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undergraduate and graduate RESEARCH CONFERENCE

APRIL 23, 2015
10 A.M.–2 P.M.
GEMMELL MPR

CLARION UNIVERSITY
ALBERT, V.E. and BIDDLE, H.B. Department of Social Sciences. 2015. Building Clarion University’s Archaeobotanical Comparative Collection.

When one pictures an archaeological site, plants are not what the general public typically considers archaeological data. However, archaeobotanical analysis is a vital building block in the reconstruction of the past. Samples taken from sites allow archaeologists to glimpse not only the environments in which our ancient ancestors lived, but also help identify the foods that enabled people of the past to flourish. Our goal is to begin the process of building an archaeobotanical comparative collection for Clarion University that will allow future generations of students to learn about the process of identifying macrobotanical remains. Specifically we focused on native varieties of squash and gourds by taking detailed measurements with the scanning electron microscope that assist in identifying altered and fragmented remains from the field. Our process includes charring modern day samples to reflect the condition in which most macrobotanical remains are found. During the curation of the collection, we are collaborating with local high school science students to collect the necessary data that will aid in future identification efforts. We have modeled our research focus on work published by The Museum of Natural Sciences in La Plata, Argentina, narrowing our scope to North American varieties of squash and gourds. The most exciting element of our project is that it has the potential to never be completed. As Clarion University and its Anthropology Department grow, this collection can evolve to meet the needs and suit the interests of future students.

Faculty Sponsor: Dr. Susan C. Prezzano.


Hematopoietic stem cells (HSCs) are found in the bone marrow of both rats and humans. They are multipotent, progenitor cells that give rise to any blood cell in the body including leukocytes, thrombocytes, and erythrocytes. HSC differentiation patterns are known to be highly affected by the microenvironment in which they grow. Within the bone marrow, HSCs are surrounded by a variety of stromal cells, such as mesenchymal stem cells (MSCs), osteoblasts, osteoclasts, adipocytes, macrophages, neurons, and fibroblasts. While much about HSC propagation, and differentiation is known, there is still much to be discovered about their behavior. Knowing the affects specific microenvironments have on HSC differentiation patterns would allow us to bank and re-culture a patient’s HSC for future use. Personalized medical care could use the flexibility in differentiation patterns of HSCs to culture varying blood cell lineages for patients. A method of thawing pre-cultured stromal cells and plating HSCs on top of these specific lab derived microenvironments could allow for the efficient culturing of the specific blood cell lineages for patients. The stock cultures of stromal cells would allow for months of tedious bone marrow culturing being unnecessary, as there would already be pure stock cultures of specific stromal cell lines that could be used for growing specific HSC lineages. We will present the current progress made in dilution cloning of HSC and MSC bone marrow cultures.

Faculty Sponsor: Dr. Douglas M. Smith.
ALVIANI R., ELLINGER, K., GORMLEY, M., SKRABA, A., STINER L., and TWOEY, J. Department of Visual and Performing Arts. 2015. A Publication on Aviation in Clarion County for the Airport Authority.

The Clarion County Airport Authority is developing a publication on the aviation in Clarion County featuring the history of Clarion County aviation and the Clarion County Airport. A previous Community Fellows Grant produced historical essays on the Clarion County aviation featuring Parker D. Cramer, an early pioneer in aviation, and Clarion University’s role in pilot training during the Second World War. The Airport Authority is working with Graphic Design students on a publication of a handbook on Clarion County Aviation. Students will also be used to produce photographic art for the publication. Five Clarion University art students will be involved in the project. The display of photographs, historical artifacts, and copies of the publication will be available in the Clarion County Airport for public viewing. The publication will be distributed widely in Clarion County and at the airport. The airport is open to the public and has several activities annually that draw large numbers of the non-flying public to the airport. Student learning outcomes include the development of skills in applied graphical arts on a practical basis. Students will be recruited from the graphical design and digital photography courses offered in the Visual and Performing Arts Department. Student presentations will be made to the Clarion County Airport Authority board and at the Academic Excellence Series in April 2015. Students will also interact with the printing company on the design, layout, and style of the publication. The students involved in the project will be credited in the publication.

Faculty Sponsors: Dr. Robert Balough and Professor James Rose.


