

CLARION UNIVERSITY OF PENNSYLVANIA

UNDERGRADUATE RESEARCH CONFERENCE



PART OF THE ACADEMIC EXCELLENCE SERIES
A CELEBRATION OF UNIVERSITY RECOGNITION AND RESEARCH

MAY 2, 2014





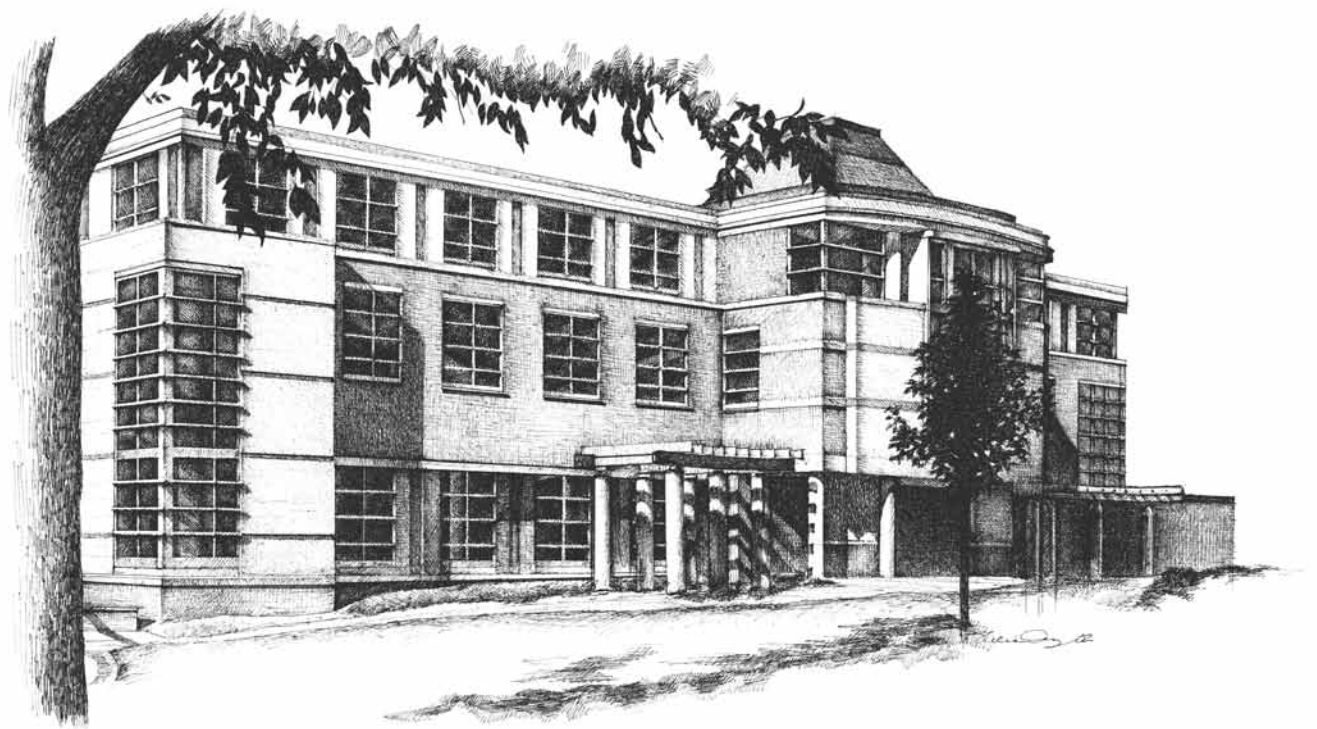
Undergraduate Research Conference

Friday, May 2, 2014

10 a.m.-2 p.m.

First floor, Carlson Library

Student Research Presentations funded by the Office of Academic Affairs.



Abstracts

Adams, K.A. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Agosti, P. A., Overlock, B. A., and Nix S. Department of Biology. 2014. *The Influence of Mycorrhizal Fungi on Fern Spore Germination.*

There are greater than 7,000 species of ferns in the world, many of which belong to the family *Polypodiaceae*. Many of these ferns form associations through their root and rhizome systems with mycorrhizal fungi. To better understand this relationship, the influence such fungi have on the germination of commercially purchased *Ceratopteris sp.* spores was observed in the laboratory. Fern spores were deposited at approximately equal densities on nutrient agar Petri dishes, which were exposed to 12 daily hours of light for 10 days. Two treatments were tested, the first treatment tracked the germination rates of fern spores when they were mixed with Mycogrow™ mycorrhizal root inoculum. The other treatment tracked germination of fern spores alone. Mean germination rates will be compared for the different treatments, and a test for significance will quantify the difference. We hypothesize that the ferns treated with Mycogrow™ will have greater germination rates than the ferns alone control treatment.

Faculty Sponsor: Dr. Shannon Nix

Albert, V.E. Department of Anthropology. 2014. *Spatial Analysis of Artifacts Found at the Hopkins Farm Site (36Fo3).*

See Newhard, S.E.

Allemang, C. Department of Physics. 2014. *Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition.*

See Berrier, S.N.

Alu, D. Center for Applied Research and Intellectual Property Development. 2014. *Modeling the Effects of Nanodiamonds within a Thin Film of Engine Oil.*

This research project seeks to identify the thermodynamic effects and mechanic properties of nanodiamonds within a thin oil film of a standard piston and engine system. The project utilizes the multiphysics modeling program Comsol in order to build an accurate cross-section model of the system and emulate the coupling of various physics to model the thermodynamic inputs and outputs of the system. The project also seeks to measure the mechanic properties of the nanodiamonds within the motion cycle of the system by tracing their displacement within the oil film. Due to the lattice structure of diamond, the additives have enormous potential as a heat augmentation medium to the system. It is theorized that the nanodiamond additives will reduce thermal stress upon the engine block and increase the overall efficiency of the engine. The mechanisms behind the heat diffusion are not well understood and this project seeks to model various stages of the experimental process in order to gather data to further the understanding of the thermodynamic effects. The model is also designed to monitor the motion of the particles in order to determine the likelihood of a non-homogeneous displacement during the motion cycle of the system. This could result in the reduction of the thermodynamic properties of the additive or create a carbon-diamond abrasive force that could damage the piston and engine block.

Faculty Sponsor: Professor Benjamin Legum

Alu, D. Department of Physics. 2014. *Detection of Falling Evaporating Bodies of the Star System 49 Ceti.*

This research project seeks to identify falling evaporating bodies in the circumstellar disk of the young star 49 Ceti. The absorption spectrum of the Ca-III K and Na-I D lines are analyzed in order to identify deviations from the expected absorption pattern of the star. Utilizing the 82 inch telescope at the McDonald Observatory in Texas, data was gathered on 10 consecutive nights within the red and blue light spectrum of the star 49 Ceti. By comparing the extracted data with the standard absorption patterns of the Ca-II K lines and Na-I D lines it is possible to detect variations on a night to night basis in the absorption spectrum of the star. Variations of the starlight are indicative of interference from a celestial object perturbing the instruments collection of continuous starlight. Given that 49 Ceti is a young A-type star it contains a circumstellar disk of gas, dust, and debris. If an object during planetary formation, such as a comet, were disturbed from its orbit due to gravitational interference it would be pulled toward the star. The gas released as the object evaporated during its inward falling motion to the star would cause a flux in the absorption pattern of the starlight. This project analyzes current understanding of planetary development and compares the analysis and results of collected data on 49 Ceti with the current data on a similar star Beta Pictoris in order to identify possible evidence to support current theories on falling evaporating bodies.

Faculty Sponsor: Dr. Sharon Montgomery

Arlet, K.E. Department of Psychology. 2014. *Dominican Republic Partnership.*

See Dickson, S.J.

Ban, J.M. Department of Physics. 2014. *DNA Electrospray.*

See Kiritchenko, V.

Bare, K. Honors Program. 2014. *A Comparison of Honors Program Curricula for Northeastern American Universities and Eastern Canadian Universities: Past Practice and Future Challenges.*

See Bond, N.

Bare, K. Honors Program. 2014. *The Political Structure of Student Organizations and Member Participation.*

See Kopper, M.

Bauer, M. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

See Caputo, M.

Bauer, M.J. Department of Physics. 2014. *Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition.*

See Berrier, S.N.

^{1,3}**Bauer, M.J.**, ^{1,3}**Lucci, B.A.**, ^{2,3}**Nelen, B.M.**, and ³**Legum, B.M.** ¹Department of Physics, ²Department of Computer Information Systems, ³Center for Applied Research and Intellectual Property Development. 2014. *Automation of Chemical Vapor Deposition (CVD) System and Development of Diamond-Like Carbon (DLC) Coatings on Ti6Al4V.*

Titanium and titanium alloys such as Ti6Al4V cause no adverse reaction when placed in the body as implants and are well suited for adhering to and promoting the growth of bone cells. However, they are less than ideal surfaces for the growth of epithelial (gum) cells, the growth of which is integral to the success of dental implants. Since epithelial cells adhere much more readily to carbon, coating titanium

with diamond- like carbon (DLC) coatings should produce dental implants with a higher success rate. The DLC coatings we are currently evaluating are deposited by atmospheric pressure chemical vapor deposition in a CVD chamber constructed in an industrial tube furnace. The furnace has also been wired into a computer running labview so as to allow for complete automation of the tube furnace and temperature logging with a simple and effective user interface.

Faculty Sponsor: Professor Benjamin Legum

Baxter, R. Department of Education. 2014. *The Origin of Cleopatra*.

Cleopatra is one of the most famous women in history. She has had her story told in both plays and movies. She is usually attributed with striking looks, military genius, and a cunning intelligence to keep her empire away from Roman domination. She is remembered as the mistress of both Julius Caesar and Mark Antony, two of the most powerful men of her time. Although she was one of the most powerful rulers of Egypt, there is still an ongoing scholarly debate about her origins and bloodline. The most common answers revolve around Egyptian, Macedonian, or Greek identity. A closer examination of primary and secondary sources regarding Cleopatra's family history and the rule of the Ptolemaic Dynasty can help address this historical riddle.

Faculty Sponsor: Dr. Robert Frakes

Bedeaux, J., Bloomberg, A., DeSantis, B., Forgey, D., Guarnieri, E., Hanes, C., Lawrence, A., McJunkin, S., Puglisi, L. and Stynchula, H. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University*.

