectively. In this study, we investigated the protective effects of quercetin against H_2O_2-induced apoptosis in human preosteoblastic MG-63 cells. H_2O_2-mediated cytotoxicity was suppressed in the presence of curcumin and quercetin compounds through trypan-blue cell counting and MTT enzymatic cell viability assays. Moreover, comparative assays on studying raw and cooked kale extracts revealed raw kale's superior rescuing potential against oxidative stress supporting the idea that cooking diminishes the health effects of phytoestrogens on cell proliferation due to the loss of beneficial nutrients. Our results in this study have given us the hope that quercetin and curcumin can promote cell proliferation and thus be effective in the prevention of osteoporosis. It also argues the possibility that dietary change in habits favoring an increased intake of phytoestrogens-rich foods that are not over-cooked, could contribute to prevent and to reduce the incidence of postmenopausal osteoporosis.

Faculty Sponsor: Dr. Natasha Dias

GROFF, S. Rehabilitation and Human Services. 2017. *Take 5*.

See BUCHAN, M.

GROMLEY, K., SKERKAVICH, A., and **WILLIAMS, C.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Multiple Sclerosis*.

An extensive literature review was completed in order to evaluate Multiple Sclerosis (MS). The review focused on hearing, techniques to improve patient's hearing, speech characteristics, physical symptoms, and common questions asked by patients with MS. Hearing, particularly in noise, in patients with MS has been found to be worse than those who do not have MS. Research has determined that technology is able to aid in hearing in noise for patients with MS. Patients with MS have been known to exhibit dysarthria impacting speech intelligibility. Along with dysarthria, patients with MS experience several physical symptoms as well. Physical symptoms of MS such as fatigue, emotional lability, pain/sensations, and mobility were researched. Research has shown that with proper therapy, MS patients can manage the symptoms of the disorder and have a life expectancy as someone who does not have the disorder.

Faculty Sponsor: Dr. Janis Jarecki-Liu

GUYTON, D.M. Department of Education. 2017. *Crime and Punishment in American Media and Television*.

See ELIAS, A.

GUYTON, D.M. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

HAGAN, A.E. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Spasmodic Dysphonia: An Overview of Etiologies, Assessment, and Treatment*.

See BURNS, A.N.

HAMMOND, K. Honors Program. 2017. *Challenges and Solutions in Recruiting Students Majoring in the Health Care Professions into an Honors Program*.

See BLASHFORD, M.

HARANCHER, M. Department of Biology and Geosciences (Biology). 2017. *Analysis of the Toxicity of Analgesic A1 on Primary Neuronal Cell Cultures.*

See BURNS, S.

HARANCHER, M. Department of Biology and Geosciences (Biology). 2017. *Analysis of Protein-Protein Interactions of Components Comprising the Type-III Secretion System of Chromobacterium Violaceum Cpi-2.*

See NIELSEN, B.

HARANCHER, M. Department of Biology and Geosciences (Biology). 2017. *Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro*.

See FRANCETTE, A.M.

HARLAN, S. Department of Biology and Geoscience (Biology). 2017. *The Effects of Positive and Negative Handling On Mark and Recapture Surveys of Mice.*

See GEORGE, C.

HARMON, C. Department of Biology and Geosciences (Biology). 2017. *Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro*.

See FRANCETTE, A.M.

HARRINGTON, K.R., HOLOHAN, B.A., OGDEN, C.E., and **ORRVICK, H.A.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Bell's Palsy: Etiology, Symptoms, Diagnosis and Treatment*.

Bell's palsy is defined as a unilateral weakness or paralysis of the facial muscles resulting from damage to the seventh cranial nerve or the facial nerve. It is typically developed from an idiopathic cause, however can result from inflammation, trauma, infection, or metabolic abnormalities concerning the facial nerve. The primary symptoms include twitching, weakness or paralysis on one or rarely both sides of the face. A diagnosis is made based on clinical presentation where distorted facial appearance and inability to move muscles on affected side is detected. It affects men and women equally and can occur at any age but is usually more common in adults than in children. In this presentation, we examine the definition, etiology, symptoms, diagnosis, and treatment of Bell's palsy.

Faculty Sponsor: Dr. Janis Jarecki-Liu

HART, K. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

HATCH, M. Department of Biology and Geosciences (Biology). 2017. *Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro*.

See FRANCETTE, A.M.

HELGERT, H. Department of Biology and Geosciences (Biology). 2017. *Comparative Permethrin Concentration and Distribution Methods on Mealworm (Tenebrio molitor) Populations.*

See COFFMAN, K.

HENRY, A.C. Keystone High School. 2017. *The Enlightenment of Pennsylvania*.

The purpose of this essay is to identify the ways in which the Enlightenment spread to Pennsylvania and therefore affected the way the United States' government was created. The U.S. government was shaped in a way that reflected the Enlightenment views of Europe in the 1600's to 1700's. The Enlightenment ideals were shaped, first by a new way of thinking, introduced in the scientific revolution, then through religious groups, such as Quakers, and William Penn. The Scientific Revolution simply sparked the Enlightenment with a new, logical way of thinking. The Quakers, who were not accepted by the Catholic Church because of their views on religion, were some of the main people who spread the Enlightenment thoughts to the "new world," specifically in Pennsylvania. One specific Quaker, William Penn, founded Pennsylvania with land granted to him by King Charles II. William Penn, when making his government, for his new land, was heavily influenced by the Enlightenment and his religion; Pennsylvania ended up with a Government that would eventually be mimicked by the United States government of today.

Faculty Sponsors: Dr. Jesse Haight and Mr. Jacob Craig

HILBERT, T.A. Department of Education. 2017. *Bridging The Gap Between Fantasy and Reality: Bringing Fantasy into the UN.*

SEE DEEN, A.L.

HILBERT, T.A. Department of Education. 2017. *From Movies to Playgrounds: The Cold War at Home*.

The Cold War was an era characterized by two major themes: patriotism and mutually assured destruction. The question that remains is how do we showcase and teach these themes to our high school students? The answer lies in the plethora of media that arose from the period and creating a discussion of the various media types. In movies, we see a recurring question of who the American people can trust, while comics created heroes that we still look up to today. Overall, this presentation will discuss how we can utilize these various media formats to teach an oft ignored subject of the Cold War; the culture.

Faculty Sponsor: Dr. Jesse Haight

HILBERT, T.A. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

HOGG, C.E. Department of Visual and Performing Arts. 2017. *Attending the 51st National Council on Education for the Ceramic Arts (Portland, Oregon).*

See GEYER, S.R.

HOLOHAN, B.A. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Bell's Palsy: Etiology, Symptoms, Diagnosis and Treatment*.

See HARRINGTON, K.R.

HORGAN, C. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

HOUSTON, A. Department of Education. 2017. *Challenging Textbooks in Your Classroom: Separating the Truth from the Fabrications with Your Students.*

Oftentimes textbook information is perceived as total truth to students, but what if some events in history found in textbooks are full of inaccuracies? Help turn your classroom into an investigative laboratory, through question-based lessons. The overriding goal of this poster presentation is to utilize question based teaching techniques to expose falsities in history that are commonly perceived as the truth. Students will become investigators by comparing what their textbook says with different resources to uncover the truth. Question-based lessons allow students to be engaged in higher-level thinking and connections come full circle. Focus will be placed on exposing the truth behind Christopher Columbus, the Scopes Trial, Rosa Parks, and more.

Faculty Sponsor: Dr. Jesse Haight

HOUSTON, A. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

HUEY, W.L.B. Department of Chemistry, Mathematics, and Physics (Chemistry). 2017. *Synthesis and Structural Determination of the Coordination Complexes of Lanthanides with 4,4'-Trimethyldipyridine Dioxide*.

The crystallization of lanthanides with various ligands has been done; however, the ligand 4,4'-trimethylebedipyridine dioxide (bppydo) has not been studied. Complexes of praseodymium, neodymium, and samarium perchlorate and bppydo were synthesized. The crystalline structure and solvent interactions of the praseodymium complex were determined by X-ray crystallography. In the praseodymium compound, the metal had a coordination number of eight. It was coordinated to two water molecules and six bppydo ligands. Five of the bppydo ligands were bridging to other praseodymium cations and one was terminal. One of the bridging ligands was disordered over two positions. There was also extensive disorder involving the solvent water and perchlorate anions. The synthesis and coordination network of the other lanthanides with bppydo will be studied in the future.

Faculty Sponsor: Dr. Jacqueline Knaust

HUMES, A., BERRY, R.G., and **CURFMAN, E.** Department of Biology and Geosciences (Biology). 2017. *Oak Regeneration at Callen Run Research Area*.

Oak trees represent a dominant group of species found within eastern deciduous forests, but are currently failing to regenerate in our forests due to fire suppression and deer over browsing. In Clear Creek State Forest there is a research area called Callen Run that has had a controlled burn treatment, and has also established areas that exclude deer. Our study evaluated oak sapling abundance within four different study areas consisting of burned excluding deer, burned with deer, unburned excluding deer, and unburned with deer. Overall, both species of oak failed to regenerate when there were deer present. Red oak did worse when fire had occurred, while white oaks were better at regenerating with a fire treatment. Overall when trying to manage for oak regeneration, deer exclusion should be implemented. Looking at the species separately, fire treatments need to be approached differently. To manage for white oak, controlled burns should be implemented and to manage for red oak regeneration fires should be suppressed.

Faculty Sponsor: Dr. Suzie Boyden

HURRELBRINK, D.N. Keystone High School. 2017. *Pennsylvania: The Making of a Nation*.

This paper seeks to emphasize the importance of Pennsylvania in the establishment of both the political structure and value system of the United States. Historians have too often disregarded the central importance of Pennsylvania's impact on the strong government liberties and equalities of the United States. In the 1682 original Frame of Government and later revisions, Penn establishes many laws and regulations that are still being implemented today throughout the United States. Penn established a democratic government that has caused the United States to have an effective government. Penn implemented both equality and liberty into Pennsylvania, which are very important values to Americans. William Penn understood the importance of education and ingrained it into our culture. The impression of Pennsylvania on the United States had a lasting influence on the political structures and value system of the United States.