The 537: Clarion Community Learning Workshop provides homework help, subject tutoring, GED and test preparation, computer literacy, writing skills, etc. We interviewed parents of children attending the Workshop in order to assess its perceived usefulness to its rural population. Parental clientele were chosen in a convenience sampling method, as they were often selected upon entering the workshop. Participants were asked six open-ended questions by an interviewer about perceived strengths and weaknesses of the Workshop. Overall, parents were consistent in their reports of why they enjoy the Workshop, as well as what they believe the Workshop could improve upon. Further, participants offered a wide variety of program suggestions that the workshop could add.

Faculty Sponsors: Dr. Leah Chambers, Dr. Rich Lane, and Dr. Jeanne Slattery.


Most species of Staphylococcus, are harmless and reside normally on the skin and mucous membranes of humans. However, one species, Staphylococcus aureus, has the potential to be pathogenic. S. aureus is the causative agent of a range of illnesses from mild skin infection, to severe diseases such as pneumonia, and toxic shock syndrome (TSS). Significantly, it has been well documented that strains of potentially pathogenic S. aureus, can be shed into the environment by human carriers. Furthermore, there are an increasing number of studies
detailing human to animal transmission that is a cause for concern. It is feasible that animals (both domestic and wild) may be able to act as vectors for the transmission and spread of \textit{S. aureus} in the environment. In order to begin investigating this possibility our study aims to determine whether S. aureus is actually present in both domestic and feral cats in Clarion, PA. We hypothesized that domestic cats would more often found to be colonized with \textit{S. aureus} due to their closer proximity to humans. We swabbed three sites on 58 domestic and feral cats. The nose, ear, and paws were swabbed using aseptic technique and placed in \textit{m}-Staphylococcus broth. Following incubation, the broths were analyzed for the presence of \textit{S. aureus} using mannitol salts agar, Gram staining, and coagulase tests. Of the 58 cats sampled for the presence of \textit{S. aureus}, there were 69 positive results for domestic cats, versus 36 for feral cats, inclusive of all three swab sites.

\textit{Faculty Sponsor: Dr. Helen Hampikian.}


See Andrews, C.E.


The Oral History Project is a unique ongoing venture to prepare Clarion University for its 150\textsuperscript{th} Anniversary in 2016-2017 by investigating primary sources and conducting interviews with influential individuals. Primary sources include archived Clarion Call newspapers, press releases, and yearbooks. The vast majority of these are digitized. Subjects of interest for interviews include a little bit of everything: past university presidents, former coaches, and alumni, as well as current Council of Trustees members, faculty, students, and staff. The President's Office offered History faculty and students the chance to conduct Clarion University research. The interviews and collected sources will be used to promote 150 years on the university’s website and throughout campus during the 2016-2017 academic year.

\textit{Faculty Sponsors: Dr. Kathleen McIntyre and Dr. Todd Pfannestiel.}

\textbf{BAILEY, N.E. MOONLEY, S.} and, \textbf{WEBER T.I.} Department of Psychology. 2015. \textit{Walk A Mile In Her Shoes.}

PASSAGES, Inc. along with the Clarion VDay Project and the students of General Studies 262: Introduction to Service Learning organized Clarion University’s second annual Walk-a-Mile-in-Her-Shoes event. This event raises awareness of sexual assault against women by having men walk a mile in red high-heeled shoes. The march benefits organizations such as Cinderella’s Closet of Kane and the free, confidential services for survivors of sexual assault provided by PASSAGES, Inc. This year’s event included extensive community outreach by hosting a shoe drive, recruiting volunteers, and asking university organizations to provide non-monetary donations. This event was made possible by a 2015 CU Community Fellows Grant.

\textit{Sponsors: Marlene Austin, Director of PASSAGES, Gina Lutz, PASSAGES Counselor, and Dr. Kathleen McIntyre.}
BAILEY, N.E. Department of Psychology. 2015. Effectiveness of a Community Learning Workshop in a Rural Area.

See, Anderson, K.R.


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 a plasmid can be done through the use of a high voltage, low current 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 is done through forming perforations in the cell membrane that allow for transmission of larger molecules across the membrane. 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.

BAN, J.M., BOND, I.P., ISSCAO, S., KIRITCHENKO, V., and PRICE, J. Department of Physics. 2015. The Examination of the Microstructures of Snail Development.