As a student group on campus we have always struggled with maintaining active membership throughout the whole school year. Students sign up to be involved in the group and would say they were participants but then would not do anything all year. This poster will provide attendees an overview of what Clarion's Student Council for Exceptional Children has done to increase participation of individuals that are part of the SCEC group. Students in the group must earn points by attending a certain amount of meetings, attending events, participating in community service and doing fundraisers to be considered an active participant in the group and to earn a certificate of participation at the end of the year. We will share meeting ideas, events that have been particularly successful, community service activities that students enjoy and successful fundraising ideas that the group has used. Using these member guidelines have increased active participation of students from an average of 10 students participating all year to an average of 25 or more students participating actively all year.

Faculty Sponsor: Dr. Lorie Taylor

Bedeaux, J., Bloomberg, A., DeSantis, B., Forgey, D., Guarnieri, E., Hanes, C., Lawrence, A., McJunkin, S., Puglisi, L. and Stynchula, H. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology*.

The growing diversity in America's schools, including students with disabilities, presents the challenge of individualizing instruction and enabling learners of all ability levels to be involved in instruction. In addition, with the alignment of special education laws and No Child Left Behind, special education students must have access, participate, and make progress in the regular education curriculum, and be evaluated within its accountability systems. Students with disabilities are often included in regular education classes. Without appropriate supports and services, these students will frequently be at risk for grade retention, may not be able to receive a high school diploma, and will often drop out of school. The use of technology is one way to help students to manage the demands placed on them by every day life. This poster will introduce attendees to assistive technology. It will provide a brief overview of what assistive technology is, the different types of assistive technologies, and how assistive technology can be used to support individuals with disabilities.

Faculty Sponsor: Dr. Lorie Taylor

Beil, A. Department of History. 2014. *Leon Trotsky in Cardenista Mexico*.

Russian intellectual Leon Trotsky was not able to seize power after the death of Vladimir Lenin. Instead, Joseph Stalin claimed power and expelled Trotsky from Russia. The only country that accepted him in 1936 was Mexico. The historical problem my paper examines is why did the government of Lázaro Cárdenas accept him and who was responsible for his death. My paper uses Mexican newspaper accounts, Trotsky's own writings and Russian sources to explore the conspiracy behind his assassination in 1940. The conclusion I reach is that the presidency of socialist-leaning Lázaro Cárdenas helped create an opening for Trotsky's amnesty; however, it could not protect him from Stalin's reach.

Faculty Sponsor: Dr. Kathleen McIntyre

Berrier, S.N., Bauer, M.J., Demark, R.V., Allemang, C., and Li, C. Department of Physics. 2014. *Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition*.

Silicon oxide nanowires have shown promise in applications such as fiber optic communications as well as light emitting sources. The performed experiments utilized a vacuum tube furnace to fabricate the wires through chemical vapor deposition. Following the procedure developed by Li et al, the experiments analyzed the effect of a change in the pressure level on the nanowire formation. Examination by scanning electron microscope and energy dispersive x-ray spectroscopy showed that different types of nanowires form at high and low vacuum levels. The experiment at low vacuum showed nanowires in the form of densely packed singular wires as well as gourdlike bunches formed around gallium droplets. In the experiment at high vacuum, analysis showed that only singular nanowires were formed.

Faculty sponsor: Dr. Chunfei Li

Berry, R. Department of Biology. 2014. *Effect of Atrazine Exposure on Crayfish Chemical Cue Response*.

See Henry, B.

Biedka, S.A., Bryner, A.N., and Scott, C.M. Department of Biology. 2014. *Biochemical Analysis of a Novel UPR_E via β -Galactosidase Assay*.

The aggregation of aberrant proteins within eukaryotic cells is the cause of many diseases such as Alzheimer's, cystic fibrosis and antitrypsin deficiency. In diseases such as these, an accumulation of misfolded protein aggregates can overwhelm the cell, leading it to undergo apoptosis. To prevent this, the cell has various mechanisms to clear aberrant proteins. Proteins destined for secretion are folded within the Endoplasmic Reticulum (ER). Proteins that are misfolded are retrotranslocated out of the ER and subsequently degraded through ER-Associated Degradation (ERAD), a constitutive protein quality control pathway. In situations when ERAD becomes overwhelmed, such as during the above diseases, the Unfolded Protein Response (UPR) is initiated to aid ERAD. The UPR is activated via HAC1 mRNA splicing, resulting 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 previous work, β -galactosidase assay was used to quantify the level of UPR induction in the presence and absence of cell stress. Via this β -galactosidase assay, the affinity of Hac1p to the characterized UPRE was determined. A putative UPRE which differs from the canonical UPRE by a single nucleotide was identified; we hypothesize that the putative UPRE, when inserted into the pJC104 reporter plasmid in the place of the canonical UPRE, will show statistically significant levels of affinity to Hac1p during times of cell stress.

Faculty Sponsor: Dr. Craig Scott

Bilak, J.D. Department of Biology. 2014. *Disease Status of Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Four Western Pennsylvania Watersheds*.

See Hepfl, N.S.

Bloomberg, A. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Bloomberg, A. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Blöse, E.A. Department of Management, Marketing, and Human Resources. 2014. *J.C Penney Company, Inc.: Can They Survive the Ron Johnson (CEO) Era?*

See Demczak, A.G.

Bond, N. and Bare, K. Honors Program. 2014. *A Comparison of Honors Program Curricula for Northeastern American Universities and Eastern Canadian Universities: Past Practice and Future Challenges.*

Recent changes in the focus of higher education in an environment of increased budgetary challenges has forced many academic departments to rethink how courses are taught and what courses to include in a curriculum. With a greater degree of emphasis on responding to market forces and demands students have in terms of potential employment preparation, college curriculums have been altered at an increased rate in order to attract students to remain competitive. With a greater degree of competition for high-achieving students, it is not surprising to see that Honors Programs and Honors Colleges at universities have witnessed similar changes. This paper will endeavor to outline major curriculum changes in honors programs seen in the past decade among universities in a similar geographic region. A meta-analysis will be performed looking at programs among universities in the northeast United States (New York, Pennsylvania, Vermont, New Hampshire and Maine) and compare them to Canadian universities in the vicinity of Niagara Falls (universities in Ontario and Quebec). A discussion as to how economic and public policy conditions in each state and province drive curriculum issues will be discussed. Once similarities and differences are established, future challenges and opportunities for changes will be discussed.

Faculty Sponsor: Dr. Rod Raehsler

Bond, N. and Brooker, D. Honors Program. 2014. *The Use of High Impact Practices in Honors Programs: Impact on Student Learning and Future Challenges.*

High Impact Practices are “an investment of time and energy over an extended period that has unusually positive effects on student engagement in educationally purposeful behavior” (Kuh, 2010). These practices can be used through experiences such as: undergraduate research, capstone courses and projects, collaborative assignments and projects, writing intensive courses, common intellectual experiences and learning communities. High Impact Practices place a “strong emphasis on global and intercultural learning, technological sophistication, collaborative problem-solving, transferable skills and real-world applications—both civic and job-related,” providing preparation for success in all meanings: economic, societal, civic and personal (Kuh, 2010). This paper will study the evidence for academic success through data obtained from Clarion University and its Honors Program. The majority of the high-impact practices utilized at Clarion University are within the Honors Program curriculum. The use of these practices has allowed Honors students to obtain a more rounded education and gain experiences outside of their majors in order to help them in their future job searches.

Faculty Sponsor: Dr. Rod Raehsler

Boniger, C.A. Department of English. 2014. *Three Witches, One Goddess*.

The paper/poster focuses on parallels between Shakespeare's "Macbeth" and Celtic folklore. More specifically, it looks at the possibility of the three weird sisters acting as a goddess figure. It discusses the nature of the triune goddess, the Morrigan, the characteristics of witches around the time of Shakespeare and how the weird sisters do or do not fit these ideas. It also briefly addresses the effect this might have on the argument of fate versus free will in the play.

Faculty sponsor: Dr. Ralph Leary

Boyd, S. Department of Biology. 2014. *Impact of Management and Deer on Tree Regeneration of Pennsylvania's Forests*.

See Chatterji, R.

Brooker, D. Honors Program. 2014. *The Use of High Impact Practices in Honors Programs: Impact on Student Learning and Future Challenges*.

See Bond, N.

Brooker, D.M., Lithuli, K., Porter, F., Cherry, M., Wilson, D. and Smith, D.M. Department of Biology. 2014. *Plaque Purification of Blue Tongue Virus Serotype 17 Mutants with Delayed Cytopathology and Preliminary Steps to Investigate the Role of Nonstructural Protein 3 in BTV-Induced Apoptosis*.

Blue tongue virus (BTV) is an arthropod-borne pathogen of cattle, sheep and wild ruminants. Upon infection, the virus immediately attacks healthy mucosal cells of the airway causing apoptosis. As the virus spreads, it infects macrophages which migrate to or reside in the lymphatic system. The mechanism of this process, however, is unknown. When BTV serotype 17 is plated onto Vero cells, apoptosis is induced. Cytopathic effects are observed as early as 48 hours post infection (hpi), and by 96 hpi, the cells are completely apoptotic. Our research lab is interested in discovering which gene product(s) are responsible for inducing apoptosis in BTV-infected Vero cells. We have created mutant viruses and use the process of plaque purification to discover a strain of mutant virus that is defective in apoptosis. We are currently in the process of purifying one mutant that shows reduced and delayed cytopathology. BTV is a fairly simple double stranded RNA virus with only ten genes and eleven proteins. Because of this, most of them are well-characterized in the literature, although two of the proteins have unclear function. One of those, nonstructural protein 3 (NS3) appears to be a likely candidate in the role of inducing apoptosis in BTV-infected cells. NS3 primarily resides in the plasma membrane where it could potentially serve as an apoptotic and phagocytic signal giving the virus a means to enter the next host cell. We show our preliminary results using RBC-mediated microinjection of anti-NS3 antibody to block BTV-induced apoptosis of Vero cells.

Faculty Sponsor: Dr. Douglas Smith

Brooks, C.S. Department of Biology. 2014. *Disease Status of Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Four Western Pennsylvania Watersheds*.

See Hepfl, N.S.

Bryner, A.N. Department of Biology. 2014. *Biochemical Analysis of a Novel UPRE via a -Galactosidase Assay*.