Faculty Sponsor: Dr. Jesse Haight and Mr. Jacob Craig

JACKSON, T. Rehabilitation and Human Services. 2017. *Take 5*.

See BUCHAN, M.

JLIDEY, M. Rehabilitation and Human Services. 2017. *Take 5*.

See BUCHAN, M.

JOHNSON, E. Department of Biology and Geosciences (Biology). 2017. *Everything is Oaky*.

See ARMER, L.

JONES, J.Z. Department of Psychology. 2017. *Is Student Productivity Related to Cell Phone Usage?*

See WAMSLEY, B.T.

JONES, J.Z. Department of Psychology. 2017. *My Study Abroad Experience in Western Australia*.

During the Fall 2016 semester, I attended Murdoch University located near Perth, Western Australia. While there, I was able to accomplish a number of things that allowed me to improve both academically, professionally, and personally. I was exposed to new teaching methods, which helped me to better my study habits. I was also faced with a more challenging academic curriculum compared to my home university. Although this proved to be difficult to overcome, I learned a lot pertaining to my major and my intended career interest. Murdoch University's student base was extremely diverse, filled with students from all around the world and of a variety of ages. This allowed me to further develop my communication skills, making me feel more confident with working in a diverse workplace. I also had multiple chances to explore the surrounding areas and meet new people all while gaining cultural insight and a sense of true adventure. Such opportunities sparked my "worldly" viewpoint and personal growth.

Faculty Sponsor: Dr. William Naugle

KARG, B.J. Department of Biology and Geosciences (Biology). 2017. *Qualitative Observations of Behavior and Quantitative Measurements of Iron in Lithobates catesbeianus Collected from Water Impacted by Acid Mine Drainage*.

See AIELLO, L.M.

KAUFMANN, A.D., MCHENRY, J.M., CHAPMAN, S.L., and **SCHMUDE, W.F.** Department of Psychology. 2017. *Community Literacy Needs Assessment for Clarion Learning Workshop*.

The Clarion Community Learning Workshop is a program that primarily offers homework help, tutoring, and GED preparation to children and adults in Clarion County. They were interested in recognizing the

literacy needs of the community and wanted to determine the current knowledge within the community about their services and what barriers to use of their services may exist. Our study involved distributing an online survey to parents of students in the Clarion area. We communicated with school districts and organizations through phone and in-person interviews. The results of our study will assist the Clarion Community Learning Workshop in expanding their services to fit community needs, increasing attendance in the program, and improving marketing strategies.

Faculty Sponsor: Dr. Jeanne Slattery

KENYON, C.M. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

KERR, K.M. Department of Economics. 2017. *The Effects of Decriminalizing Marijuana on Crime Rates*.

While incarceration rates are decreasing with decriminalization laws—the main motive for many states to pass such laws—does this policy decrease crime rates? Particularly, does the decriminalization of marijuana in twenty-one states and the District of Columbia reduce drug related crimes, such as property crime and certain types of violent crime? To answer these questions, I run seven panel data models of different types of crime as dependent variables. Panel data from all fifty states and the District of Columbia are collected, and I use differences-in-differences technique by creating a time varying dummy that take into account the states which have passed the law of decimalization of marijuana. I also created three leads as placebo test of the policy to test whether a decrease (or increase) to crime was due to the policy of decriminalizing marijuana, or if it was simply due to a trend. Finally, I run a post estimation test (Hausman Test) to validate the appropriate model (Fixed Effect or Random Effect) that fit my data. The paper finds that decriminalization laws only affect certain types of crime; property crime, burglary, larceny, and robbery were influence in some way by the policy.

Faculty Sponsors: Dr. Boniface Yemba and Dr. Sandra Trejos

KETH, L.B. Department of Biology and Geosciences Biology (Biology). 2017. *Micro Caddisfly Illustrations*.

The purpose of this project was to illustrate newly found species of micro caddisflies, as well as re-work old illustrations to make them more consistent for future publication in scientific journals. This was accomplished by first identifying the species by observing structures on the abdomen and the male genitalia through a microscope. Then the images were drawn in ventral, dorsal, and lateral view, and finalized in Adobe Illustrator. The entire process was long and tedious, and took a fair amount of time and lots of refining to get the images just right. I was happy with the results and the way that the images turned out. As an artist, I try to make sure my work looks clean, professional, and consistent. The images look crisp, simplified, while retaining a good amount of detail to be able to identify the insect. Even though I accomplished many illustrations of both new and old species, this project is not finished. I hope to continue to work on this project in my future years here, and possibly even dedicate a website to these illustrations. This project will likely continue even after I graduate, since new micro caddisfly species are being discovered all of the time. I would recommend anyone that would fill my shoes to pay close attention to detail, while also trying to keep it simple at the same time.

Faculty Sponsor: Dr. Steve Harris

KINNEY, S. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

KIRITCHENKO, K. Department of Social Sciences (History). 2017. *Mario and the Magician: Thomas Mann's Analysis of Fascism*.

The project addresses the impact of the historical context on Thomas Mann's short story "Mario & the Magician" (1929) in relation to his observations of Adolf Hitler and Benito Mussolini in contemporary Germany and Italy. My research includes an analysis of Mann's life, works, and personal letters, as well as scholarly articles analyzing the story. By examining Mann's ethical commentary of politics in conjunction with the historical context, it is possible to develop a clearer understanding of how Fascist regimes rise and fall. My project illuminates the characteristics of Fascist leaders, mass psychology of Fascist movements, and reactions to Fascism during the 20th century Interwar period.

Faculty Sponsor: Dr. Robert Frakes

KIRITCHENKO, K. Department of Social Sciences (History). 2017. *The Mobilization of Clarion: A Case Study of World War I's Effects on American Civilians.*

This project seeks to provide deeper insight into the impact of World War I on small communities in the United States via case study of Clarion, Pennsylvania from 1916-1919. My research includes an analysis of local newspapers, Normal State School yearbooks, personal letters, and artifacts. By examining the economic, social, and psychological effects on a smaller scale, in addition to the personal communications with the front line, a clearer understanding of the Great War's impact on the daily lives and foundations of American civilians and communities can be understood. My project illuminates the difficulties of local industries, the change in women's roles, and the shift in mentality and perspective of the American people by the interwar period of the 20th Century.

Faculty Sponsor: Dr. Kathleen McIntyre

KOLECK, R. Department of Biology and Geosciences (Biology). 2017. *Effects of Fire Disturbance and Hay-scented Fern on Understory Regeneration*.

See GEYER, S.R.

KOTHE, B., and **LIPPOLD, S.R.** Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Study of Nano Rings Found in Al-Cu-Fe Alloy*.

It has been observed that the alloy, $Al_{65}Cu_{20}Fe_{15}$, when fractured by arc melting, produces stable icosahedral quasicrystals. There are two microstructures observed on this alloy, one of which is microspheres. These microspheres have been shown to create concentric rings on the surface, which a side-view shows to have a step-like structure. The possibility of the rings having an orientation perpendicular to the axes of rotational symmetry has been investigated and has shown the spheres to have two fold and three fold symmetric axes. Additionally, nanoparticles have been observed to form along these concentric rings, perhaps bonding with the speculated high energy vertical surfaces of the steps mentioned previously.

Faculty Sponsor: Dr. Chunfei Li

KRAUS, J. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Huntington's Disease*.

See DGIEN, J.

KROESEN, J.E. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Wilson's Disease*.

See AHRENS, A.B.

KROUSE, R.M. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *200-kW Solar Electric Propulsion Tug for Transfers of Payloads for LEO and LDRO*.

See DENMARK, R.V.

KUMETIS, T.J. Department of Biology and Geosciences (Biology). 2017. *The Effects of Shoal Size on the Shoaling Behavior of Zebra Fish (Danio rerio)*.

See ECKMAN, C.

KUMETIS. T.J. Department of Biology and Geosciences Biology (Biology). 2017. *Timeline of the Emergences of Caddisflies (Trichoptera) in the Pine Barrens of New Jersey.*

Trichoptera, commonly known as caddisflies, emerge from the water as fully formed adults after a pupation period. These insects are important to streams as a source of nutrients for insectivores, and can form the base of most aquatic food webs. To capture the adults, one of the common methods is setting malaise traps, which are tent-like nets placed above the water to capture insects as they emerge. Unlike light traps, which attract insects in a wide area, malaise traps are used to examine emergence rates per area, since they have a defined area of capture. This study examines the emergence sequence of caddisflies, and how it changes throughout the seasons. In effect, the purpose is to determine when each type of caddisfly emerges, and form a timeline of emergence events.

Faculty Sponsor: Dr. Steve Harris

LAMIELLE, B., MCKISSICK, P., and **WINGET, D.** Department of Psychology. 2017. *Investigation of Social Media Use on Mindfulness and Self-Esteem in College Students.*

People are spending increasing amounts of time on their cell phones and social media networks. The research on the effects of social media is contradictory and inconclusive, with both negative and positive effects associated with its use. We find it particularly interesting to investigate the impacts of social media on college students' mindfulness, attention span, and self-esteem, because our relationships with others, our education, and our surroundings are possibly impacted as a result. Participants of this study are students from Clarion University of Pennsylvania who completed an anonymous online survey. We hypothesized that college students who spend more time on social media will have decreased mindfulness and a lower self-esteem than those who use less social media. We are hoping to identify additional factors related to an increase in social media usage such as gender, academic class standing and types of social media being used.

Faculty Sponsor: Dr. Jeanne Slattery

LANINGA, K.L. Department of Biology and Geosciences (Biology). 2017. *Linking ERAD and the UPR: Developing a Genetic Screen Via the Expression of Antitrypsin*.

See STERN, R.M.

LIPPOLD, S.R. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Study of Nano Rings Found in Al-Cu-Fe Alloy*.

See KOTHE, B.

LITTLE, C.A. Department of Biology and Geoscience (Biology.) 2017. *Application of a qPCR Assay for Monitoring Microbial Pathogens in Amphibians.*

See MINNIX, S.F.