Not much is known about the structure at the nano- and micro-scales of snails. The purpose of this experiment is to use the Scanning Electron Microscope (SEM) to find the relationship between the microstructures of snails and the eggs they produce in the categories of size, age, as well as the presence of patterns. The standard optical microscope does not have a high enough resolution (1nm) to see the small structures that make up snails. In order to study these structures in depth, a Scanning Electron Microscope (SEM) is required with its resolution of 1nm. The snail egg structures are too small to be seen with the optical microscope and require the use of the SEM. For our purposes, we used two species of snail: Helisoma and Physa. Both species are easily grown in a lab environment. Initial testing revealed unusual oblong structures that seemed consistent for both species. The finding sparked many questions because both snails were of different species and should have different shell structures. A number of shells from each species were observed and continued to yield the same oblong structures. The SEM is used in conjunction with the Critical Point Dryer. The CPD will allow the research group to work with more intact biological specimen by enabling the viewing of soft body portions of the specimen. The SEM, due to its internal delicacies and high vacuum, allow us only to observe the hard body portions of the specimen.

Faculty Sponsor: Dr. Steven Harris.
**BARE, K.R.** Department of Communication Sciences and Disorders. 2015. *Patterns in Spanish Language Acquisition: A Comparative Analysis of Vowel Production in English Speaking University Students.*

The study examines patterns in Spanish language acquisition in native English speakers of various speech proficiencies at the university level. It focuses on the pronunciation of vowels in English and Spanish words and sentences. The participants in the study include a sample of seven male and eight female university students 18-25 years of age ranging in knowledge and skills with regards to the Spanish language. The participants consisted of five beginning speakers, five intermediate speakers, and six advanced speakers. Each student was asked to provide speech samples containing English and Spanish words modified and compiled from an English and Spanish version of a contextual articulation test probe. The productions were perceptually analyzed and reviewed for commonalities in production errors. The findings were compared between two students of speech language pathology to determine reliability of the results. Comparisons were made among and between the subjects to determine patterns of Spanish vowel errors. The results of this study suggest patterns consistent with the native language in the second language production errors. The number of errors is consistent with proficiency level. The findings offer considerations for reducing common errors between English and Spanish vowels.

*Faculty Sponsor: Dr. Mary Pat McCarthy.*


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 and remain competitive. With a greater degree of competition for high-achieving students, it is not surprising to see that Honors Programs, Honors Colleges, and Departmental Honors Programs at universities have witnessed similar changes. This paper and poster will endeavor to outline major curriculum changes in honors programs seen in the past decade among universities similar in geographic region. A meta-analysis will be performed looking at programs among universities in all 50 of the states in America. A discussion as to how economic and public policy conditions in each state drive curriculum issues will be discussed. Once similarities and differences are established, future challenges and opportunities for changes will discussed.

*Faculty Sponsor: Dr. Rod Raehsler.*

**BAUER, M.** Department of Chemistry, Mathematics and Physics. 2015. *Preparation and Analysis of Stable Icosahedral Quasicrystals.*

Alloys of compositions Al65Cu20Fe15 and Al59Cu37Fe3Si1 containing Icosahedral Quasicrystalline Nanoparticles (IQNPs) were sliced using a diamond saw, subjected to various annealing conditions, and analyzed using Clarion University’s Scanning Electron Microscope. The purpose of the annealing process is to increase grain size in order to yield quasicrystals.
larger than two hundred micrometers so that the reciprocal image of their atomic structures can be obtained by Electron Channeling Contrast Imaging. The conducted research is vital for efficiently altering particle size and to further understand the crystallography of these particles. In addition, the relatively large pure quasicrystals can then be subject to various processes in order to extract free-standing IQNPs, which would be a novel result.

Faculty Sponsor: Dr. Chunfei Li.