See Biedka, S.A.

Buffington, S.J. Department of Library Science. 2014. *Integrating K-12 Core Curriculum and Materials at the Public Library.*

Students enrolled in LS257 and LS258 received a Community Fellows Grant to assist the public library in acquiring K-12 materials for library instruction and research. They conducted a needs analysis of the existing collection by comparing it to recommended lists and bibliographies for children, young adults, and school libraries. They compiled a list of recommended materials that were mapped to the Model Curriculum for Pennsylvania School Library Programs.

Faculty sponsor: Dr. Janice M. Krueger

Caputo, M., Timbs, B., Myers, S., Bauer, M., Carey, E., Simpson, L., and Lippold, S. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

Quasicrystalline nanoparticles have great potential for industrial use and in the medical field. Some of these applications include hydrogen storage and a replacement for gold nanoparticles, which are used in the treatment of cancer. Our project involves the isolation and filtration of stable quasicrystalline nanoparticles to a size of less than five micrometers from an arc melted sample of Al₅₉Cu₃₇Fe₃Si₁. Successful filtration of less than five micrometers was completed using a SPI black membrane screen filter into a concentrated ethanol solution. It was then confirmed using a Tescan Vega 3 SEM. The composition of the nanoparticles was examined by Oxford, Aztec EDS.

Faculty Sponsor: Dr. Chunfei Li

Carey, E. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

See Caputo, M.

Carter, E.L., Talley, J.S., Peretic, T.J., Strausser, K. and Smith, D.M. Department of Biology. 2014. *Determination of the Minimum Inhibitory and Bactericidal Concentrations and Cytotoxicity for an Antimicrobial Compound Discovered in Human Urine.*

The anti-infectives industry is a multi-billion dollar enterprise in the United States. However, there is always a need for new classes of antimicrobials because of the increased frequency of antibiotic-resistant pathogen-derived infections. Our laboratory is interested in finding new classes of antimicrobial agents for use in treating infections. We discovered an antimicrobial agent in human urine and successfully identified the compound responsible for antimicrobial activity using gas chromatography mass spectroscopy analysis after distillation, solid, and liquid phase extraction techniques. We purchased the pure compound and tested it to confirm its ability to act as an antimicrobial compound and we were successful. We have begun determining the compound's Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) on a variety of patient derived organisms. We also have begun to determine the cytotoxicity of the compound on human leukemic HL-60 cultured cells.

Faculty Sponsor: Dr. Douglas Smith

Chapman, E.J. Department of Biology. 2014. *Disease Status of Eastern Hellbender (Cryptobranchus a. alleganiensis) Populations in Four Western Pennsylvania Watersheds.*

See Hepfl, N.S.

Chatterji, R. and Boyden, S. Department of Biology. 2014. *Impact of Management and Deer on Tree Regeneration of Pennsylvania's Forests.*

Pennsylvania forests have undergone drastic changes in the past few centuries, such as the loss of old-growth trees and changes to the structure of the forests. Overgrazing by Pennsylvania's state mammal, the white-tailed deer (*Odocoileus virginianus*), has shaped the general diversity of plants as a result of the herbivores' selective consumption. Due to the altering dynamics of forest composition,

several management practices have been employed to restore tree species characteristic of old growth forests. These management strategies can be compared to those of natural disturbances, such as thinning of the canopy and controlled ground fires. Such active forest management techniques can assist in restoring the diversity in the understory as well as accelerating the regeneration of certain tree species. The objective of this study was to compare the effect of different management practices on the regeneration and diversity of tree seedlings in stands with and without deer in Clear Creek State Forest, Pa. Overall seedling richness and diversity were highest in plots that were burned and thinned, but the thinning seemed to promote red maple, while burning contributed to increased oak and other hardwood species. White-tailed deer's preference for consuming certain tree species was apparent as the proportion of maple seedlings was much higher in sites with deer. Finally, seedling height growth was greatest in sites that were thinned and not exposed to deer. This study has shown that the presence or absence of deer influence the impact of forest management techniques on the species composition of tree seedlings.

Faculty Sponsor: Dr. Suzanne Boyden

Chatterji, R., Cypher, A.D. (University of Akron), **Harvey, S. C., Henry, B. L., and Keth, A.** Department of Biology. 2014. *Impact of Bisphenol A (BPA), an Environmental Estrogen, on Zebra Fish Aggression.*

The objective of the project was to explore how an environmental contaminant and estrogen-mimic, bisphenol A (BPA), affects aggression in zebra fish (*Danio rerio*). BPA is an important ingredient in the production of plastics for bottles, canned foods, and receipt paper. Overtime, BPA leaches into soil and water where it is then taken up into tissue of animals. While exposure to BPA at high concentrations has been clearly linked to reproductive failure in male fish species, it remains unclear if BPA can alter the aggression of these fish. A decrease in aggression could compromise their ability to compete for food and interact with potential mates. This would represent a sub-lethal impact to fish population dynamics that could ripple into and alter local community dynamics as well. In this study, zebra fish aggression was compared between BPA exposed fish and control fish. Individuals' aggression was measured by observing the rate of head-butting and nipping at mirror images. We hypothesized that the rate of aggression would be lower in BPA-exposed fish than in control fish.

Faculty Sponsor: Dr. Andrew Keth

Chatterji, R. and Lacey, E. Department of Biology. 2014. *Comparison of Fish Juveniles as a Function of Proximity to Mangroves between Punta Caracol and Smithsonian Reef in Bocas del Toro, Panama.* Institute of Tropical Ecology and Conservation, Bocas del Toro, Panama.

The future of healthy fish populations in a tropical setting will largely depend on the subsequent health of mangrove forests which are the backbone for many marine species. Despite this apparent ecological need for the proper functioning of mangroves, there has not been much exploration of how proximity to mangroves affects juvenile fish populations. In this field experiment, juvenile fish populations were compared between two sites with different proximity to mangroves, Punta Caracol and Smithsonian Reef at Bocas del Toro, Panama. It was hypothesized that there would be a higher juvenile fish population in the Punta Caracol site as it is closer to the mangrove wetlands compared to the site at Smithsonian Reef. In order to test this hypothesis, a visual survey sampling method was carried out at both sites and the number of juveniles at each site was noted. Data analysis showed that there was a significant difference in the size classes of fish between each site, and significantly higher number of juvenile fish at the Punta Caracol site than at Smithsonian Reef. This reinforces the fact that mangrove systems provide a critical habitat for many fish nurseries. This research was conducted as part of a study abroad experience in Panama. In addition to taking a coral reef ecology course and conducting independent research, I was able to immerse myself in the culture and activities native to the region. Among other activities, I got SCUBA certified, was exposed to tropical rainforests, hiked in a cloud forest, and witnessed rare and exotic animals (such as the resplendent quetzal and howler monkeys!) The study

abroad experience enhanced my work as a future scientist, allowed me to make contacts with faculty and students at other universities, and provided me with very rich experiences.

Faculty Sponsor: Dr. Suzanne Boyden

Cherry, M. Department of Biology. 2014. *Plaque Purification of Blue Tongue Virus Serotype 17 Mutants with Delayed Cytopathology and Preliminary Steps to Investigate the Role of Nonstructural Protein 3 in BTV-Induced Apoptosis.*

See Brooker, D.M.

Clay, M.E. and Kiritchenko V. Department of Biology and Department of Physics. 2014. *Characterization of Nanostructures Utilized by Members of the Order Lepidoptera.*

We will utilize scanning electron microscopy techniques to characterize the nanostructures of the scales of members of the order Lepidoptera native to western Pennsylvania. We will be examining these nanostructures with respect to their corresponding colors as seen by the naked eye, as previous research suggests that nanoscale baffling structures are able to alter the wavelengths of light reflected off of the wing scales, perhaps masking the effect of organic pigments present within the scales. These baffled structures are hypothesized to filter out certain wavelengths of light, and what is perceived by the human eye as color is the result of white light minus the filtered out wavelengths. For example, baffle structures in the wings of Blue Morpho butterflies that filter out yellow wavelengths (570-590nm) yield a scale that appears to be blue. We will also examine other nanostructures that are not known to provide a change in perceived pigmentation.

Faculty Sponsors: Drs. Chunfei Li and Shannon Nix

Clay, M.E., Sheehan, P.W., Miknis, C. M., and Wilson, D.M., Department of Biology. 2014. *Creation of a Batrachochytrium dendrobatidis (Bd) ELISA Kit.*

In 1998, a chytrid fungus was discovered that killed large numbers of amphibians and is now believed to have driven many species of amphibians, frogs in particular, to extinction. *Batrachochytrium dendrobatidis (Bd)*, one of only two chytrid fungi classified as parasitic, is so widespread that it is found on every continent that harbors amphibians. Amphibians infected with *Bd* may develop chytridiomycosis, in which the skin thickens and becomes more porous to ions, disrupting electrolyte balance, and ultimately leading to death by cardiac arrest. Currently, the only way to test for *Bd* is through a Polymerase Chain Reaction (PCR) test. This test has limitations; it cannot be performed readily in the field, is costly, and is not time-efficient. The goal of our research is to develop an Enzyme Linked Immunosorbent Assay (ELISA) that is highly specific, accurate, portable, and inexpensive to provide a more efficient way to test for *Bd*. Mice were injected with *Bd* over a period of four weeks to stimulate an immune response. The spleen was then harvested to retrieve the antibody-producing B-cells. These were fused with Sp2/O myeloma cells to produce hybridoma cells which are then screened for the production of *Bd*-specific antibodies. We will then be able to use these *Bd*-specific antibodies to construct an ELISA kit. Our research will lead to more rapid detection of the fungus in the wild, allowing researchers to begin treatment of *Bd*-infected/carrying amphibians in the least amount of time possible.

Faculty Sponsor: Drs. Douglas Smith and Andrew Keth

Coleman, K.C., Lenhart, M.E., Sonney, A.L. and Snyder, J.N. Department of Art. 2014. *Fine Arts, NCECA.*

Our goal for attending the National Council for the Education of Ceramics Arts (NCECA) was to engage with demonstrating and attending artists to increase our skill set and bring our knowledge back to our peers at Clarion University. Between the four of us we viewed numerous demonstrations involving techniques such as dry throwing, slip casting, double walled forms and glaze calculation. Through our interactions with other artists and attendees we spread the word about our fall and spring wood fire, bringing in people from Edinboro University, Slippery Rock University, Carlow University and other

professional potters from around the state. This sort of networking provides opportunities to Clarion students and gives them exposure to different ideas which they can then spread amongst their peers.