LLOYD, C.E. Keystone High School. 2017. *Women in Egypt: An Ancient Exception.*

This research points towards the conclusion that the females of Ancient Egypt bridged the gap consistently held between the genders. By traditional standards, females were bound to a life of housework and subordination to males. Empowered and unrestrained, the women of this society were a status symbol of their time and centuries to come. Biased opinions on the part of historians and Egyptologists have too often concealed the truth concerning these unique women of antiquity. The women of Ancient Egypt impacted Egyptian society through artistic expression, religious beliefs, gender roles, and social class, Art of this period displays an image of the females that honored their existence rather than abased them in comparison to their male counterparts. The religion of the Ancient Egyptian helps to further promote the fair nature of females. Though gender roles still existed, women no longer completed mundane tasks, but instead had occupations that held meaning in society. Similar to many societies throughout history, Ancient Egypt enforced a strict social structure that often held a greater influence than gender. This paper looks to further enhance the general necessity and importance not just of women in Ancient Egypt, but of the value of females in every society.

Faculty Sponsors: Dr. Jesse Haight and Mr. Jacob Craig

LOCKWOOD, A. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

LYNCH, A. T*he Influence of Voice Disorders on College Students' Perceptions of an Individual's Socio-communicative Abilities*.

See ALLEMANG, L.N.

MAGRINI, R.R. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Spasmodic Dysphonia: An Overview of Etiologies, Assessment, and Treatment*.

See BURNS, A.N.

MAHAFFY, L.M. Department of Social Sciences (History). 2017. *Female Hysteria in the Victorian Era: The Medical Community, Society, and Perceptions of Sexuality.*

During the Victorian Era, a disease known as Hysteria made a profound mark upon both the public's perception of sexuality and mental illness. The study and subsequent attempts to treat Hysteria changed the relationship between medical and psychological treatments forever. The Victorian perception of women and the mentally ill were both strongly influenced by the Era's images of sexuality, as these images evolved so did the perception and treatment of Hysteria. This evolution can be traced by examining primary sources regarding women and sexuality during the period, as well as learning about the methods that were used to treat Hysteria.

Faculty Sponsor: Dr. Kathleen McIntyre

MAIER, D.M. Department of Biology and Geosciences (Biology). 2017. *Mitochondrial Stress Response: Developing a genetic screen utilizing 2, 4 – Dinitrophenol.*

See SCHILL, C.N.

MASON, J.P. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

MATTES, N. Department of Biology and Geoscience (Biology). 2017. *Comparison of the Aquatic Macro-invertebrates in Acid-Mine Drainage Impacted Areas of Mill Creek to Remediated Areas of the Same Stream.*

See MEDVID, C.

MCCLAY, T. Honors Program. 2017. *Challenges and Solutions in Recruiting Students Majoring in the Health Care Professions into an Honors Program*.

See BLASHFORD, M.

MCCOOL, K.A. Department of Education. 2017. *The American Government: Really American?*

See DEEN, A.L.

MCCOOL, K.A. Department of Education. 2017. *Using College Councils to Take Informed Action in Social Studies.*

See COUDRIET, Z.A.

MCCOSBY, J.B. Department of Biology and Geosciences (Geosciences). 2017. *Investigating the Spatial Distribution of Foraminifera, Ostracods, and Thecamoebians in Subaqueous Caves Yucatan Peninsula, Mexico.*

See REDMOND, H.R.

MCELRATH, H. Department of Biology and Geosciences (Biology). 2017. *Comparison of Aquatic Macroinvertebrates in Seeps of Old Growth and Secondary Growth Forests in Cook Forest State Park.*

See SOLLICK, A.

MCELRATH, H. Department of Biology and Geosciences (Biology). 2017. *The Effects of Hay-Scented (Dennstaedtia Punctilobula) Fern on Red Oak (Acer Rubrum) Acorn Germination.*

See GEYER, S.R.

MCGLONE, D.M., GEYER, S.R., BONIFAY, K., SOLLICK, A., and **WHITEHOUSE, S.K.** Department of Biology and Geosciences (Biology). 2017. *Eastern Deciduous Forest Symposium*.

Clarion University offers a multitude of professional development opportunities. One such experience was shared among five students last fall when they attended the 2016 Eastern Deciduous Forest Symposium. The conference was held at the Powder Mill Nature Reserve, a beautiful plot of land in Rector PA that has been dedicated to research, education, and conservation for more than 50 years. The weekend long event encompassed professional talks given by forest ecologists and graduate students from around the globe. Many of the studies focused on climate change and global developmental impacts on our forest ecosystems. Open forums allowed students to make important professional connections among the members presenting at the conference. It is our hope that by sharing our experiences it will encourage other students to attend other professional development opportunities offered by Clarion University.

Faculty Sponsor: Dr. Suzie Boyden

MCGLONE, D.M., and **SLATER, C.L.** Department of Biology and Geosciences (Biology). 2017. *Feeding Ecology of the Eastern Red-backed Salamander (Plethodon cinereus) in Forest Patches Dominated by Fern*.

In many Pennsylvania forests, the dominance of ferns in extensive areas is associated with high densities of White-tailed Deer and changes in forest structure. Although the Red-backed Salamander (*Plethodon cinereus*) is an abundant predator in the leaf litter and plays an important role in the forest food web, no previous studies have examined effects of fern on salamander feeding ecology. We conducted a field experiment to compare salamander feeding in dense fern patches and in adjacent areas dominated by leaf litter. We captured adult salamanders (n = 17) at a different location, held them in the lab to clear gut

contents (48 hrs), and then randomly placed each in a "foraging bucket" located within dense fern or within adjacent leaf litter for 24 hours. In addition, we opportunistically collected adult salamanders (n = 20) actively foraging in areas dominated by fern and in adjacent areas of leaf litter. Individual prey items were removed from the stomachs of all individuals retrieved from the field, identified to taxonomic order, and then photographed and measured for total length using a microscope and digital image processing software. Our results will include statistical comparisons of diet composition and feeding rates, along with quantitative food webs associated with salamanders foraging in fern or leaf litter. Findings from our study will be valuable for clarifying the roles of amphibians in forest food webs and assessing the various impacts of changes in forest structure.

Faculty Sponsor: Dr. Kurt J. Regester

MCGLONE, D.M., WHITEHOUSE, S.K., and **WALLACE, G.** Department of Biology and Geosciences (Biology). 2017. *Do Varying Light Levels Affect Sapling Regeneration?*

What happens in the upper levels of a forest canopy can directly affect the regeneration of tree saplings on the forest floor. For a tree, the first five years pose the highest risk of mortality. Without successful sapling regeneration the forest will fail to replace itself. One of the biggest resources integral to plant growth is sunlight, and canopy cover influences how much light can reach the understory. Herbaceous plants are much better at photosynthesizing compared to trees. Therefore, will an area with a more open canopy, that allows more light in, benefit the growth of herbaceous plants and negatively affect the growth of the tree seedlings? For this study, sample plots were distributed throughout a forest and the forest floor species make-up was surveyed along with the amount of light that reached the plot. The study found that an open canopy results in more light reaching the forest floor. Positive correlation between understory light availability and density of herbaceous cover was found through the data, and it was also noted that as percent herbaceous cover increased there was an overall decrease in tree saplings present. Due to the better photosynthetic ability of herbaceous plants, when more light is available they are able to outcompete tree saplings and inhibit forest regeneration.

Faculty Sponsor: Dr. Suzie Boyden

MCHENRY, J.M. Department of Psychology. 2017. *Community Literacy Needs Assessment for Clarion Learning Workshop*.

See KAUFNANN, A.D.

MCKEE, K.N. Department of Psychology. 2017. *The Divide of the People*.

Biases are automatic and reflexive in nature. Discrimination created by such biases is a complex issue because there are times when we are unaware that we enable it. It is a problem that seems to be trapped in a struggle for balance. Something that is necessary for survival like imprinting, anchoring, and creating boundaries within society can also have a downfall. These natural psychological systems are a byproduct of the way our brain functions. The brain has the ability to misguide us. This creates a problem when it comes to treating people the way in which we believe is morally right. It is unethical for people to treat another person unequally based upon the shallow presumption of unnecessary compartmentalizations. Whether it is intentional or unintentional the results are the same. There are many psychological mechanisms in which we become blinded to our own thoughts and unintentionally treat others with prejudice. These mechanisms include anchoring, the availability heuristic, cognitive dissonance, the outgroup homogeneity effect, and the fundamental attribution error. I would like to present how these biases have affected current events, how no one is immune to this way of thinking, and how awareness of it has the potential to decrease its effects.

Faculty Sponsor: Dr. Jamie Phillips

MCKENZIE, L.J., and **CHAPMAN, H.A.** Department of Biology and Geosciences (Biology). 2017. *Influence of Climate and Water Levels on Long-Term Population Dynamics of Largemouth Bass (Micropterus salmoides) in Kahle Lake.*

The largemouth bass (*Micropterus salmoides*) is a freshwater gamefish of large ecological and economical significance. A substantial amount of research has been devoted to explaining recruitment variability of largemouth bass populations, with notable emphasis on growth and survival during early life stages. Various abiotic and biotic factors have been shown to affect both bass class year strength, as well as relative weights of the bass population. Noticeably absent from the literature, however, are studies with a long-term, continuous dataset regarding effects of environmental change on bass population structure. We analyzed a long-term dataset of a largemouth bass population from Kahle Lake, spanning 26 years, for relationships between CPH (catch per hour) of YOY (young of year) bass with both spring temperature and total precipitation. We also analyzed trends in the relative weights of the bass using length-weight regressions to determine the general health (short-term feeding conditions) of the population over time. We collected data in October using boat electrofishing at night in collaboration with the PFBC. Our preliminary results show that June air temperature had a significant effect on abundance of YOY bass. The results also show a clear decline in relative weights of the population over time. Future goals are to assess which environmental factors play a significant role in determining the fluctuations in abundance and growth of largemouth bass in Kahle Lake, and hence make appropriate recommendations on ways to increase future population recruitment.

Faculty Sponsor: Dr. Andrew Turner

MCKISSICK, P. Department of Psychology. 2017. *Investigation of Social Media Use on Mindfulness and Self-Esteem in College Students.*

See LAMIELLE, B.