Annexins are a family of ubiquitous proteins whose function has been associated with cell signaling, membrane trafficking, anti-coagulation, signal transduction, and potent anti-inflammatory action, although the exact physiological roles remain largely unknown. One of those proteins, annexin 1, has been shown, through prior research, to aid in the removal of apoptotic cells through phagocytosis by white blood cells called macrophages. The objective of the experiment was to determine if calcium (Ca^{2+}) was required to bind annexin 1, in order to increase the activity of the macrophages, and to ascertain if the calcium bound to the receptor complex on the macrophages, or on the neutrophils. HL60 human promyelocytic cells were differentiated into macrophages and senescent neutrophils for use in the experiment. The HL60’s were placed in a twelve well plate with tetradecanoyl-4,5-phorbol acetate (TPA) to induce macrophagic differentiation. HL60s were also cultured in medium with fetal bovine serum (FBS) and 1.5% DMSO serum to induce neutrophilic differentiation, spun down on the third day and re-suspended in medium without FBS to induce senescence. Wright Geimsa staining techniques were employed, and the morphology of the cells were assessed to determine if the desired neutrophils and macrophages had been obtained. Four treatments: calcium/annexin, calcium/no annexin, no calcium/annexin, no calcium/no annexin were applied to the different groups. The cells were assessed for annexin 1 binding to the cell surface using immunofluorescent staining.

Faculty Sponsor: Dr. Douglas M. Smith.


The Black Death caused mass hysteria, animalistic behavior, and a lawless nature within people from 1346-1353. The devastation it caused brought out the very worst in those afflicted. The Black Death inspired individuals to neglect all of their responsibilities and shift their survival focus to the most sinful, excessive, and damning behavior possible. In some people, the epidemic brought forth the savage nature of humans which rebuked even what were perceived as God’s laws. Others did what they could to help out their fellow man by caring for the sick and providing comfort for those on their deathbeds. They felt compassion for and compelled to help, those sick without worrying whether they would get sick in the process. Examination of primary sources includes a letter written by Louis Sanctus, Boccaccio’s introduction to The Decameron, di Tura’s Sienese Chronicle, Heinrich of Herford’s Book of Memorable Matters, De Venette’s Chronicle, and the Córtes of Castile’s Ordinance can shed light on reactions to the Black Death in Europe in the 14th century. Without the preserved firsthand accounts of doctors, writers, and lay people, we would not have been able to personify such lecherous and saintly behaviors. Regardless of whether people aided those in need or spent their time fully enjoying
their last days alive, the Black Death had a definite impact on the economics and society of the late Middle Ages.

Faculty Sponsor: Dr. Robert M. Frakes.

BERRIER, S., and DEMARK, R. Department of Physics. 2015. Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition.

Silicon oxide nanowires have shown promise in fields such as fiber optic communications, with previous work being done to understand the conditions in which this material can be fabricated. Having a better understanding of the formation mechanism, current experiments are aimed at fabricating the nanowires by using fly ash as a source of silicon instead of silicon wafers. A source powder of ZnO, Ga2O3, and C was vaporized and then deposited onto crushed fly ash placed in alumina boats. This deposition was expected to react with the silicon present in the fly ash to produce the silicon oxide nanowires, similar to the reaction with the silicon wafers. However, analysis of the sample did not show any nanowire formation, a reduced presence of silicon in the fly ash, and an unexpected burning of the fly ash closest to the center of the furnace.

Faculty Sponsor: Dr. Chunfei Li.


Fresh water is being contaminated all across the globe by different pollutants and contaminants. Not only is there physical garbage in the water that is harming species, but also, the chemicals that leach out from some of this pollution have effects that can be seen even once the garbage is removed. The impacts of these pollutants are not immediately lethal, but over time, they alter species’ interactions and therefore change how the ecosystem functions. BPA is a man-made chemical that is used widely in the production of polycarbonates (plastics), epoxy resins, and flame retardants. It is most commonly known for its use in plastic bottles. In other studies, BPA has been found to be an endocrine-disrupter, and specifically it mimics estrogen. In this experiment, we are using male zebrafish to test the behavioral effects of BPA. We hypothesize that since BPA has the same endocrinal effects as estrogen, it will make the males less aggressive. We suggest this because aggression is a common courtship behavior among males when competing for females. We also hypothesize that social tendencies may decrease because they will compensate for the added stressor. Typically, zebrafish are very social and swim in large groups called shoals, so it is likely that with compromised health, they will try fewer times to join the shoal (or swim towards it) and may even try to leave or ignore it (swim away from the shoal).

Faculty Sponsor: Dr. Andrew Keth.