Faculty Sponsor: Professor Gary Greenberg

Cooke, J.E., Department of Economics. 2014. *Academic Growth Through International Experience*.

Through studying at the Dublin Business School in Dublin, Ireland, I learned of not only Irish culture but also the social, cultural and academic differences between the United States of America and Europe. The course work and lectures which I attended at the Dublin Business School, in addition to the life experiences I had through living with international students, traveling in Ireland and throughout Europe, gave me new insight into global economics and international relations. The courses which I attended were mainly centered about the management styles and the analysis of corporation's management structures. Travel throughout Ireland and trips to Italy and the Netherlands allowed experiences with new cultures, foreign languages, and economic structures. The differences found in not only how each country conducted business but also in the value of the money in each country despite all three countries being a part of the Eurozone gave a new perspective in comparing economic systems. The overall experience lead my academic growth and development making me a better student and global citizen.

Faculty Sponsor: Dr. Sandra Trejos

Cypher, A.D. (University of Akron). Department of Biology. 2014. *Impact of Bisphenol A (BPA), an Environmental Estrogen, on Zebra Fish Aggression*.

See Chatterji, R.

Dailey, A.E. Department of Biology. 2014. *What's in a Paw Print? Are Our Pets Potentially Pathogenic? Analysis of the Incidence of Staphylococcus aureus in Domestic Pets*.

See Zeiler, A.L.

Davidson, E. Department of History. 2014. *Challenging Gender Stereotypes: Soviet Women in World War Two*.

This paper focuses on the role that women of Soviet Russia played during World War Two. These women worked in the factories and served in the military during the war. Many Soviet women served as pilots and in other capacities during the war and their experiences paved the way for women's rights in Soviet Russia.

Faculty Sponsor: Dr. Kathleen McIntyre

DeFrancis, D.M., Fischer, A.M., and Regester, K.J. Department of Biology. 2014. *Quantifying the Prevalence of Ranavirus Infection Among Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Central and Western Pennsylvania*.

Emerging infectious diseases of ectothermic vertebrates are increasingly a management and conservation concern for wildlife biologists. Among amphibians, emerging pathogens such ranavirus and the fungus *Batrachochytrium dendrobatidis* have been implicated in a worldwide decrease in amphibian abundance and diversity. In comparison to other states, relatively few species of amphibians in Pennsylvania have been tested for these pathogens. In collaboration with researchers from the Western Pennsylvania Conservancy's Watershed Conservation Program, our goal is to quantify the prevalence of ranavirus infection among Eastern Hellbender (*Cryptobranchus a. alleganiensis*) populations inhabiting 23 streams distributed throughout central and eastern Pennsylvania. We propose to capture hellbenders by hand or dip net at each study site, excise a small tissue sample from the dorsal aspect of the tail and then preserve samples in a 2 mL vial containing 70 percent laboratory grade ethanol. In addition, we will assess sex for each individual, measure total length and mass, record malformations

and lesions based on an external examination and tag each individual with a passive integrated transponder (PIT) for future identification. Each tissue sample will be tested for ranavirus using triplicate polymerase chain reaction (PCR) assays. Using PCR test results, we will calculate prevalence and 95 percent confidence intervals for each study population and construct a map illustrating the distribution of ranavirus throughout central and western Pennsylvania. Our results will contribute to a database used to assess the long-term disease dynamics of ranavirus among hellbenders. Further, our research will provide important information needed for adaptive management plans and conservation efforts.

Faculty Sponsor: Dr. Kurt J. Regester

Deibert, A.E. Department of English. 2014. *Research Paper Revamped*.

See Deitz, D.C.

Demczak, A.G., Mohnkern, M.J., Vasquez, S.M., Blöse, E.A., and Ehrgott, M.L. Department of Management, Marketing, and Human Resources. 2014. *J.C Penney Company, Inc.: Can They Survive the Ron Johnson (CEO) Era?*

The Society for Advancement of Management (SAM) conference was held in Orlando, Fla., April 3-6, 2014, at the Rosen Plaza Hotel. We presented a 15-minute student management case competition on J.C. Penney Company. The purpose of our presentation was to conduct an in depth research analysis about J.C. Penney and provide a strategic plan to turn the company around. At the end of our presentation, we were then asked a series of questions from the judges about our plan for J.C. Penney. Unfortunately, we did not place in the top three of our division; however it was a great learning experience. We will be able to take this incredible experience and incorporate the knowledge into many of the courses we still have to take. We also will use this knowledge to win this competition at next year's conference! In addition to our team presenting in Orlando, we were able to attend workshops in our free time. As a group we attended a workshop on key points that should be on a resume and how to prepare for an interview. We also attended the SAM Board of Directors election which had an opening for two new board members. One of our Clarion SAM Members, Alex Demczak, presented a remarkable speech on why he would be a great asset to the SAM Board of Directors. Alex won the election and will now serve as a SAM member for the Board of Directors for the 2014-2015 school year.

Faculty Sponsor: Dr. Chad Smith

Demark, R.V. Department of Physics. 2014. *Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition*.

See Berrier, S.N.

DeSantis, B. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University*.

See Bedeaux, J.

DeSantis, B. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology*.

See Bedeaux, J.

Dickson, S.J., Arlet, K.E., and Haynes, M.R. Department of Psychology. 2014. *Dominican Republic Partnership*.

Joining a 20-year partnership between the New Wilmington Presbyterian Church and La Iglesia Evangélica Dominicana providing aid in medical, construction, Christian education, educational tools, dental and more, we promoted change and growth within the Dominican Republic. The efforts put forth during the team's stay did not end with our departure. The work is finished and maintained by

the Dominican community. We provided medical contributions by delivering and prescribing \$20,000 worth of pharmaceuticals that treat common ailments of the demographic area. Our medical team serviced nearly 1,000 patients and the remaining medicines are expected to last the community six to nine months after our departure. In efforts to further develop and support the Dominican education system, our team provided local teachers with books, study materials and a number of service learning projects. Education in the Dominican is viewed as a means to rise above poverty levels. While we support the development of education, our team also supports improvement at a basic level to provide better living conditions. Our opportunity to travel abroad and provide service to the people of the Dominican Republic was a cultural learning experience that allowed us to take our knowledge beyond the classroom.

Faculty Sponsor: Dr. Marite Haynes

Dietz, D.C., Deibert, A.E., and Greenman, R.M. Department of English. 2014. *Research Paper Revamped*.

The popular research paper used in high schools across the country is the tried and true method for developing students' research skills. Unfortunately, this method fails to prepare all students for the wide range of disciplines and careers they will pursue after graduation. There are, however, new innovative methods for fostering research skills. As we move into the more technological and participatory culture of the 21st century, our tried and true instructional methods must change to engage students. Innovative approaches are more efficient, engaging and relevant. At the Sigma Tau Delta International Conference, held Feb. 26 to March 2, 2014, we presented research supporting our claim that more engaging methods, including Infographics, Comics, and Multigenre Research projects, should be used in the secondary classroom settings to teach students the pragmatics of building a rhetorical argument from carefully researched data. We carefully outlined the disadvantages of the research paper and the advantages of incorporating alternative methods into the classroom. Carefully constructed student learning outcomes show the value of these alternative methods in replacing or working up to the traditional research paper. Our research ultimately concluded that, while research papers are valuable in certain contexts, alternative methods may be valuable in other instances or as a means of scaffolding learning.

Faculty Sponsor: Dr. Kevin Stemmler

Ehrgott, M.L. Department of Management, Marketing, and Human Resources. 2014. *J.C. Penney Company, Inc.: Can They Survive the Ron Johnson (CEO) Era?*

See Demczak, A.G.

Fagan, K. Department of Art. 2014. *The Street Art Outcasts: Banksy and Shepard Fairey*.

As an artist it is imperative I remain constantly connected to the art world outside of Clarion University's little corner. One movement that has been sweeping the entire world is the street art movement. Through the street art movement people can display their works for the entire world to see, not just the people who walk through stuffy museums. However, there are two specific artists of today's time who have gone against the rules and regulations of the street art culture and given in to the higher power—money. Banksy and Shepard Fairey have gone through the loops of being street artists, being a conman, gaining attention through their misdemeanors and ultimately being notorious for their insane art plastered on the walls of buildings in various cities. Both of these artists decided they wanted more, so they sold out to the corporate world we live in today. From being revered as some of the most inspirational street artists of modern time to being shunned in most, if not all street art circles, this situation is reminiscent of Keith Haring's decision to sell his works and display them in museums. It is my duty as an artist to reveal the machinations of this shirking from society and how Banksy and Shepard Fairey try to gain (or further injure) others' respect for them in the art world.

Faculty Sponsor: Dr. Vicky A. Clark

Fazio, E. Department of Biology. 2014. *Effect of Atrazine Exposure on Crayfish Chemical Cue Response*.

See Henry, B.

Felton, O. Department of Communication Science Disorders. 2014. *The Development of Growing Sounds: A Phonological Awareness Camp.*

High-impact educational practices demonstrate active, engaged, and collaborative learning practices enhance students' cumulative learning. During an undergraduate research experience, students reviewed applicable literature and integrated their findings into the development of an intensive phonological awareness camp—Growing Sounds. This poster will highlight its development and results via students' experience.

Faculty Sponsor: Dr. Mary Beth Mason-Baughman

Ferringer, B.A. Department of Business Administration. 2014. *International Business Study Abroad.*

No matter what the profession, studying abroad is an important aspect to every job seekers resume. The world is becoming more and more global as time goes on and businesses will continue to become more global. Having international experience is especially important to business majors who want to be successful. This study abroad experience that I participated in was located in London, England; Paris, France; Geneva, Switzerland; Amsterdam, The Netherlands; and Heidelberg, Germany. The experiences that I have had the opportunity to take part in would never have happened if it weren't for this study abroad experience that I participated in, as well as the funding that was provided by the International Scholars Award. I not only learned about the companies that I had visited, but I also made friends from all over the world. While I was there, I went to many international businesses and learned about their corporate structure as well as other information of businesses within Europe. I brought these skills back to the states and am applying them in my studies.