MCMILLEN, M., and **BALLIET, L.** Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Electron Beam Lithography*.

The aim of the experiment is to become familiar with the practice of Electron Beam Lithography (EBL) using the Scanning Electron Microscope (SEM), and further understanding of the subject and its potential applications. The project's success is the production of a Micro-Eagle image on a Silicon wafer using EBL. The current success is the production of an image containing two sets of initials. Electron-beam lithography is the practice of scanning a focused beam of electrons to draw custom shapes on a surface covered with an electron-sensitive film covered with a resist. Electron Beam Lithography is a tried and true approach in device fabrication on the nanoscale; however it is a new process to Clarion University. It is important to learn this function on the SEM so that we can teach others how to perform EBL experiments safely and in a practical manner.

Faculty Sponsor: Dr. Chunfei Li

MEALY, B.R. Department of Biology and Geosciences (Biology). 2017. *Investigating the Inhibitory Effect of Zinc on MG-63 Osteoblast-Like Cells as a Potential Compound to Treat Diabetes Induced Osteoporosis.*

See RICKLEY, M.L.

MEDVID, C., and **MATTES, N.** Department of Biology and Geoscience (Biology). 2017. *Comparison of the Aquatic Macroinvertebrates in Acid-Mine Drainage Impacted Areas of Mill Creek to Remediated Areas of the Same Stream.*

Acid-mine drainage (AMD) is currently the main pollutant of surface water in the mid-Atlantic region, degrading more than 4,500 stream miles. AMD occurs when sulfur-bearing minerals are exposed to air and water producing sulfuric acid which then enters streams by runoff. This highly acidic runoff lowers

the pH of the receiving stream harming the aquatic organisms. AMD is especially prevalent in Clarion County due to past practices of strip mining. One such impacted stream, is Mill Creek where the Mill Creek Coalition has been active for over 30 years in an effort to reverse the effects of AMD to the point where a cold-water fisheries can be sustained. To date nearly 12 million dollars has been spent in the reclamation efforts in the Mill Creek drainage. Our project compared water-quality and aquatic macroinvertebrates populations in treated portions and untreated portions of Mill Creek. Water-quality measures included specific conductance and pH. Macroinvertebrates were collected in the same areas, identified and counted. AMD- impacted and remediated areas of the stream were surprising more similar than hypothesized, however, more collections from additional sites and from different seasons are needed to verify our results.

Faculty Sponsor: Dr. Steven Harris

MILLER, T.M. Department of Biology and Geosciences (Biology). 2017. *Effects of Prey Biodiversity on Fish Growth.*

See ANDERSON, C.T.

MILLER, T.M., and **DEAN, M.A.** Department of Biology and Geosciences (Biology). 2017. *Toxicity of Copper Sulfate to Gastropods.*

Gastropod and bivalve mollusks are an important part of the food web of most freshwater ecosystems, and they can be especially abundant in large rivers. Large rivers often contain endangered mollusks and also receive effluent containing persistent chemicals used in households, agriculture, or industry. Copper sulfate ($CuSO_4$), a widely used fungicide and herbicide, is also used to treat septic systems, including those of riverfront homes. Mollusks are known to be especially sensitive to even low concentrations of dissolved metals. This study was conducted to determine the lethal concentrations of copper sulfate to the freshwater snail species *Helisoma Trivolvis*, *Helisoma Anceps*, and *Physa Gyrina*. Wild caught animals were dosed with copper sulfate in a laboratory setting. Single animals were exposed to a range of $CuSO_4$ concentrations, in order to determine the concentration required to induce 50% mortality (LC50). Studies were replicated to maximize precision and conducted according to standard protocols. Preliminary results show that the LC50 of Gastropods across all species is estimated to be .233 mg $CuSO_4$/L, and that the three snail species had similar lethal thresholds. These preliminary results are part of a focused study that will more accurately quantify $CuSO_4$ toxicity in mollusks.

Faculty Sponsor: Dr. Andrew Turner

MINNIX, S.F., and **LITTLE, C.A.** Department of Biology and Geoscience (Biology.) 2017. *Application of a qPCR Assay for Monitoring Microbial Pathogens in Amphibians.*

Amphibians are experiencing a significant drop in population that is linked to several causes, including infection with the fungus *Batrochochytrium dendrobatidis* (*Bd*) and the DNA virus Ranavirus (*RV*). Disease surveillance is crucial if we are to understand how these microbial pathogens are spreading among amphibian populations, and the factors that underlie this spread. In collaboration with Dr. Kurt Regester's lab and the Pennsylvania Amphibian and Reptile Survey (PARS), we are working to evaluate the presence of these pathogens in the adult red spotted newt (*Notophthalmus viridescens*) across the state of Pennsylvania. We have developed conventional polymerase chain reaction (PCR) and quantitative PCR assays to detect genes specific to *Bd* and *RV* in DNA extracted from swabs and tail clips. We are currently applying our assays to the screening of 200 samples collected from a variety of different eco regions across the state. Our study is the first ever statewide surveillance project undertaken to assess levels of these significant microbial pathogens among amphibians. By detecting and quantifying the presence of these disease-causing organisms, we will gain important insights into how *Bd* and *Rv* are contributing to the amphibian population crisis in Pennsylvania.

Faculty Sponsor: Dr. Helen Hampikian

MONTUE, T. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

MORELLI, K.A., SMITH, H.L, SMITH, M.F., MONTUE, T., HART, K., LOCKWOOD, A., CLARK, D., and **SMITH, D.M.** Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

Treating patients with bacterial infections is becoming increasingly difficult for healthcare professionals due to the amount of antibiotic resistant pathogens, many being resistant to more than five different classes of antibiotic. Therefore, the spectrum of antibiotics that are available to combat these pathogens is diminishing. For this reason, new types of antimicrobial agents are highly sought after. Our laboratory is interested in finding new antimicrobial agents to help with this crisis. We have discovered an antimicrobial activity in human urine and have begun purifying and characterizing this activity using filtration, distillation, solid-phase extraction and elution laboratory techniques. Throughout the purification process, the activity remains unaltered in its ability to kill bacteria. We have visited The Huck Institute of the Life Sciences Proteomics Core Facility at Penn State University to analyze the isolated fraction with liquid chromatography time-of-flight mass spectrometry (LC-TOF-MS), with the hope of identifying the molecule(s) that possess the activity. Once the molecule(s) has been identified, we will proceed with testing for the minimum inhibitory and bactericidal concentrations. Identification of the compound responsible for this antimicrobial activity in human urine would represent a novel therapy for treating patients with UTIs.

Faculty Sponsor: Dr. Doug Smith

MORGAN, A. Department of Biology and Geosciences (Biology). 2017. *Comparison of Aquatic Macroinvertebrates in Seeps of Old Growth and Secondary Growth Forests in Cook Forest State Park.*

See SOLLICK, A.

MYERS, S.B. Department of Biology and Geosciences (Biology). 2017. *Understanding the Relationship and the Affinity of the Hac1p Transcription Factor to a Novel UPRE*.

See BOLDT, K.R.

NAKHATA, C. Department of Management and Marketing. 2017. *Social Influence and Post-Consumption Satisfaction*.

See DUNGAN, K.

NEWCOMB, P.E. Department of Communication. 2017. *Galaxy of Legend: Student Film*.

In March 2016, I wrote the script Galaxy of Legend. This poster is an overview of the project from its original script to the final production. This project allowed myself along with many other students the opportunity to create and learn about what goes into creating a movie. I was able to learn all the different positions, how to be a leader of a project on a larger scale, and so much more. Throughout this project, students were able to take what they learn in class and apply that knowledge throughout the film project. This project gave not only Communication majors, but also students from other departments many opportunities. We had an actor and two make-up artists from the theatre department. We moved quickly from pre-production to production and then post-production. When the project was in production, students were divided into different departments. For example, we had students working with Audio while other students were working on lighting and camera work. While in post-production students would edit the scenes separately before bringing it all together. We would edit each scene together to make it look the best.

Faculty Sponsor: Dr. Lacey Fulton

NIELSEN, B., and **HARANCHER, M.** Department of Biology and Geosciences (Biology). 2017. *Analysis of Protein-Protein Interactions of Components Comprising the Type-III Secretion System of Chromobacterium Violaceum Cpi-2.*

Chromobacterium violaceum is a virulent bacterium that is equipped with molecular machinery to move bacterial proteins used to disrupt the normal function of host cells, from the bacterial cytosol into the host cell cytoplasm. This protein transport mechanism is essential for the organism to be able to infect host cells. In *C. violaceum* this transport system is referred to as the type-III secretion system (T3SS), a mechanism which is found in many other virulent species of Gram negative bacteria, and which resembles a molecular syringe composed of approximately 25 proteins. These components span the bacterial cell envelope and form a conduit structure with a needle-apparatus that allows translocation of virulence factors directly into a host cell. *C. violaceum* is an emerging pathogen that has been analyzed through comprehensive bioinformatics analysis, and found to contain two T3SS encoding gene clusters, that encode for Chromobacterium pathogenicity islands 1 and 2 (Cpi-1 and Cpi-2 respectively). Genes on the loci of both Cpi-1 and Cpi-2 are evolutionary related to those in the Spi-1 and Spi-2 encoded T3SSs of *Salmonella enterica*. Based on this evidence, it has been proposed that Cpi-1 may function early in infection, and Cpi-2 may be required for survival within host cells. Currently very little is known about the components and function of the T3SS encoded by Cpi-2. We have made significant progress in analyzing the components, and protein-protein interactions that occur between proteins predicted to comprise the basal and needle apparatus of Cpi-2.

Faculty Sponsor: Dr. Helen Hampikian

NUSSBAUM, G.N. Department of Visual and Performing Arts. 2017. *Attending the 51st National Council on Education for the Ceramic Arts (Portland, Oregon).*

See GEYER, S.R.

NUSSBAUM, G.W. Department of Biology and Geoscience (Geosciences). 2017. *Determining the Flooding History of Cueva Margarita Cave System, Cuba Using Testate Amoebae (Thecamoebians)*.

See GORDON, B.R.