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. While this herbicide is meant for landscape use, rain and other storm events often carry the chemical from terrestrial
to aquatic systems, where it has been observed to cause several negative effects. A number of studies have related Atrazine exposure to reduced olfactory reception in fish and suggest that Atrazine acts as an endocrine disruptor in fish and amphibian species that come into contact with this chemical at ecologically relevant levels. As aquatic species sense most of their information about environmental conditions through olfaction, this is particularly important for crayfish, who only replace their olfactory cells during molting. In this study, we examine the impacts of the herbicide Atrazine on crayfish responses to food cue and pursue possible explanations for behavioral changes based on observation of olfactory structure surface morphology utilizing scanning electron microscopy. 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 chemical cues indicating the presence of a food source. Behavioral changes in response to these chemical cues may indicate a need to further consider the non-lethal effects of Atrazine, in addition to other understudied pollutants.

Faculty Sponsor: Dr. Andrew Keth.


The international business conference hosted by the Society for the Advancement of Management is an annual case competition that gives undergraduate and graduate business students the opportunity to showcase their intellectual ability to evaluate and assess a company and its problems. After analyzing the specifics of our company, 3D Systems, who were the founders of 3D printing technology, we had to take into consideration the performance of our top competitors. These include Stratasys, ExOne, and Arcam. Once the evaluation process is complete, our team came up with strategies to get the company moving forward in the right direction. Our three strategies included consolidate product line and shift company focus, concentrate on organic growth; not external growth, and emphasize “environmentally green” benefits of our products. Given the current economy and potential for future growth on an international scale, we highlighted the benefits of our number one strategy through graphical representation and analytical figures.

Faculty sponsor: Dr. Chad Smith.

BIDDLE, H.B. Department of Anthropology. 2015. Building Clarion University’s Archaeobotanical Comparative Collection.

See Albert, V.E.

BOLDT, K.R., CUNNINGHAM, A.L., MINICH, C.L., and SCOTT, C. Department of Biology and Geosciences. 2015. Examination of a Novel UPRE at a Protein Level Via a β-galactosidase Biochemical Assay.

The aggregation of aberrant proteins within the Endoplasmic Reticulum (ER) of eukaryotic cells is the cause of many diseases such as Alzheimer’s. In diseases such as this, the cell becomes overwhelmed by the accumulation of protein aggregates, leading the cell to undergo
programmed cell death. The cell has various mechanisms to clear aberrant proteins. Proteins destined for secretion are folded within the ER. However, many proteins will not fold into the proper conformation. 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, the Unfolded Protein Response (UPR) is initiated to expand the ER and increase the synthesis of cellular components necessary for expedited ERAD function. The UPR is induced through a cascade reaction which results in the translation of the transcription factor, Hac1p, which binds to a UPR-Element (UPRE) present in the promoter region of some UPR target genes. In a previous study, a novel UPRE was identified. In a different study, the putative UPRE was shown to be necessary for gene expression during times of cellular stress via examination of mRNA levels. In this project, we hope to expand on the initial findings and examine the putative UPRE in its ability to be recognized by Hac1p. A β-galactosidase biochemical assay has been used to quantify the level of UPR induction in the presence and absence of cell stress induced with established chemical agents in two yeast strains. Via this β-gal assay, the affinity of Hac1p to the classical UPRE was defined and we hope to determine the affinity of Hac1p to the novel UPRE. We are interested in providing further evidence to support the evidence that the putative UPRE is a bona-fide UPRE.

Faculty Sponsor: Dr. Craig M. Scott.

BOND, I.P. Department of Physics. 2015. *The Examination of the Microstructures of Snail Development.*

See Ban, J.M.

BOND, I.P. Department of Physics. *Plasmid Introduction through Electrospray Apparatus.*

See Ban, J.M.


See Bare, K.

BONIGER, C.A. Department of English and Modern Languages. 2015. *To Kill or Not to Kill.*

The paper/poster focuses on parallels between Shakespeare’s *Macbeth* and Celtic folklore. More specifically, it looks at the eponymous character’s motivation for killing the Scottish king. It examines the nature of Celtic kingship and whether Duncan fulfils his role as a good king, and if he does not, the possibility that Macbeth removes him in with the intention of properly caring for the kingdom.

*Faculty Sponsor: Dr. Ralph Leary.*


This roundtable discussion will focus on the various fan fiction novels that have been written based on Jane Austen’s novels. The discussion will examine not only how the fan fiction novels manipulate and change the original text, but why Austen fans are driven to write them in the first place. Among the novels participants will discuss are *Longbourn, Fitzwilliam Darcy,*
A Gentleman, Death Comes to Pemberley, Pride and Prejudice and Zombies, and others. The participants will also examine various film adaptations of Austen’s work via movies and vlogs. Since we often examine the original novels carefully, we are interested in looking at the work that they inspire in other writers as well as filmmakers.