Faculty Sponsor: Dr. Chad Smith

Fischer, A.M. Department of Biology. 2014. *Quantifying the Prevalence of Ranavirus Infection Among Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Central and Western Pennsylvania.*

See DeFrancis, D.M.

Forgey, D. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Forgey, D. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Fries, E. Honors Program. 2014. *The Importance of Arts and Humanities in the Academic Performance of Traditional Students and High-Achieving Students.*

See Kopper, M.

Graham, L.M. Department of Anthropology. 2014. *Spatial Analysis of Artifacts Found at the Hopkins Farm Site (36Fo3).*

See Newhard, S.E.

Greenman, R.M. Department of English. 2014. *Research Paper Revamped.*

See Deitz, D.C.

Gruver, J.R. and Selker, K.R. Department of Biology. 2014. *Characterization of an Anti-Biofilm Compound for Use in Eye Care Materials.*

Preventing the growth of biofilms on eye care materials and contact lenses is vital for eye health. Bacterial biofilms are a layer of bacteria that have attached to a living or non-living surface. Once bacteria have adhered to a surface, they produce an exopolysaccharide matrix that serves as a protective layer inhibiting the access and effects of antibiotics and other sanitizing agents. Biofilms that have grown on eye care materials, such as contact lenses and their cases, can result in many eye infections that, if severe enough, have the potential to lead to blindness. Bacteria have easy access to contact lenses and contact cases. Improper cleaning techniques and individuals contaminating them through touch can lead to bacterial growth in the cases or on lenses. The purpose of this study is to determine if an antimicrobial compound discovered in our laboratory prevents the growth of bacterial biofilms on contact lenses and cases. In our experiments we use bacteria that commonly cause eye infections such as *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Serratia marcescens*. The organisms were assessed for their ability to form biofilms on or near the antimicrobial compound in conditions simulating contact case storage. The amount of biofilm was then qualitatively assessed using phase contrast and fluorescence microscopy. Developing an antimicrobial compound that inhibits the growth of bacterial biofilms on medical devices could lead to the prevention of many infections that occur not only in eyes, but in many medical situations.

Faculty Sponsor: Dr. Douglas Smith

Guarnieri, E. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Guarnieri, E. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Hake, B. Department of Biology. 2014. *Effect of an Experimental Manipulation of Coarse Woody Debris on Substrate Particle Size in Small Streams.*

See Odonish, M.J.

Halloran, S. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Hanes, C. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Hanes, C. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Harvey, S.C. Department of Biology. 2014. *Impact of Bisphenol A (BPA), an Environmental Estrogen, on Zebra Fish Aggression.*

See Chatterji, R.

Haynes, M.R. Department of Psychology. 2014. *Dominican Republic Partnership*.

See Dickson, S.J.

Henry, B.L. Department of Biology. 2014. *Impact of Bisphenol A (BPA), an Environmental Estrogen, on Zebra Fish Aggression*.

See Chatterji, R.

Henry, B., Berry R., Fazio E., and Timashenka P. Department of Biology. 2014. *Effect of Atrazine Exposure on Crayfish Chemical Cue Response*.

Atrazine, a triazine herbicide used to kill broadleaf weeds in agricultural and roadway applications, is one of the most widely used pesticides in the United States. A number of studies suggest that Atrazine acts as an endocrine disruptor in fish and amphibian species that come into contact with this chemical at ecologically relevant levels. In addition, studies have related Atrazine exposure to reduced olfactory sensitivity in fish. As aquatic species sense most of their information about environmental conditions through olfaction, this is particularly important for crayfish. In this study we examine the impacts of the herbicide Atrazine on the compromise between predator avoidance and foraging behaviors in the crayfish. Because Atrazine has been observed to be an endocrine and olfactory disruptor in other species, its non-lethal effects in crayfish could potentially disrupt the food web dynamics of aquatic systems. We hypothesize that exposure to ecologically relevant concentrations of Atrazine will result in irregular behavior in crayfish presented with separate chemical cues indicating the presence of either a food source or a predator. Behavioral changes in response to these chemical cues will indicate a need to further consider the non-lethal effects of Atrazine, in addition to other understudied pollutants.

Faculty Sponsor: Dr. Andrew Keth

Henry, B. Department of Biology. 2014. *Using metabolic fingerprinting to assess the impact of disinfectants on the microbial community of captive spotted salamanders (*Ambystoma maculatum*)*.

See, Stahr, M.N.

Hepfl, N.S., Bilak, J.D., Kennedy, C.D., McCauley, A.N., Regester, K.J., Messmer, M., McFate, J., Brooks, C.S., and Chapman, E.J. Department of Biology. 2014. *Disease Status of Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Four Western Pennsylvania Watersheds*.

Emerging infectious diseases have been linked to declines in amphibian abundance and diversity around the world. One of the largest contributors globally is the fungus *Batrachochytrium dendrobatidis* (*Bd*), which has been implicated in many amphibian declines, but relatively few species in Pennsylvania have been assessed for this pathogen. Between June and August 2010-2013, we collected skin swab samples from 559 Eastern Hellbenders (*Cryptobranchus a. alleganiensis*) inhabiting four Pennsylvania watersheds: French Creek (Crawford County), Tionesta Creek (Forest County), Little Mahoning Creek (Indiana County), and Tubmill-Hendricks Creek (Westmoreland County). We stored samples in 70 percent ethanol and assayed them for pathogen DNA using polymerase chain reaction analysis. Among hellbender populations, *Bd* prevalence ranged from 10-34 percent for French Creek, 7-46 percent for Little Mahoning Creek, 35-88 percent for Tubmill-Hendricks Creek, and 27-54 percent for Tionesta Creek. Our study adds to a database documenting the prevalence of *Bd* for additional amphibian species in Pennsylvania and provides baseline data for monitoring changes in *Bd* prevalence among hellbender populations. Assessing the disease status of other amphibians across a wide taxonomic and geographic range is important for identifying other species at risk in Pennsylvania.

Faculty Sponsor: Dr. Kurt J. Regester

Hetrick, N. Department of Biology. 2014. *Stream Assessments in the Clarion River Watershed: Linking Water Quality and Fish Communities.*

See Lineman, D.

Johnson, A.L. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Kennedy, C.D. Department of Biology. 2014. *Disease Status of Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Four Western Pennsylvania Watersheds.*

See Hepfl, N.S.

Keth, A. Department of Biology. 2014. *Impact of Bisphenol A (BPA), an Environmental Estrogen, on Zebra Fish Aggression.*

See Chatterji, R.

Keth, A.C. Department of Biology. 2014. *Using Metabolic Fingerprinting to Assess the Impact of Disinfectants on the Microbial Community of Captive Spotted Salamanders (*Ambystoma maculatum*).*

See, Stahr, M.N.

Kiritchenko V. Department of Physics. 2014. *Characterization of Nanostructures Utilized by Members of the Order Lepidoptera.*

See Clay, M.E.

Kiritchenko, V., Ban, J.M., and McMillen, M.E. Department of Physics. 2014. *DNA Electrospray.*

Current methods of cell transformation involve chemicals as well as using temperature to cause a cell to accept in new genetic sequence that is foreign to the cell in the form of a plasmid vector. This method causes trauma to the cell and has a high risk of cytotoxicity. Current methods also have a high probability that due to the method, the cells to lyse and die. All of these outcomes result in extensive cell recovery time or, the more likely case, cell death. To avoid the aforementioned problem, introduction of plasmid can be done through the use of a high voltage, low current electrospray on a colony of cells. Introduction of plasmid can be done through the use of electrospray on a colony of cells. By exposing cells to genetic material in solution and then subjecting the exposed cells to an electrospray apparatus the cells have a higher probability of taking in the new genetic information found on the plasmid and express the characteristics found on the plasmid. This method of cell transformation will decrease the probability of cytotoxicity and increase the number of cells that will take in the plasmid, express the encoded traits, and have a faster recovery time when exposed to this procedure.

Faculty Sponsor: Dr. John Heard

Kopper, M., and Bare, K. Honors Program. 2014. *The Political Structure of Student Organizations and Member Participation.*

This research discloses information in regards to freshmen and sophomore organization participation on campus. In particular, we examined participation in the Student Honors Association in comparison to other Clarion University student organizations. The data displays many correlations between grade level, gender, academic major, and grade point average. Sophomore participation in organizations seems to be greater than freshmen. Along with this discovery, we found that females are more involved than males and also perform better academically. The most prevalent reasons why students are not as involved in

Student Honors Association are due to being “too busy,” “not being informed,” and the organization having “inconvenient meeting times.” We found students are more involved in other campus organizations than Student Honors Associations; however, many are willing to become more involved if given more information. The data illustrates freshmen base their participation on their grade point average, whereas sophomores base their participation on prior experience with the organization. Overall, this data exemplifies that the outlook for student participation in Student Honors Association is mostly positive and may reach the same level of involvement as other student organizations.

Faculty Sponsor: Dr. Rod Raehsler

Kopper, M., and Fries, E. Honors Program. 2014. *The Importance of Arts and Humanities in the Academic Performance of Traditional Students and High-Achieving Students.*

A long-standing debate as to the importance of courses in the arts and humanities in the overall education process has grown over the past few years due to budgetary constraints in elementary and secondary school districts and among institutions of higher education. As a consequence, educational institutions typically look at cutting programs in art, music and theater as a way of meeting shrinking budgets in favor of fields exhibiting growing demand. These fields are often in either the STEM fields (science, technology, engineering and mathematics) or in business when concentrating on higher education issues. A standard response by those in support of the arts is that these types of courses offer students with a more broad-based education and, therefore, will improve their performance in other courses and their employment prospects. While this does seem like a reasonable claim, little has been done to empirically validate this conjecture. This study will endeavor to do so from two perspectives. Using survey results given to faculty members from a broad range of disciplines and business leaders in western Pennsylvania, perceptions on the importance of art, theater, and music education will be analyzed. A second perspective will use a standard regression model to determine the marginal impact of courses in the arts and humanities on overall academic performance.

Faculty Sponsor: Dr. Rod Raehsler

Koziell, E.M. Department of Anthropology. 2014. *Curation, Identification and Analysis of Material Culture from the State Road Ripple Site (36CI52).*

See Thies, L.R.

Lacey, E. Department of Biology. 2014. *Comparison of Fish Juveniles as a Function of Proximity to Mangroves between Punta Caracol and Smithsonian Reef in Bocas del Toro, Panama. Institute of Tropical Ecology and Conservation, Bocas del Toro, Panama.*

See Chatterji, R.