O'CONNOR, J., SCHUMACHER, L., SOMMER, K., TROIANO, M., and **WILCOX, B.** Department of Communication Sciences and Disorders (Graduate Program). 2017. *Cerebral Palsy*.

Cerebral palsy (CP) is a non-progressing and non-life threatening neurological disorder. This research explores the characteristics of Cerebral Palsy along with common motor speech intervention strategies to improve intelligibility. There is no single cause of Cerebral Palsy, however, a small amount is related to damage to the developing brain either during pregnancy or shortly after birth. Cerebral Palsy is the most common congenital disorders of childhood. This disorder is a physical disability that affects movements and pressure in an individual. Cerebral Palsy can affect an individual's body movement, muscle control, muscle coordination, muscle tone, reflex, posture and balance. Each individual with this disorder will vary in type of movement, dysfunction, location and the amount of limbs involved as well as to what extent. To enhance daily function in a person with Cerebral Palsy, physical therapy, occupational therapy, speech-language therapy and recreational therapy are provided when needed. CP commonly affects the language centers of the brain which impacts oral motor skills needed for speech. Speech Language Pathologists work on improving function of mouth, jaw and throat muscles to assist speech, breathing and swallowing. There is no known cure; although, therapy, treatment and medication can manage the effects on the body. Children and adults with Cerebral Palsy require long-term care with a medical team.

Faculty Sponsor: Dr. Janis Jarecki-Liu

OGDEN, C.E. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Bell's Palsy: Etiology, Symptoms, Diagnosis and Treatment*.

See HARRINGTON, K.R.

OPYRCHAL, M. Department of Biology and Geosciences (Biology). 2017. *The Effects of Hay-Scented (Dennstaedtia Punctilobula) Fern on Red Oak (Acer Rubrum) Acorn Germination.*

See GEYER, S.R.

ORRVICK, H.A. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Bell's Palsy: Etiology, Symptoms, Diagnosis and Treatment*.

See HARRINGTON, K.R.

OSCHUMACHER, L. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Cerebral Palsy*.

See O'CONNOR, J.

PARK, B. Department of Biology and Geosciences (Biology). 2017. *Analysis of the Toxicity of Analgesic A1 on Primary Neuronal Cell Cultures.*

See BURNS, S.

PECKMAN, M. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

PITTSLEY, K.A., and **PROBST, A.R.** Department of Marketing and Management and Department of Finance. 2017. *International Business Seminar Study Abroad Journey Through Europe.*

We believe there are just certain lessons that cannot be taught in the classroom, and programs such as the International Business Seminars offered experiences we would not be able to get anywhere else. During our trip, we traveled to five countries in just fourteen days, which included London, United Kingdom, Paris, France, Geneva, Switzerland, Heidelberg, Germany and Amsterdam, Netherlands. We were able to network and learn from executive level professionals of international companies such as Deutsche Bank, World Trade Organization, and Euronext. We were able to immerse ourselves in multiple cultures and languages, which allowed us to improve our ability to adapt unfamiliar environments. The business world has become a global marketplace and by traveling abroad, we have improved our cross-cultural literacy skills and better understand how to conduct business with people and companies in other countries and cultures. Throughout the duration of our trip, people we met, and places we visited we were able to become more independent and confident traveling internationally and believe that our experiences will be extremely beneficial to our careers and future endeavors.

Faculty Sponsor: Dr. Jeffery Eicher

PORTER, N. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

PORTER, V.M., and **WENNER, A.D.** Department of Biology and Geosciences (Biology). 2017. *Analysis of Fish Behavior and Respiration in Fluctuating Water Temperature Cycles.*

There are some places showing the effects of temperature destabilization including The Great Barrier Reef; Newtok, Alaska; Mumbai, India; the Alps; and Gansu Province, China. Climate change affects these places by bleaching corals, melting ice, and changing water cycles. In Pennsylvania we have been

experiencing fluctuating temperatures. We wanted to explore how these fluctuating temperatures impact aquatic systems. Twenty rosy red minnows were kept in separate tanks and exposed to fluctuating water temperatures. Data on their movement and respiration were observed. We hypothesize that the fluctuating water temperatures would lead to decreased activity and respiration.

Faculty Sponsor: Dr. Andrew Keth

PRICE, J.C. Department of Biology and Geosciences. 2017. *The Effects of Fire on Forest Regeneration*.

See CRATE, J.M.

PROBST, A.R. Department of Marketing and Management and Department of Finance. 2017. *International Business Seminar Study Abroad Journey Through Europe.*

See PITTSLEY, K.A.

RAMSEY, A.D. Department of Biology and Geosciences (Biology). 2017. *Effects of Prey Biodiversity on Fish Growth*.

See ANDERSON, C.T.

REDMOND, H.R., SCHELLER, J.L., and **MCCOSBY, J.B.** Department of Biology and Geosciences (Geosciences). 2017. *Investigating the Spatial Distribution of Foraminifera, Ostracods, and Thecamoebians in Subaqueous Caves Yucatan Peninsula, Mexico.*

In Ox Bel Ha Cave System located in the Yucatan Peninsula, Mexico cave sediments can be studied in order to learn information above the paleoenvironment and flooding history of the cave system. The Yucatan aquifer is an open system characterized by a stratified water column of meteoric water resting on top of saline groundwater. The mixing zone of fresh and saline water, known as the halocline, leads to a change in pH, temperature, and dissolved oxygen, all of which have an effect on the dissolution of carbonate rocks. The water table and halocline position as well as hydrologic conditions can be quantitatively distinguished by studying past deposition of sediments and the different microfossils such as gastropods, foraminifera, ostracods, and thecamoebians. These microfossils occupy habitats of varying salinities making them good indicators of cave water level and salinity. Due to differences in-cave morphology the sediment record in the cave system demonstrates spatial variability, because of this, our results come from two separate core samples that have been taken from different locations from the Ox Bel Ha Cave System. By conducting a quantitative analysis of microfossils in these sediment cores information about cave paleoenvironment and flooding history can be determined. Our results show an inverse relationship between varying sizes of calcite rafts and organic matter both derived from the sediment analysis. Current analyses have found no thecamoebians preserved in the sediment. Data has shown an inverse relationship between gastropods and foraminifera, which was expected based on their salinity niches. Comparing microfossils abundances with the Holocene sea-level curve will help determine the flooding history of the Ox Bel Ha Cave System.

Faculty Sponsor: Dr. Shawn Collins

REICHELDERFER, W. Department of Finance. 2017. *Falling Fall Markets and Seasonal Unemployment*.

Historically, the third quarter is the worst quarter for stock market performance. A potential reason for this poor performance may be seasonal unemployment driven by climate changes as winter approaches. Using least squares multiple regression analysis, this study looks to see if there is a link between the unemployment rate and the fiscal quarter. The correlation between stock market performance and unemployment is also studied to see if seasonal unemployment is a potential cause for the stock market's historically poor third-quarter performance. Upon analysis, the study found that there is, in fact, a link

between the unemployment rate and the fiscal quarter, however there is no significant correlation between stock market performance and unemployment. While this does justify the existence of seasonally adjusted data, it does help explain why the third quarter performance of the stock market is so poor. Further research into possible causes of this issue may provide the answer.

Faculty Sponsors: Dr. Sandra Trejos and Dr. Rod Raehsler

REICHELDERFER, W. Department of Finance and Management. 2017. *A Study of Content v. Skills Based Knowledge Using Clarion High School Seniors and College Freshmen as a Representative Example.*

The purpose of this study is to test whether college courses focus on teaching content or skills based knowledge using Clarion as a representative example. Mock Principles of Economics exams were given to Clarion Area High School Students and Clarion University Students with the stipulation that they may use any Internet resource available to them in a week's time to complete the exam. Exams were then graded and analyzed, as they would have been were the course taken as a regular Clarion University of Pennsylvania course. Based upon the scores achieved, we hope to shed light on whether colleges are teaching content-based knowledge, which should be relatively easy to find on the Internet, or skills based knowledge which is much more difficult to find online. From this information, we hope to show there is something special about college instruction that cannot be imitated by self-taught Internet learning.

Faculty Sponsor: Dr. Paul Woodburne

REICHELDERFER, W., RIZER, C., DUGAN, K., SHEFFER, M., PECKMAN, M., HORGAN, C., PORTER, N., and **KINNEY, S.** Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

The SAM International Business Conference asks participating teams from across the country to analyze a real-world company that is either failing or has experienced a setback in the recent past. This year, teams were asked to look at Facebook Inc.'s ad revenue dependent business model and analyze the sustainability of their current revenue streams, as well as formulate possible solutions to limit the dependency on ad revenue. The Clarion chapter of SAM sent one team to compete in the Undergraduate Division, made strictly available to undergraduate students, and one team to compete in the Open Division, made available to students at both the undergraduate and graduate levels as well as business professionals. After months of preparation, our teams presented to and were asked a series of questions from a panel of businesspersons, highly regarded in their fields, whom had also done extensive research on this case. This year's conference took place in Orlando, FL, where teams were able to gain valuable business and professional experience to bring back to Clarion University.

Faculty Sponsor: Dr. Chad Smith

RHOADES, N.J. Department of Social Sciences (History). 2017. *The Impact of the Roosevelt-Taft Quarrel on the 1912 General Election.*

The 1912 election had a drastic impact on the direction of our country. This research analyzes the intriguing relationship that President Theodore Roosevelt and President William Taft had prior to and during the 1912 presidential election. Moreover, we can examine how the tensions between them divided the Republican Party and eventually let the Democrat Woodrow Wilson win the White House. By studying the damaging feud between Roosevelt and Taft for the Republican nomination of 1912, it is strongly evident that a multi-candidate general election for President of the United States sets the stage for the opposing party to take the White House. This research was accomplished using a variety of primary sources, such as letters to the editor, political cartoons, and personal letters, as well as various secondary sources like journal articles and books

Faculty Sponsor: Dr. Kathleen McIntyre

RHOADES, N.J. Department of Education. 2017. I*mplementing Technology to Bring Trigonometry Outside of the Classroom*.