Faculty Sponsors: Dr. Kevin Stemmler and Dr. Elizabeth MacDaniel.


See Bare, K.


Blue tongue virus (BTV) is an arthropod-borne pathogen of cattle, sheep, and wild ruminants. Upon infection, the virus immediately infects healthy mucosal cells of the airway causing cell death (also known as 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. The infected cells will burst open and the virus will spread to the surrounding cells. Cytopathic effects are observed as early as 48 hours post infection (hpi), and by 96 hpi, the cells are completely apoptotic. Cytopathic effects cause the cells that are infected to bloat up with the virus. 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 virus strains 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 M. Smith.


We hypothesized that taking notes by hand will increase recall of a complex set of information, and does so because it facilitates a more generative approach to learning (Mueller & Oppenheimer, 2014). Twenty-three participants were recruited from General Psychology classes and asked to study a packet of information about APA Style under three different conditions: taking notes by pencil, taking notes by computer, and taking no notes. A short multiple choice test was administered to assess the participants’ recall of the APA packet following a 15-minute
period of study. No significant difference among the groups was found. The group that took notes by longhand (Mn=9.67) did better on the test, however, relative to the group that took notes by computer (Mn=8.40). The group that took no notes (Mn=8.86) fell between the other groups. In an unobtrusive measure which compared the difference between key words in participants' notes taken by either pencil or computer. No significance was found. However, the means of the pencil note takers (Mn=32.6) and the computer note takers (Mn=29.6) does show a small contrast. Our results lend to a body of research that highly supports the theory that writing in longhand does indeed increase recall and more generative approaches to learning.

Faculty Sponsor: Dr. Jeanne Slattery.


Siltation is the leading cause of stream impairment in Pennsylvania. Stream siltation is often caused by sediment escaping from building construction sites due to the removal of vegetation and earthmoving activity. It is especially difficult to contain sediments when construction projects are conducted on steep slopes. Here we assess stream siltation and sediment transport associated with Clarion University’s East Main Street Project. Sediment exports from this site are of special interest because the drinking water supply for the region is drawn from an intake pipe located in the Clarion River and immediately downslope from the construction site. In order to assess the contribution of construction activity to stream sediment loads, we compared two streams, one running directly below the construction area (“campus stream”), and another similar sized stream draining an adjacent watershed that is mostly urban but lacking major construction projects (“reference stream”). We measured total suspended solids (TSS), turbidity, and total dissolved solids (TDS) of these two streams at biweekly intervals over a 6 month period. The results show that the campus stream had consistently higher TSS, turbidity, and TDS than did the reference stream. Sediment concentrations in the campus stream, draining the watershed containing the East Main Street Project, were on average 3.2-fold higher than in the reference stream, and up to 5-fold higher during rainfall or snowmelt episodes. These results illustrate the difficulties of conducting construction projects on steep slopes without impairing our water resources.

Faculty Sponsor: Dr. Andrew Turner.

BRUSH, R.C. Department of History. 2015. The Continuity of Christianity in Post-Roman Britain: An Assessment of Its Survival on the Mainland From c.450-597 CE.

The disappearance of Christianity on the post-Roman British mainland has long been the established position held by historians. When the Anglo-Saxons invaded, they brought their polytheistic religious practices with them, which dominated the island until after the proselytizing mission of Augustine of Canterbury in 597 CE. A close examination of written sources, coupled with a special emphasis of material culture and linguistic evidence, may yet yield clues that would necessitate a revision of the accepted historical consensus. This paper seeks to establish whether an emendation to that consensus, positing some surviving semblance of Christianity’s presence in early Anglo-Saxon England, is warranted.