Lawrence, A. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Lawrence, A. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Legum, B.M. Center for Applied Research and Intellectual Property Development. 2014. *Automation of Chemical Vapor Deposition (CVD) System and Development of Diamond-Like Carbon (DLC) Coatings on Ti6Al4V.*

See Bauer, M.J.

Legum, B.M. Center for Applied Research and Intellectual Property Development. 2014. *Gingival Cell Adhesion on Diamond-Like Carbon Coatings*.

See Warner, K.E.

Lenhart, M.E., Sonney, A.L., and Snyder, J.N. Department of Art. 2014. *Fine Arts, NCECA*.

See Coleman, K.C.

Li, C. Department of Physics. 2014. *Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition*.

See Berrier, S.N.

Lineman, D., and Hetrick, N. Department of Biology. 2014. *Stream Assessments in the Clarion River Watershed: Linking Water Quality and Fish Communities*.

Water quality of headwater streams can be degraded by current or historical land use, but the effects on fish are not often quantified because the fisheries of most headwater streams have not been assessed. Here we present data from 108 streams surveyed in conjunction with Pennsylvania's Unassessed Streams Initiative. Our results show strong links among land use, water quality and fish communities. Fifty-two of the 108 streams had a summer base flow pH of < 6.0. Total fish density and fish diversity were both much lower in acidic streams compared to neutral streams. Total dissolved solids and alkalinity also varied a great deal among streams, and was linked to land use, but analysis show pH is the best predictor of fish diversity and fish density. Forty-five of the 108 streams contained populations of wild brook trout. Trout abundance also varied significantly among these streams. We are currently integrating our data into a GIS database in order to quantify the relationships among forest cover, land use and trout abundance.

Faculty Sponsor: Dr. Andrew M. Turner

Lippold, S. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles*.

See Caputo, M.

Lithuli, K. Department of Biology. 2014. *Plaque Purification of Blue Tongue Virus Serotype 17 Mutants with Delayed Cytopathology and Preliminary Steps to Investigate the Role of Nonstructural Protein 3 in BTV-Induced Apoptosis*.

See Brooker, D.M.

Logue, C. Department of Art. 2014. *Generating Community Through Street Art*.

The purpose of this project was to educate citizens about street art and to explore the positive effects it can have on a community. Street art and vandalism are terms that can easily be mistaken for synonyms, when in all reality they are very different. Street art can make a community beautiful, it can be seen in the same light as an artist painting a mural on the side of a building. By placing a piece of street art up, you attract attention to an otherwise useless wall. Recently Faller's Furniture on Main Street, Clarion, granted permission to our collaborative team to hang eight 4' by 8' painted panels "street art" on the side of their building. This social project bettered the community of Clarion, connected the university and Clarion Area High School and furthered my own education.

Faculty Sponsor: Professor Mark Franchino

Lucci, B.A. Department of Physics, Center for Applied Research and Intellectual Property Development. 2014. *Automation of Chemical Vapor Deposition (CVD) System and Development of Diamond-Like Carbon (DLC) Coatings on Ti6Al4V*.

See Bauer, M.J.

Lutkus, L. Department of Chemistry. 2014. *Testing Purity of Nanodiamonds Using Conductive Atomic Force Microscopy*.

The primary method of creating nanodiamonds is detonation synthesis, while cost effective; it does yield an impure product. Amorphous carbon and metal particles from the walls of the reaction vessel are created along with the nanodiamonds from detonation synthesis. Impurities may even be present after purification steps are taken. In this experiment the purity of the nanodiamonds is tested by using conductive atomic force microscopy (AFM) to separate the sp³ hybridized insulating nanodiamonds from the sp² conducting amorphous carbon impurities and conductive highly ordered pyrolytic graphite (HOPG) substrate. The experiment is focused on supplementing prior research on the adhesive properties of nanodiamonds in which the purity of the samples were unknown. Conductivity measurements coupled with topography scans allow for differentiation of nanodiamond particles from impurities.

Faculty Sponsors: Professors Vasudeva Aravind and Benjamin Legum

Mangan, C. Department of Education. 2014. *Education Abroad*.

The purpose of this research is to compare the schooling systems in America to Ireland. The first part of the project I contrast what the students are learning in the same grade levels. I use text books and lesson plans to validate the information given. In the second part, I record the structure of a typical day of school and the responsibilities of the classroom teachers. There are pictures available to view what I brought into the classroom. The last phase will discuss what challenges I faced as a student teacher in a new country. I hope to provide students with information about studying abroad and all the opportunities they can embark upon.

Faculty Sponsor: Dr. Peggy Apple

McCauley, A.N. Department of Biology. 2014. *Disease Status of Eastern Hellbender (Cryptobranchus a. alleganiensis) Populations in Four Western Pennsylvania Watersheds*.

See Hepfl, N.S.

McFate, J. Department of Biology. 2014. *Disease Status of Eastern Hellbender (Cryptobranchus a. alleganiensis) Populations in Four Western Pennsylvania Watersheds*.

See Hepfl, N.S.

McJunkin, S. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University*.

See Bedeaux, J.

McJunkin, S. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology*.

See Bedeaux, J.

McMillen, M.E. Department of Physics. 2014. *DNA Electrospray*.

See Kiritchenko, V.

Messmer, M. Department of Biology. 2014. *Disease Status of Eastern Hellbender (Cryptobranchus a. alleganiensis) Populations in Four Western Pennsylvania Watersheds*.

See Hepfl, N.S.

Miknis, C.M. Department of Biology. 2014. *Creation of a Batrachochytrium dendrobatidis (Bd) ELISA Kit.*

See Clay, M.E.

Mohnkern, M.J. Department of Management, Marketing, and Human Resources. 2014. *J.C Penney Company, Inc.: Can They Survive the Ron Johnson (CEO) Era?*

See Demczak, A.G.

Myers, S. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

See Caputo, M.

Nelen, B.M. Department of Computer Information Systems, Center for Applied Research and Intellectual Property Development. 2014. *Automation of Chemical Vapor Deposition (CVD) System and Development of Diamond-Like Carbon (DLC) Coatings on Ti6Al4V.*

See Bauer, M.J.

Newhard, S.E., Albert, V.E., Oglietti, G.N., and Graham, L.M. Department of Anthropology. 2014. *Spatial Analysis of Artifacts Found at the Hopkins Farm Site (36Fo3).*

The Hopkins Farm site (36Fo3) is located in Forest County north of Tionesta along the banks of the Allegheny River. Clarion University undergraduates performed excavations at Hopkins Farm from 1997-2000. Preliminary results indicate that the site has multiple occupations dating from the 1950s to as early as the Late Archaic period (ca 5000 years ago). Our project is to analyze the artifacts and data recovered from the site to determine the vertical and horizontal extent of each occupation. The analysis for this project began with cataloguing the artifacts using the Pennsylvania Historic and Museum Commission guidelines. Our next task included searching map databases to obtain the physical characteristics of the site. These maps helped us, for example, to determine elevation, soil types and distances from major water and main tributaries. We then performed spatial analysis of artifact distribution using Surfer software to create maps that depict the artifact distribution in relation to these land features. The results of this analysis helped us to determine when the site was occupied and how Native Americans used this location along the Allegheny.

Faculty Sponsor: Dr. Susan Prezzano

Nix, S.S. Department of Biology. 2014. *The Influence of Mycorrhizal Fungi on Fern Spore Germination.*

See Agosti, P.A.

Nix, S.S. Department of Biology. 2014. *Using Metabolic Fingerprinting to Assess the Impact of Disinfectants on the Microbial Community of Captive Spotted Salamanders (Ambystoma maculatum).*

See, Stahr, M.N.

Odonish, M.D. Department of Biology. 2014. *Effect of an Experimental Manipulation of Coarse Woody Debris on Substrate Particle Size in Small Streams.*

See Odonish, M.J.

Odonish, M.J., Odonish, M.D. and Hake, B. Department of Biology. 2014. *Effect of an Experimental Manipulation of Coarse Woody Debris on Substrate Particle Size in Small Streams.*

Stream substrate has a large influence on a wide array of in-stream processes including fish reproduction and invertebrate production. The substrate may be influenced by the presence of dead trees and down wood within the stream channel (coarse woody debris), but many of our streams lack coarse woody debris

due to historical logging practices. The purpose of this research was to determine whether coarse woody debris additions have an effect on substrate particle sizes. This project was conducted in the Allegheny National Forest with pre-treatment data being collected in 2012 and post-treatment data in 2013. In 2012, in collaboration with the Forest Service, trees were strategically placed into the stream channel of Windfall Run, Thundershower Run, Maple Run, Meade Run and Wagner Run. The size of the substrate was recorded in the control and experimental reaches using the Rosgen Stream Classification System. We hypothesized that with wood additions small substrate particles will be washed away, settling in the slow moving pools while leaving larger particles upstream of the logs. Pre and post treatment were compared to show the effect of coarse woody debris on the streams. It was found that the coarse woody debris had no significant effect on particle size distribution within the streams. However the opportunity for change was limited by the short time scale of the study and changes may develop overtime.

Faculty Sponsor: Dr. Andrew M. Turner

Oglietti, G.N. Department of Anthropology. 2014. *Spatial Analysis of Artifacts Found at the Hopkins Farm Site (36Fo3)*.

See Newhard, S.E.

Ogura, R., and Stefaniak, B. Department of Business Administration. 2014. *Happiness Economics Around the World*.

This study uses regression analysis to determine the link between the level of happiness and various factors across developed and developing countries. It estimates how economic as well as noneconomic factors, such as political instability, cultural fractionalization, network, and environmental sustainability, affect subjective well-being (happiness) in the large set of countries. This research tests the hypothesis that income inequality has a stronger effect on happiness rather than absolute income (as measured by per capita) does in developed countries, whereas satisfaction with basic human needs will be more essential to increase happiness in developing countries, while controlling for other important variables. Also, this research examines the effect of free trade agreements on subjective well-being. Some of the empirical evidence will reveal that different policies are needed for developed versus developing countries. Policy recommendations are provided to better incorporate the discussion of happiness in the mist of economic development efforts.