"When am I ever going to use this in real life?!" Trigonometry is well rooted in real-world problem solving. This presentation details how students used their estimation skills, attention to measurement and precision, knowledge of trigonometric ratios, and technology like their smartphone to help determine the height of the high school.

Faculty Sponsor: Dr. Jesse Haight

RICKLEY, M.L., and **MEALY, B.R.** Department of Biology and Geosciences (Biology). 2017. *Investigating the Inhibitory Effect of Zinc on MG-63 Osteoblast-Like Cells as a Potential Compound to Treat Diabetes Induced Osteoporosis.*

Diabetes mellitus is a common metabolic disease that can impair osteogenesis through a decrease in osteoblast activity leading to an increased fracture risk. While it is known that diabetes mellitus affects bone, the underlying connection between diabetes and osteoporosis remains unidentified. Deficiencies of zinc are seen in the course of ageing and in diabetic patients. Additionally, zinc supplements have been shown to exert positive effects in type-2 diabetes. Our study is aimed to examine the mechanism underlying diabetes induced osteoporosis, and determine the protective effects of zinc, and its association with osteoporosis and diabetes. Our data demonstrates zinc to have an inhibitory effect on advanced glycation end product (AGE) induced MG-63 cell apoptosis through trypan-blue counting and MTT enzymatic cell viability assays. Furthermore, natural sources of zinc (oysters and spinach extracts) were found to protect cells against AGE induced apoptosis. Our preliminary data provides a better understanding of the mechanism underlying diabetes induced osteoporosis, and indicate zinc as a novel micronutrient for its prevention and treatment.

Faculty Sponsor: Dr. Natasha Dias

RIZER, C. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

ROBERTS, S.M. Departments of International Business and Economics. 2017. *The Costa Rican Society*.

This presentation is a general overview of my experience in Costa Rica and what I learned. My intention of this is to inform you on the Costa Rican society, culture and my time spent in Costa Rica. I went to Costa Rica this past summer of 2016 from July 30th to August 17th with a small group of Clarion University students receiving 3 credits for BSAD 237-Global Travel Seminar. We kept ourselves busy every day, optimizing our time in Costa Rica. We formally met the current vice president of Costa Rica, Helio Fallas Venegas, and a former president whom was also rewarded the Nobel Peace Prize in 1987, Oscar Arias Sánchez. We visited large businesses like Intel, Boston Scientific and Dos Piños. We spent time volunteering at Guardería Angeles; a childcare center and at a bilingual school ranging from preschool to 6th grade. We traveled around Costa Rica exploring National Parks, volcanoes, coffee plantations, nature, culture, etc. and opening our minds to new perspectives. I strongly encourage students to study abroad during their college years.

Faculty Sponsor: Dr. Sandra Trejos

RUSSEL, M. Department of Biology and Geosciences (Biology). 2017. *Oh Dam! How River Dams Affect Biological Recovery from Pollution.*

See GEYER, S.R.

SACK, B. Department of Social Sciences (Political Science). 2017. *Kafka's The Trial.*

In *The Trial*, Franz Kafka exemplifies the rampant growing of anti-Semitism in Europe, the industrialization of Austria-Hungry, and the harsh oppression of middle class citizens in this autocratic state during this period. The great misfortune of the novel's protagonist, Joseph K., takes the reader on journey through a small city in which people are held on trial for reasons nobody can explain. His desperate attempts to prove his innocence are met with great obstacles, colossal confusion, and additional questions left unanswered. Close examination of the story of Joseph K. in concert with Kafka's life and the broader historical context, provides insight into the pre-WWI era of autocratic regimes and their ability to forcibly do as they see fit to their powerless citizens.

Faculty Sponsor: Dr. Robert Frakes

SALLACK, K.L. Department of Biology and Geosciences (Biology). 2017. *The Effects of Shoal Size on the Shoaling Behavior of Zebra Fish (Danio rerio)*.

See ECKMAN, C.

SALLACK, K.L. Department of Biology and Geosciences (Biology). 2017. *Evaluating the Role of Competition in Structuring Fish Assemblages: Biomass Compensation in Coldwater Streams.*

The fish assemblages of headwater streams include trout, several species of minnows and suckers, and other fish species, but it is not well understood how these species interact. Trout might compete with other fish species, prey upon other species, or be preyed upon by other species. The smallest streams tend to contain only trout, larger streams usually contain only minnows and suckers, and intermediate size streams contain both guilds. In this study, we examine fish-biomass density data for all three types of streams to distinguish among alternative hypotheses of species interactions. We used electrofishing data from Clarion University's participation in Pennsylvania's Unassessed Waters Initiative and selected a subset of 102 streams for further analysis that were uniform with respect to water quality and land use. Averaged across streams, the biomass of minnows and suckers nearly doubled in the absence of trout ($t=3.787$, $p=0.001$), suggesting that trout are suppressing these other fish species, either through competition or predation. In contrast, we found that trout biomass density was similar in the presence and absence of other fish species ($t= 0.730$, $p> 0.05$), which suggests that predation by trout on other fish species is an important process. Trout biomass density in trout-only streams was much lower than total fish biomass density in either mixed guild ($t=2.446$, $p=0.017$) or minnow/sucker streams ($t=3.919$, $p<0.001$). This may reflect abiotic constraints on fish production in small, cold streams, or it may be a result of food web structure.

Faculty Sponsor: Dr. Andrew Turner

SANDERS, L.J. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Motor Speech Disorders Associated with Stroke*.

See BURNS, N.M.

SAVITSKY, D.A. Department of Communication Sciences and Disorders. (Graduate Program). 2017. *Lee Silverman Voice Treatment and the Effects on Individuals with Parkinson's Disease*.

See BARCHALK, G.L.

SCHELLER, J.L. Department of Biology and Geosciences (Geosciences). 2017. *Investigating the Spatial Distribution of Foraminifera, Ostracods, and Thecamoebians in Subaqueous Caves Yucatan Peninsula, Mexico.*

See REDMOND, H.R.

SCHILL, C.N., MAIER, D.M., and **SCOTT, C.M.** Department of Biology and Geosciences (Biology). 2017. *Mitochondrial Stress Response: Developing a genetic screen utilizing 2, 4 – Dinitrophenol.*

Cellular stress, specifically mitochondrial stress responses are a vital part of cell physiology, yet not fully elucidated. Metabolic biochemical pathways have many implications in human diseases, such as Diabetes mellitus and Leigh syndrome. These pathways are subjected to changes during times of cellular stress. Examples of these pathways are the Citric Acid Cycle, the Electron Transport system, or Apoptosis via the Caspase Cascade, which occurs in and around the mitochondria of eukaryotic cells. Using yeast as a model organism, it is our goal to utilize a yeast mutant knockout library, in which each strain has one specific yet non-essential gene removed or knocked out. This library can help identify which specific aspects of the mitochondria is affected and how the cell responds to the exposure of 2,4-dinitrophenol (DNP), which is known to cause mitochondrial stress. This screen is performed by exposing a specified amount of yeast on complete media agar plates to predetermined concentrations of DNP via sterile filter paper discs. These spot assays are incubated for three days and images are taken every twenty-four hours to monitor yeast growth, or lack thereof. We are using three parental wild type yeast strains as baseline controls (BY4742 [parental strain to the yeast knockout library], RSY607, and W303), and plan to examine mutant strains that have been shown to localize or associate with the mitochondria. By examining the specific populations of yeast mutant strains, we hope to gain a clearer picture of what proteins are involved in the clearance of mitochondrial stressors, such as DNP. This should then allow a better understanding of biochemical pathway(s) involved in mitochondrial stress.

Faculty Sponsor: Dr. Craig Scott

SCHLAFHAUSER, A.L. Department of Nursing (Graduate Program). 2017. *Barriers to the Use of Low-Dose Chest Tomography.*

See DONELSON, R.L.

SCHMADER, A.M. Department of Psychology. 2017. *Is Student Productivity Related to Cell Phone Usage?*

See WAMSLEY, B.T.

SCHMUDE, W.F. Department of Psychology. 2017. *Community Literacy Needs Assessment for Clarion Learning Workshop*.

See KAUFNANN, A.D.

SCHULTZ, M.L., and **YVORRA, M.M.** College of Business. 2017. *National Conference Model United Nation Conference.*

After months of hard work, Clarion University's Model United Nations (CUMUN) is looking forward attending another successful conference in New York City from April 9 to April 13, 2017. The conference provides an opportunity for students to be familiar with the workings of the United Nations by assuming a role as a delegate of a country. The students then work on issues concerning that particular country with other students from different colleges across the globe. This spring CUMUN will be representing the Republic of Maldives, and twelve club members will be in six different committees debating on topics such as women's rights, possession of weapons, environment programs and many more. Although attending the conference is very rewarding, it requires hard work and dedication to get there. The discussions of global issues and international affairs at the conference involves in depth researching and studying beforehand. Therefore, our members that make up this club are very devoted individuals that are willing to take on this extra workload along with their regular schoolwork. Overall, we are honored to represent Clarion University at such a prestigious event, and we look forward to sharing another positive experience at the Undergraduate Research Conference.

Faculty Sponsor: Dr. Sandra Trejos

SCHWERZLER, M.S. Department of Education. 2017. *Experimental Learning: No Textbook Required.*

See SWARTZ, H.S.

SCOTT, C.M. Department of Biology and Geosciences (Biology). 2017. *Linking ERAD and the UPR: Developing a Genetic Screen Via the Expression of Antitrypsin*.

See STERN, R.M.

SCOTT, C.M. Department of Biology and Geosciences (Biology). 2017. *Mitochondrial Stress Response: Developing a genetic screen utilizing 2, 4 – Dinitrophenol.*

See SCHILL, C.N.

SEIBEL, B.L. Department of Biology and Geosciences (Biology). 2017. *Qualitative Observations of Behavior and Quantitative Measurements of Iron in Lithobates catesbeianus Collected from Water Impacted by Acid Mine Drainage*.

See AIELLO, L.M.

SHAW, M.L. Department of Visual and Performing Arts. 2017. *Attending the 51st National Council on Education for the Ceramic Arts (Portland, Oregon).*

See GEYER, S.R.

SHEEHAN, P. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

SHEFFER, M. Department of Accounting, Finance and Marketing. *The SAM International Business Conference*.

See REICHELDERFER, W.

SHETLER, B.R. Department of Chemistry, Mathematics, and Physics (Chemistry). 2017. *The Study of Aromatic Compounds in Wax for Wax Burners*.

Wax burners can be used to replace the traditional candle and mimic natural smells such as pine. How do regular wax burners compare to those that are labeled as natural? Natural products have been a popular topic lately because of the recent environment concerns. Wax burners are often used in homes for long periods of time for fragrance. It is important to know what compounds are being released into the air by these products. The purpose of this study was to separate and determine if α- and β- pinene was presented in the vapor emitted by the pine-scented wax after melting. Other aromatic compounds that are associated with the smell of pine were also determined to be present in the samples. Each wax was sampled at different stages of melting; no melting, immediate sampling after melting, and long period of melting before sampling. A gas chromatograph with a flame ionization detector was used to separate the compounds in the samples and gas chromatograph-mass spectrometer was used to identify the compounds in the sample.

Faculty Sponsor: Dr. Amanda Lockwood

SIEFERT, M.R. Department of Biology and Geosciences (Biology). *The Effects of Fish Presence on Salamander Abundance in Streams.*

Salamanders are ecologically important in streams as predators of many aquatic invertebrates. Fish can be major competitors and even predators of salamanders in these streams. The extent to which fish can affect salamanders has been studied on small spatial scales, but the relationships of fish and salamander

biomass have not been studied at the scale of entire landscapes. We used fish and salamander data collected from 51 streams as part of Clarion University's Unassed Waters Project and determined the biomass and density of both stream-dwelling salamanders and fish. The results show that in streams with low fish biomass, larval salamander density and biomass are often high, but also highly variable. Streams with a moderate or high abundance of fish always have a low density and biomass of salamanders. We will conduct more sampling on small, headwater streams in order to better understand the factors responsible for regulating salamander abundance in low-fish abundance ecosystems.

Faculty Sponsor: Dr. Andrew Turner

SIPE, A. 2017. Department of Communication Science and Disorders. (Graduate Program). 2017. *A Comparison of Apraxia of Speech Treatment Options*.

See BARRON, R.

SKERKAVICH, A. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Multiple Sclerosis*.

See GROMLEY, K.

SKUBISZ, A.J. Honors Program. 2017. *Measurement of the Regional Economic Impact of Honors Program Students in a Small Public University.*

Economic impact studies have long been utilized by policymakers and might represent the most important empirical application of economic theory. A PASSHE study released in 2015 determined the economic impact of Clarion University to be nearly $265 million to the regional economy with over $69 million coming from student spending in the region. While these kind of empirical studies are commonplace, this study seeks to discover how individual programs influence local economic activity. One might expect that the economic impact for these students would simply be a fixed fraction of the overall economic impact of all students at a university. That conclusion, however, is based on the assumption that honors students have the same regional spending habits as all other students on campus. Casual observation indicates that this is not likely the case. This research project will, therefore, look to empirically determine the economic impact of students in the Honors Program at Clarion University on the regional economy. A survey of all students currently enrolled in the Honors Program helped determine local spending patterns of these students in order to quantify the total spending and employment impact of this sample on the regional economy. The primary outcome of this analysis is to determine the overall economic impact of students enrolled in the Honors Program relative to that of other students on campus.

Faculty Sponsor: Dr. Rod Raehsler

SLATER, C.L. Department of Biology and Geosciences (Biology). 2017. *Feeding Ecology of the Eastern Red-backed Salamander (Plethodon cinereus) in Forest Patches Dominated by Fern*.

See MCGLONE, D.M.

SMITH, D.M. Department of Biology and Geosciences (Biology). 2017. *Analysis of the Toxicity of Analgesic A1 on Primary Neuronal Cell Cultures.*

See BURNS, S.

SMITH, D.M. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

SMITH, D.M. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

SMITH, H.L. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

SMITH, J.R. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

SMITH, M.F. Department of Biology and Geosciences (Biology). 2017. *Isolating and Identifying an Antimicrobial Activity Found in Human Urine.*

See MORELLI, K.A.

SOLLICK, A. Department of Biology and Geosciences (Biology). 2017. *Eastern Deciduous Forest Symposium*.

See MCGLONE, D.M.

SOLLICK, A. Department of Biology and Geosciences (Biology). 2017. *Everything is Oaky*.

See ARMER, L.

SOLLICK, A., BENSON, L., MCELRATH, H., and **MORGAN, A.** 2017. Department of Biology and Geosciences (Biology). *Comparison of Aquatic Macroinvertebrates in Seeps of Old Growth and Secondary Growth Forests in Cook Forest State Park.*

Cook Forest provides a valuable resource for aquatic macroinvertebrates with seeps in pristine untouched forests and within previously disturbed forest systems. This study to compare the species of aquatic macroinvertebrates found in each system was undertaken with the threat of impending disturbances to these previously untouched forests due to climate change and invasive species. The study was to find what species, if any, are found solely in the old growth forests that might be lost due to changes in the forest system. These two systems directly next to each other provide a unique example of how disturbances in the past allow us to predict the effects of the future.

Faculty Sponsor: Dr. Steven Harris

SOMMER, K. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Cerebral Palsy*.

See O'CONNOR, J.

STACK, B.M. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *200-kW Solar Electric Propulsion Tug for Transfers of Payloads for LEO and LDRO*.

See DENMARK, R.V.

STERN, R.M., GEYTENBEEK, S. M., LANINGA, K.L., and **SCOTT, C.M.** Department of Biology and Geosciences (Biology). 2017. *Linking ERAD and the UPR: Developing a Genetic Screen Via the Expression of Antitrypsin*.

Genetic disorders, such as Alpha-1 Antitrypsin Deficiency (ATD), can lead to the accumulation of aberrant and aggregation-prone proteins within the Endoplasmic Reticulum (ER). The defect associated with ATD can lead to cirrhosis of the liver and/or emphysema of the lung. While the disease states of ATD have been extensively studied, the mechanism of abnormal protein clearance within liver cells is not

fully understood. There are two biochemical pathways that exist in the liver cells to manage the clearance of misfolded proteins: Endoplasmic Reticulum Associated Degradation (ERAD) and the Unfolded Protein Response (UPR). ERAD identifies newly synthesized misfolded proteins and retro-translocates them out of the ER to be degraded by the 26S proteasome. The other biochemical pathway, the UPR, is an intracellular transmembrane signaling cascade that alleviates ER stress by inducing expression of specific genes when environmentally pressured. A previous study revealed that the protein Add66p is essential in the assembly of the 26S proteasome; therefore, deletion of the *ADD66* gene will disrupt proteasome production, function, and ERAD. Furthermore, ADD66 is a target of the UPR during times of ER stress. Along with this, the expression of A1PiZ, a mutant form of the human gene A1Pi (Antitrypsin), is used as a stress-inducing agent in yeast. This stress agent is expressed in two wild-type strains as well as a strain lacking *ADD66* (*add66Δ*). The goal of this project is to determine whether or not combining A1PiZ with an *add66Δ* will result in a defective growth phenotype. If a reproducible growth defect can be identified and used as a positive baseline control, then this experimental method may be used to screen and identify new proteins involved in ERAD, UPR, or both. Therefore, creating a clearer picture of the cell's stress response pathways.

Faculty Sponsor: Dr. Craig Scott

STORER, N.D., and **DUNKEL, C.A.** Department of Biology and Geosciences (Geosciences). 2017. *Determining the Utility of Diatoms as Environmental Proxies in Submerged Caves, Yucatan, Mexico.*

Underground cave systems in the Yucatan Peninsula, Mexico have been shown to provide conformable repositories of sedimentological information. This project explored the utility of diatoms to study paleoenvironments in proximity to areas that diatoms inhabit. Diatoms are microscopic (0.2-0.5mm), single-celled algae, found in aquatic conditions, with durable cell walls (frustules) made of silica (Si02 + H20). Abundant species diversity and high rates of preservation of frustules have made diatoms an indicator of past environmental conditions in other studies. Diatoms are photosynthetic organisms, which limits their habitat to sunlit cenotes (sinkholes). When conditions are ideal, algae will bloom in the cenote. After death, frustules are transported and deposited in the cave. Harsh hydrologic conditions in the cave environment prevent bioturbation providing a conformable sediment record. By studying the vertical assemblage of deposited diatoms, they can be used as an indicator for environmental changes in the water table, which can be an indictor past paleo-hurricane events or paleo climate. The hydrology of the cave system consists of freshwater floating on saline water, where they intersect is called the halocline. The halocline in cenotes raises and lowers according to meteoric water intake into the system. By comparing the occurrence of freshwater species vs marine species in the core and comparing it to the age of the core, the past conditions of the cave can be determined. One of the limiting factors of this study was the poor preservation of diatom frustules. Future work should investigate the effect of changing hydrologic conditions and preservation.

Faculty Sponsor: Dr. Shawn Collins

STOHON, L.N. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Wilson's Disease*.

See AHRENS, A.B.

STONER, D.J. T*he Influence of Voice Disorders on College Students' Perceptions of an Individual's Socio-communicative Abilities*.

See ALLEMANG, L.N.

SWARTZ, H.S., and **SCHWERZLER, M.S.** Department of Education. 2017. *Experimental Learning: No Textbook Required.*

In today's classroom, lessons are coming more from a textbook rather than life experiences. This presentation will display non-traditional classroom lesson plans and tactics that engage students in learning through hands-on experiences and activities.