Faculty Sponsor: Dr. Sandra Trejos

Omecinski, C. Department of Education. 2014. *Going Local: Teachers and Students Getting “Hands On” with History*.

During the 2014 spring semester, the Clarion University Council for the Social Studies (CUCSS) secured the Clarion University Community Fellows Grant. With this grant they forged a professional, symbiotic relationship with the Clarion County Historical Society. Pre-service teachers frequented the Historical Society and researched the history of Clarion County. They were able to catalogue various artifacts and documents taken from the surrounding regions of the County and arrange these items into specific trunks that were allotted for five of the surrounding school districts. After the items were catalogued in a school-specific manner (each trunk containing artifacts representative of the whole of Clarion’s history, as well as specific artifacts unique to the area of the County in which a particular school district is located), these pre-service teachers drafted lesson plans to accompany each trunk; creating a brief “walk-through” of Clarion history. The lessons will constitute a brief unit that local educators could use to supplement their instruction at their own pace, as well as relate historical methods, on a personal level, to their students. These trunks will be piloted by our pre-service teachers who are currently making their way into the local school districts.

Faculty Sponsor: Dr. Jesse A. Haight

Overlock, B.A. Department of Biology. 2014. *The Influence of Mycorrhizal Fungi on Fern Spore Germination.*

See Agosti, P.A.

Parson, J. Department of Biology. 2014. *Genetic Analysis of the Impact of 2,4-Dinitrophenol on Various Mitochondrial Biochemical Pathways.*

See Pisarchick, T.

Peretic, T.J. Department of Biology. 2014. *Determination of the Minimum Inhibitory and Bactericidal Concentrations and Cytotoxicity for an Antimicrobial Compound Discovered in Human Urine.*

See Carter, E.L.

Pisarchik, T. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Pisarchick, T., and Parson, J. Department of Biology. 2014. *Genetic Analysis of the Impact of 2,4-Dinitrophenol on Various Mitochondrial Biochemical Pathways.*

The chemical compound 2,4-dinitrophenol (DNP) is an inhibitor of mitochondrial energy production in eukaryotic cells. DNP acts as an uncoupler of oxidative phosphorylation by disrupting the proton motive force essential for efficient ATP production. This results in less efficient pathways being utilized, meaning the cell must use more metabolites to achieve basal energy levels. For two years, the purpose of our project has been to elucidate the mechanism of DNP on mitochondrial energy production. We have developed a genetic screen that tests the effects of various concentrations of DNP on the growth of strains of *Saccharomyces cerevisiae*. Each yeast strain examined has one mitochondrial gene disrupted by a whole gene knockout. Yeast serves as our model organism because it's a simple eukaryotic organism which maintains many mitochondrial genes and pathways as humans. We have identified over 130 mitochondrial genes to screen. Our data is assessed qualitatively from three independent screens. Strains in which abnormal growth is observed are marked for further investigation. As a proof of concept for the knockout strains as well as the screen we are cloning the knockout gene and transforming it into the mutant. From this we expect to see the growth rate revert back to the wild type strain. Also the protein expression patterns of the strains will be observed by SDS-PAGE. The SDS-PAGE will allow us to visualize the amount of various proteins expressed in response to different concentrations of DNP. We expect that the selected strains correlate with proteins showing different expression patterns.

Faculty Sponsor: Dr. Craig Scott

Puglisi, L. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Puglisi, L. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Regester, K.J. Department of Biology. 2014. *Disease Status of Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Four Western Pennsylvania Watersheds.*

See Hepfl, N.S.

Register, K.J. Department of Biology. 2014. *Quantifying the Prevalence of Ranavirus Infection Among Eastern Hellbender (*Cryptobranchus a. alleganiensis*) Populations in Central and Western Pennsylvania.*

See DeFrancis, D.M.

Roy, S., and Ward, J. Department of Art and Department of Chemistry. 2014. *Bridging the Artistic World and Science with the Scanning Electron Microscope.*

The artistic aspect of this project uses a minimalist approach, we convey the simple can be beautiful. Materials in our work are commonly found, and inexpensive. Though the process in each piece looks simple it is very diligent and takes time to complete. We work very meticulously to perfect the simple designs created. Each piece contains a circle. The scientific objective of this research was to discover the artistic value of the natural world, as well as man-made, on the micro and nano scale, while bringing together the arts and sciences. This effort consisted of the use of Clarion's new SEM (Scanning Electron Microscope) to view various objects and identify points of aesthetically pleasing images. Modifications and adjustments were made to some of the images digitally and the best of these images were printed in museum quality, contemporary fine art standard.

Faculty Sponsors: Drs. Jeremy Boyle and Chunfei Li

Rutkowski, J. Department of Biology. 2014. *Investigation of a Novel Mechanism for Platelet-Mediated Control of Mesenchymal Stem Cell Fate.*

See Wilson, D.

Sariano, K. Department of Administrative Sciences. 2014. *Consumers' Perceptions Regarding Sustainable Certifications.*

This Honors Research Study deals with corporate sustainability. After reviewing the relevant literature, I decided to focus on the effect sustainable certification has on consumers' perceptions of companies. By conducting an online questionnaire, the goal of the study is to determine whether or not consumers want companies to advertise their sustainable certifications and if a competitive advantage is given to companies who obtain a sustainable certification. Also, this study will provide some insight on channels of advertising consumers' prefer as well as sustainability's effect on employer attractiveness.

Faculty Sponsor: Dr. Miguel Olivas-Lujan

Sasnarine, V.D. Department of Anthropology. 2014. *Curation, Identification and Analysis of Material Culture from the State Road Ripple Site (36CI52).*

See Thies, L.R.

Scott, C.M. Department of Biology. 2014. *Biochemical Analysis of a Novel UPRE via a -Galactosidase Assay.*

See Biedka, S.A.

Selker, K.R. Department of Biology. 2014. *Characterization of an Anti-Biofilm Compound for Use in Eye Care Materials.*

See Gruver, J.R.

Sheehan, P.W., Miknis, C.M., and Wilson, D.M. Department of Biology. 2014. *Creation of a *Batrachochytrium dendrobatidis* (Bd) ELISA Kit.*

See Clay, M.E.

Simpson, L. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

See Caputo, M.

Smith, D.M. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Smith, D.M. Department of Biology. 2014. *Determination of the Minimum Inhibitory and Bactericidal Concentrations and Cytotoxicity for an Antimicrobial Compound Discovered in Human Urine.*

See Carter, E.L.

Smith, D.M. Department of Biology. 2014. *Investigation of a Novel Mechanism for Platelet-Mediated Control of Mesenchymal Stem Cell Fate.*

See Wilson, D.

Smith, D.M. Department of Biology. 2014. *Plaque Purification of Blue Tongue Virus Serotype 17 Mutants with Delayed Cytopathology and Preliminary Steps to Investigate the Role of Nonstructural Protein 3 in BTV-Induced Apoptosis.*

See Brooker, D.M.

Snyder, J.N. Department of Art. 2014. *Fine Arts, NCECA.*

See Coleman, K.C.

Sonney, A.L. Department of Art. 2014. *Fine Arts, NCECA.*

See Coleman, K.C.

Speicher, J.A. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures.*

See Werner, J.J.

Spencer, J. Department of History. 2014. *John Adams and the Model Treaty of 1776.*

During the American Revolution, John Adams was the most ardent supporter of foreign alliances. American historians have focused on Adams' role as a diplomat. My research illustrates how the Model Treaty of 1776 fostered Adams' strong motivation for an alliance with France. A model to create treaties with other nations to recognize the United States could ultimately help defeat the British. I examine how Adams did not want to form military alliances other than those that would benefit both nations for trade. I argue that Adams' draft of the Model Treaty, as well as his actions, influenced diplomacy in France.

Faculty Sponsor: Dr. Kathleen McIntyre

Stahr, M.N., Henry, B., Wallen, T., Keth, A.C., and Nix, S.S. Department of Biology. 2014. *Using Metabolic Fingerprinting to Assess the Impact of Disinfectants on the Microbial Community of Captive Spotted Salamanders (*Ambystoma maculatum*).*

Over the past several decades, a significant decline in amphibian populations has been globally observed. This is in part due to chytridiomycosis, a disease caused by the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*). In captivity, disinfectants are used to prevent the spread of *Bd*, but little is known about the impact of these chemicals on the ambient epidermal microflora of

amphibians. It is important to avoid eradicating or disrupting the ambient epidermal microflora of an amphibian, as it serves as a natural defense against infections. Studies were conducted in 2012 and 2013 which investigated the epidermal microflora of the spotted salamander (*Ambystoma maculatum*) and the response of the microflora community to different disinfectants. In these studies three antimicrobial agents (Amphotericin B, F10 Biocare Disinfectant, and Voriconazole) were evaluated for their ability to affect the functional diversity of the epidermal microflora of captive spotted salamanders. Epidermal washes were collected from each salamander and inoculated into BIOLOG EcoPlates™. EcoPlates™ are 96-well test plates with 31 different carbon sources in triplicate and three control wells which after incubation produce a metabolic fingerprint for each sample that can be used to assess community-level structure and function. While results for the 2012 and 2013 trials were consistent, minor modifications in the protocol were implemented that we would like to assess. For this experiment, we intend to follow the 2012 protocol and we hypothesize that our results will be consistent with the two previous studies highlighting the accuracy of those previous studies, as well as addressing any procedural issues.

Faculty Sponsor: Dr. Shannon Nix

Stefaniak, B. Department of Business Administration. 2014. *Happiness Economics Around the World.*

See Ogura, R.

Strausser, K. Department of Biology. 2014. *Determination of the Minimum Inhibitory and Bactericidal Concentrations and Cytotoxicity for an Antimicrobial Compound Discovered in Human Urine.*

See Carter, E.L.

Stynchula, H. Department of Special Education, Rehabilitation and Human Services. 2014. *Active Member Guidelines for SCEC Groups, An Example from One University.*

See Bedeaux, J.

Stynchula, H. Department of Special Education, Rehabilitation and Human Services. 2014. *An Overview of Assistive Technology.*

See Bedeaux, J.

Talley, J.S. Department of Biology. 2014. *Determination of the Minimum Inhibitory and Bactericidal Concentrations and Cytotoxicity for an Antimicrobial Compound Discovered in Human Urine.*

See Carter, E.L.

Thies, L.R., Koziell, E.M., and Sasenarine, V.D. Department of Anthropology. 2014. *Curation, Identification and Analysis of Material Culture from the State Road Ripple Site (36Cl52).*

State Road Ripple (36Cl52) is an extremely important site located on a wide terrace of the Clarion River approximately 6 miles north of Clarion Borough. Clarion undergraduates excavated this site from 1970-1980, and performed detailed preliminary analysis of the artifacts and data retrieved. Based on a series of radiocarbon dates, the site contains multiple occupations with the earliest dating to 11,425 years ago. Although the records of excavation are extensive, the excavators produced no site report and the site data are not organized up to modern standards, especially since the site was excavated prior to the systematic use of computers. Our project focuses on reorganizing and digitizing the records by applying the Pennsylvania Historic and Museum Commission's standards on archeological collections to the data and artifacts retrieved during excavations. State Road Ripple contains a wealth of artifacts and data due to the length of excavation. We approached the project by selecting a single unit of excavation for data processing. We used the data processing as a test case for evaluating a procedure that can be applied to the entire site data in the future. We also analyzed the data from this unit to determine

characteristics of occupation. Our analysis of the unit revealed that the State Road Ripple site had an eighteenth century Native American occupation as well as habitation during several prehistoric periods.

Faculty Sponsor: Dr. Susan C. Prezzano

Thomas, J. Department of Biology. 2014. *Investigation of a Novel Mechanism for Platelet-Mediated Control of Mesenchymal Stem Cell Fate.*

See Wilson, D.

Timashenka, P. Department of Biology. 2014. *Effect of Atrazine Exposure on Crayfish Chemical Cue Response.*

See Henry, B.

Timbs, B. Department of Physics. 2014. *Methods of Filtering Stable Quasicrystalline Nanoparticles.*

See Caputo, M.

Vasquez, S.M. Department of Management, Marketing, and Human Resources. 2014. *J.C Penney Company, Inc.: Can They Survive the Ron Johnson (CEO) Era?*

See Demczak, A.G.

Vemulapalli, M. Department of Biology. 2014. *Identifying Anti-host Effector Proteins in the Opportunistic Human Pathogen, *Chromobacterium violaceum*.*

Chromobacterium violaceum is a Gram negative opportunistic human pathogen, which is often found in soil and water in tropical and subtropical climates. Although infection is rare, this organism can cause fatal diseases in humans and other mammals, including damage to the lungs and liver; the mode of entry is thought to be through cuts in the skin. It has been found that *C. violaceum* has genes which encode for a type III secretion system (T3SS), which likely functions to transport bacterial virulence factors (effector proteins) directly into host cells. Effector proteins function to subvert host-cellular functions and promote disease. T3SSs are present in a variety of well-studied Gram negative pathogens such as *Yersinia*, *Salmonella*, *Shigella* and *E. coli* where they are essential for virulence. It has yet to be experimentally determined whether the genes that encode the T3SS in *C. violaceum* are fully functional and directly involved in virulence. This project aims to establish whether four *C. violaceum* genes annotated as “hypothetical” (CV2589, CV2595, CV2595 and CV2695) represent type-III secreted effector proteins. These genes were cloned into the C-terminal FLAG-tag vector pFLAG-CTC and will be assayed for secretion in a type-III dependent manner using the *Yersinia* secretion assay. The *Yersinia* secretion assay is a well-established molecular biology technique used for identifying type-III secreted proteins using ectopic expression of the protein of interest in an attenuated strain of *Yersinia*. If our proteins are type-III secreted they will be present in the supernatant when the *Yersinia* is propagated under T3S inducing conditions.

Faculty Sponsor: Dr. Helen J. Hampikian

Wallen, T. Department of Biology. 2014. *Using Metabolic Fingerprinting to Assess the Impact of Disinfectants on the Microbial Community of Captive Spotted Salamanders (*Ambystoma maculatum*).*

See, Stahr, M.N.

Ward, J. Department of Chemistry. 2014. *Bridging the Artistic World and Science with the Scanning Electron Microscope.*

See Roy, S.

Warner, K.E.^{1,2}, **Wyatt, K.S.**^{1,2}, and **Legum, B.M.**², ¹Department of Biology and ²Center for Applied Research and Intellectual Property Development. 2014. *Gingival Cell Adhesion on Diamond-Like Carbon Coatings*.

Dental implants provide the form and function to replace a tooth that may have been lost or removed. Generally, a titanium post is inserted into the bone of the jaw. The titanium post eventually integrates with the surrounding bone tissue and provides a strong structural anchor that may last decades. Once integrated, a crown can then be fixed to the post. This integration of the titanium post occurs due to the similarity in tensile properties between bone and titanium. Although the osseo-integration of titanium occurs readily, in gingival tissue it does not. The soft tissue has little similarity to the metal and, as a result, does not integrate well with the post. Healing times are often 6-8 weeks when it should only take 3-4 weeks. Failure of gingiva to adhere to the titanium can lead to increased vulnerability to inflammation and infection. We investigated the efficacy of gingival cell adhesion to diamond-like coatings on the surface of titanium wafers. This is based on the premise that a thin carbon coating on the titanium provides a surface more conducive to adhesion by increasing cell affinity, both in the phospholipid bilayer and in cell adhesion molecules. In turn, increased efficiency in cell adhesion may decrease infection rates in dental implant procedures.

Faculty Sponsor: Professor Benjamin Legum

Werner, J.J., Johnson, A.L., Pisarchik, T., Halloran, S., Adams, K.A., Speicher, J.A., and Smith, D.M. Department of Biology. 2014. *Co-culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences the Fate of Neurons in Brain and Spinal Cord Primary Cultures*.

Hematopoietic Stem Cells (HSCs) are multipotent stem cells capable of differentiating into all types of blood cells and formed elements such as erythrocytes, leukocytes, and platelets. HSC fate is dictated by the microenvironment provided by bone marrow stromal cells which include mesenchymal stem cells (MSCs), macrophages, fibroblasts, neurons, epithelial cells, adipocytes, osteoblasts, and others. The ability to culture a patient's HSCs, bank them and then later re-culture and direct the formation of the different types of white blood cells has a wide range of personalized medical applications. While certain requirements for HSC propagation and differentiation are known, many of the factors that contribute to HSC proliferation and specialization are still largely unknown and their effect on other cell types is only now receiving attention. In this project, we seek to identify the effects that anchorage-dependent bone marrow stromal cells have on suspension cells like HSCs found in bone marrow and how the presence of both types of cells might influence the fate of cells from other tissues in culture. Growth and specialization of neurons in the brain and spinal cord rely upon frequent "pruning" by microglial cells and contact with bone-forming osteocytes that arise from macrophage precursors and MSCs respectively in the marrow. Rat mesenchymal stem cells (MSC) were isolated by dilution cloning from bone marrow cultures and added to fresh HSC preparations to identify their contribution to bone marrow, brain, or spinal cord primary cultures. We will present our results from MSC/bone marrow co-culture with neurons from brain and spinal cord.

Faculty Sponsor: Dr. Douglas Smith

Werner, J.J. Department of Biology. 2014. *Investigation of a Novel Mechanism for Platelet-Mediated Control of Mesenchymal Stem Cell Fate*.

See Wilson, D.

Wilson, D. Department of Biology. 2014. *Plaque Purification of Blue Tongue Virus Serotype 17 Mutants with Delayed Cytopathology and Preliminary Steps to Investigate the Role of Nonstructural Protein 3 in BTV-Induced Apoptosis*.

See Brooker, D.M.

Wilson, D.M., Department of Biology. 2014. *Creation of a Batrachochytrium dendrobatidis (Bd) ELISA Kit.*

See Clay, M.E.

Wilson, D., Werner, J.J., Thomas, J., Rutkowski, J., and Smith, D.M. Department of Biology. 2014. *Investigation of a Novel Mechanism for Platelet-Mediated Control of Mesenchymal Stem Cell Fate.*

Autologous adult mesenchymal stem cells (MSC) possess the ability to differentiate into a wide variety of tissue types in vitro and hold implications in personalized medicine. Previous work in our laboratory has shown that when exposed to platelet-rich plasma (PRP), MSC display increases in growth, differentiation, and gene expression. Levels of mRNA corresponding to particular genes associated with growth and differentiation in MSC were found to increase significantly after being incubated with PRP. The molecular mechanisms of how PRP induces this response are not entirely clear. We investigated using fluorescence microscopy whether platelets can be seen actively interacting with MSC in a way that suggests they may be delivering contents directly to the cytoplasm of MSC. We postulate that mRNA may be among the materials delivered by platelets to MSC in order to influence their growth and cell fate.

Faculty Sponsor: Dr. Douglas Smith

Wyatt, K.S. Department of Biology and Center for Applied Research and Intellectual Property Development. 2014. *Gingival Cell Adhesion on Diamond-Like Carbon Coatings.*

See Warner, K.E.

Zeiler, A.L., and Dailey, A.E. Department of Biology. 2014. *What's in a Paw Print? Are Our Pets Potentially Pathogenic? Analysis of the Incidence of Staphylococcus aureus in Domestic Pets.*

While there are 40 known species of *Staphylococcus*, one species, *Staphylococcus aureus*, is a frequently found resident of the human respiratory tract and part of the normal skin flora. Although it is not always pathogenic, it is the most common cause of staphylococcal infection due to high nasal carriage and its immune-evasive strategies. It has been well documented that strains of potentially pathogenic *S. aureus* can be shed into the environment by human carriers. Additionally, there is documentation of human to animal transmission. Our study aims to determine the extent to which *S. aureus* is present in domestic pets in Clarion, Pa. We are particularly interested in determining that when *S. aureus* is present, whether it is also present in the human pet owner/caregiver and/or other pets in the household, and if it is of the same genotype. After supplying volunteers with a questionnaire and instructions, select sites on both the pet/s and caregiver/s were swabbed and placed into m-Staphylococcus broth. Factors such as species, age, sex, environment and intact or sterilized were also recorded. Following incubation, mannitol salt agar plates were streaked and Gram-staining and coagulase tests were performed to determine the presence of *S. aureus*. The data we have gathered so far indicates that *S. aureus* is indeed present in domestic pets with a tropism for canines over felines. This is a brand new project to Clarion University and will set a platform for more in-depth studies relating to potentially pathogenic microorganisms that are harbored by our pets.

Faculty Sponsor: Dr. Helen J. Hampikian

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