Faculty Sponsor: Dr. Jesse Haight

TIMASHENKA, P.C. Department of Biology and Geosciences (Biology). 2017. *Estimation Of Hemlock Forest Cover With LIDAR: How Good Is Good Enough?*

The Eastern Hemlock (*Tsuga Canadensis*) is a dominant species in forests in the Mid-Atlantic region, and serves many roles within terrestrial and aquatic ecosystems. An infestation of the Hemlock Wooly Adelgid, an invasive insect from Asia, is leading to high tree mortality and changing forest composition. Because Hemlock dominate the riparian zone of many streams, the impending loss of hemlock may affect the fish community. We collected biotic and abiotic data from 65 streams during the summers of 2012, 2013 and 2016, for the Pennsylvania Unassessed Waters Initiative. The watersheds of these streams vary a great deal in forest composition, so the data can potentially be used to compare fish assemblages from hemlock-dominated watersheds to fish assemblages of deciduous-dominated watersheds and thereby assess the relationship between fish community metrics and hemlock coverage. However, a remote-sensing method for estimating hemlock coverage is required. We developed a method using LIDAR (Light Detection and Ranging) data to estimate hemlock coverage for each of our sample sites. LIDAR is an airborne laser mapping technique. A model was built and tuned to process LIDAR returns and yield hemlock coverage estimates at three spatial scales for each study site. The accuracy of the model was assessed by comparing high quality images to model predictions at 400 random points located throughout the target watersheds. The outcome of this assessment will be displayed in an error matrix.

Faculty Sponsor: Dr. Andrew Turner

TROIANO, M. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Cerebral Palsy*.

See O'CONNOR, J.

VICKERS, R. Keystone High School. 2017. *The Absence of Rights in Sparta.*

In the traditional view of the Spartan society, all citizens were seen as being in possession of similar rights. Unlike other Greek city-states, Spartan women were able to perform work outside of their homes, and own and inherit land. Men, on the other hand, had authority over government and a large military. Equal rights seem to be given out to all citizens. Rights, in standard terms, are the guarantees people gain as human beings. Social class can often have an effect on how rights are distributed amongst the population. At first glance, the Spartans appear to be given rights based off their social class. A closer look at the Spartan society reveals that there were not rights, but privileges granted to those who needed them. This paper looks at the truth behind the Spartan society. Spartans did not follow a consistent set of rights, follow any legal right, or possess a social understanding of what modern rights are. The lack of those important criteria made it nearly impossible for the Spartans to have rights.

Faculty Sponsor: Dr. Jesse Haight and Mr. Jacob Craig

WALLACE, G. Department of Biology and Geosciences (Biology). 2017. *Do Varying Light Levels Affect Sapling Regeneration?*

See MCGLONE, D.M.

WALLS, J.L. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Wilson's Disease*.

See AHRENS, A.B.

WALSH, T. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Huntington's Disease*.

See DGIEN, J.

WAMSLEY, B.T., SCHMADER, A.M., and **JONES, J.Z.** Department of Psychology. 2017. *Is Student Productivity Related to Cell Phone Usage?*

As cell phone usage increases in college students, we have noticed a negative correlation between cell phone use and low-test scores, which then is related to overall QPA. Poorer task performance is correlated with receiving phone calls, text messages, and notifications. In our study, Clarion University (CU) students were asked to complete an anonymous online survey, in which we asked questions relating to their academic performance and patterns in cell phone use. We expect that productivity in CU students will be negatively correlated with cell phone usage; specifically, students with higher academic performance and more efficient study habits use their cell phones less than those with lower academic performance.

Faculty Sponsor: Dr. Jeanne Slattery

WENNER, A.D. Department of Biology and Geosciences (Biology). 2017. *Analysis of Fish Behavior and Respiration in Fluctuating Water Temperature Cycles.*

See PORTER, V.M.

WHITEHOUSE, S.K. Department of Biology and Geosciences (Biology). 2017. *Eastern Deciduous Forest Symposium*.

See MCGLONE, D.M.

WHITEHOUSE, S.K. Department of Biology and Geosciences (Biology). 2017. *Do Varying Light Levels Affect Sapling Regeneration?*

See MCGLONE, D.M.

WHITEHOUSE, S.K. Department of Visual and Performing Arts. 2017. *Attending the 51st National Council on Education for the Ceramic Arts (Portland, Oregon).*

See GEYER, S.R.

WILCOX, B. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Cerebral Palsy*.

See O'CONNOR, J.

WILLIAMS, C. Department of Communication Sciences and Disorders (Graduate Program). 2017. *Multiple Sclerosis*.

See GROMLEY, K.

WILLIAMS, L. Department of Biology and Geosciences (Biology). 2017. *Extracellular Matrix Components Fibronectin and Collagen II Modulate Hematopoietic Stem Cell Colony Formation in Vitro*.

See FRANCETTE, A.M.

WILSON, D.M. Department of Biology and Geosciences (Biology). 2017. *Increasing the Sensitivity of a Field Kit for the Detection of Batrachochytrium Dendrobatidis.*

See BOUCH, R.J.

WINGET, D. Department of Psychology. 2017. *Investigation of Social Media Use on Mindfulness and Self-Esteem in College Students.*

See LAMIELLE, B.

WYANT, R.B. Department of Chemistry, Mathematics, and Physics (Physics). 2017. *Preparation of Quasicrystalline Nanoparticles*.

See ALLEMANG, C.M.

YVORRA, M.M. College of Business. 2017. *National Conference Model United Nation Conference.*

See SCHULTZ, M.L.

ZAESKE, C. Keystone High School. 2017. *Pennsylvania Philosophy: Influences Upon the Pennsylvania Colony That Contributed To the Making of the United States of America.*

This study shows that Pennsylvania served as a proving ground for Enlightenment thought through the actions of idealists, such as William Penn. Pennsylvania was in many ways the prototype that supplied the new colony with the values that led to the creation of the United States. Independent and free, the United States strives to maintain civil and governmental liberties that can be traced from the colonial period that show Pennsylvania played a crucial role in today's government. The research also shows Pennsylvania served as a prototype for many civil liberties and for some level of religious toleration that laid the foundation for modern American values. Visions of Enlightenment thought continue to influence today's political, cultural, governmental structures in the United States.

Faculty Sponsor: Dr. Jesse Haight and Mr. Jacob Craig

ZAVINSKI, E. Honors Program. 2017. *An Assessment and Analysis of a Student-Driven Mentorship Program to Assist in Honors Program Student Recruitment and Retention.*

In a time of change for our Honors Program's mentorship program, we have decided to uncover students' thoughts on its effectiveness. Previously, at Clarion University, we matched incoming freshmen students with upperclassmen according to major. With a lack of participation of mentors (a phenomenon that is reflected in our data), we have moved on to incorporating our mentor program with honors student workers in our office to provide the same resources for freshmen interested in having student-driven guidance. Data uncovered show various trends in mentor program effectiveness and in the relationships students were able to develop in the Honors Program.

Faculty Sponsor: Dr. Rod Raehsler

ZIMMERMAN, H.L. Honors Program. *The Impact of an Honors Program on Academic Performance of Speech Pathology Students*.

See BLASHFORD, M.E.

ZIMMERMAN, H.L. *The Influence of Voice Disorders on College Students' Perceptions of an Individual's Socio-communicative Abilities*.

See ALLEMANG, L.N.

FRESHMAN INQUIRY SEMINAR
Final Research Projects

Some of the projects included in the Undergraduate Research Fair were created by first-year students enrolled in Freshman Inquiry Seminar courses. These small, discussion-based courses help students develop skills in teamwork, inquiry, and analysis and information literacy. At the end of the course, all students complete an inquiry-based research project that requires them to develop questions about a topic and then do research to address those questions. The students then pull together their research for display on a tri-fold poster board. This semester, students completed projects in three different Inquiry Seminar courses. Descriptions of the courses and the final projects within each course is provided below, along with a list of the students in each course who are presenting their work today.

BIOL 128: THE FATE OF THE ALLEGHENY *Faculty: Dr. Suzie Boyden*

Rickie Bellamy, Sarah Boodjeh, Tyrone Bowen-Collateta, Tyonya Brown,Leah Campbell, Natalie Clifford, Jeremiah Frazier, Nicholas Fugh, Taylor Haner, Shiane Harris, Tarieck Hicks, Mariah Johnson, Leah Kappel, Zachary Loutsion, Aaliyah McMullen, Chynna McQueen, Savana Oler, Reyna Presson, Meliah Roman, R'monni Sargent, Briana Schwab, Stephanie Stearns, Kirsten Wenner, and Lauren Wingert.

Students in this course have been exploring the direct and indirect values forests hold, and the threats forests face from development, invasive species, logging practices, gas and oil development, insects, and disease. For their final project, they worked in small groups to research one particular threat to forests and developed possible solutions to this problem. This research is designed to answer two questions of the students' choosing. The first is a scientific question about the nature of the threat, its origin or impact, which they answered through the use of the scientific literature. The second is a non-scientific question, about possible courses of action. This required students to identify the ethical, political, or economic values involved in solving the problem.

ENGL 107: WHAT'S FUNNY ABOUT THAT? *Faculty: Dr. Melissa Downes*

Katie Caldwell, Azlyn Greenlee, Mary Kenepp, Marcus McCoy, Amanda Ritchey, Erica Czachowski, Sutherlyn Hollabaugh, Dasia Jackson, Katelyn Kister, Sasha Norris, and Stephanie Reighard.

For their final project, each student, as a starting point, selected one chapter from the major text for the course, The Humor Code. Each chapter focuses on a larger question about humor (Why do we laugh? Does humor have a dark side? etc.) and investigates that question in different countries (Japan, Tanzania, Palestine, etc.), emphasizing and modeling inquiry and primary and secondary research. After selecting a chapter, the students developed their own research question, did primary (choosing from observation, experiment, interviews, surveys, textual analysis, and focus groups) and secondary research, and synthesized, analyzed, and drew conclusions from that research.

GEOG 101: A PICTURE IS WORTH A THOUSAND WORDS *Faculty: Dr. Yasser Ayad*

Nicholas Clark, Sadie Clark, Tyla Cornelius, Dustin Daihl, Tahj Dickerson, Darius Early, Angel Lozada, Xhonane Olivas, Joshua Payne-White, Reyna Presson, Austin Robinson, Jessica Rohm, Matthew Severns, Alyssa Tufano, and Jared Weeter.

Students in this course investigated the value of images and photos in communicating information in a variety of setting, including casual (phone, social media, selfies, etc.) and professional (art, photojournalism, earth observation, etc.). For their final project, they did a free inquiry into the subject of photography—experimenting with different tools and techniques in imaging and comparing technologies, lighting setting, media types, environments and subjects.

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