Faculty Sponsor: Dr. Robert M. Frakes.
BUELL, C.E. and SKELTON, N.L. Department of Biology and Geosciences. 2015. *Biomass and Nutrient Standing Stocks Associated With Populations of the Eastern Red-Backed Salamander (Plethodon cinereus) on State Game Land 69, Crawford County, Pennsylvania.*

Two classic studies by Burton and Likens (1975) are widely cited in the scientific literature and textbooks as evidence of the ecosystem-level importance of salamander populations in eastern deciduous forests. However, few other studies have been conducted to compare terrestrial salamander biomass and nutrient standing stocks in similar systems. We quantified biomass (dry mass = DM, ash-free dry mass = AFDM) and nutrient standing stocks (N, Ca, P, K, S, Na, Mg, Zn) associated with Eastern Red-backed salamander (*Plethodon cinereus*) populations on State Game Land 69, Crawford County, Pennsylvania. During 2010, 2012, and 2014, we conducted salamander sampling using 50-75 randomly selected quadrats positioned along parallel transects. We developed and used species-specific allometric relationships to estimate individual salamander DM and AFDM from field measurements of snout-vent length, then used published values to convert DM to specific nutrients. Salamander biomass (mean ± 1SE) was 0.050 ± 0.009 g/m² DM and 0.042 ± 0.008 g/m² AFDM in 2010, 0.039 ± 0.008 g/m² DM and 0.033 ± 0.007 g/m² AFDM in 2012, and 0.019 ± 0.004 g/m² DM and 0.016 ± 0.004 g/m² AFDM in 2014. Our results were similar to those of Burton and Likens (1975) and indicate that salamander populations occur at relatively high biomass and nutrient standing stocks compared to published estimates for other vertebrates. These findings underscore the importance of terrestrial salamanders in temperate forest food webs and their role in ecosystem-level processes such as energy flow and nutrient cycling.

*Faculty Sponsor: Dr. Kurt Regester.*


It was an eye-opening experience to participate in a 16th century Japanese firing technique that continues to produce beautiful pottery. A raku firing differs from any other ceramics firing, because the process requires the pottery be removed from the kiln at the glazes’ maximum temperature. Our focus while at the NCECA conference was on raku firings, including the forming and glazing techniques used for better efficiency and higher quality production. Our research includes gathering methodology practices of other artists, understanding the stability of clay involved, and applying unique glazes and slips to the pottery before and after firing. Specifically, the techniques of naked raku and Baltic raku are examined. Naked raku involves the formation of a slip applied immediately before firing, creating a “cracked” detail to the pottery. Baltic raku involves the submersion of the pottery within a fermented yeast solution immediately after firing. One of the guest speakers, Steven Branfman, author of “Mastering Raku,” proved an excellent resource for information on our studies. In conclusion, while at NCECA, our group gathered as much knowledge as we could dealing with raku firings centered on glazing techniques and applications to the pottery before and after the firing process.

*Faculty Sponsor: Professor Gary Greenberg.*
BUKOSKI, B. and STRAUSBAUGH, S.E. Department of Physics. 2015. Exocomets and Variable Circumstellar Gas Absorption in the Debris Disks of Nearby A-Type Stars.

We have detected the possible presence of comets in three star systems by carefully studying the light from seven nearby, hot, A-type stars. Two of these seven stars were observed with the 74-inch telescope housed at the South African Astronomical Observatory. Three were observed using the 79-inch telescope housed at the Pic du Midi Observatory in France. Finally, additional data was acquired from the European Southern Observatory that was made available to the general public. In this manner, we were able to download and examine the light from two additional stars. Specifically, we have looked at the amount of starlight present at around 393 nanometers (the light sometimes absorbed by ionized calcium). By observing the light of three stars, we found evidence of warm, quickly-moving gas, which is most likely due to evaporating comets that are approaching their host stars. So far, comets have been detected in 13 different star systems. However there was no evidence of comets in the other 27 systems. We have begun to look at the ways in which the 13 star systems with comets differ from those that do not contain comets in order to better understand the phenomenon. In general, we have found that the 13 star systems that contain comets are slightly younger and are more likely to include chemically-peculiar stars than the 27 systems that do not contain comets. The stars’ chemical peculiarity may be confirmation of infalling comets since large numbers of infalling comets may be contaminating these stars’ atmospheres.

Faculty Sponsor: Dr. Sharon Montgomery.

CAREY, E.A. Department of Physics. 2015. Fabrication of Icosahedral Quasicrystalline Nanoparticles.

It is already known that stable quasicrystals can form in compositions of aluminum based alloys such as Al-Cu-Fe-Si. However, quasicrystalline structures on a nanoscale have not been reported. The purpose of this research is to determine if they can be fabricated on the nanoscale. It will be tested if there is a possibility for quasicrystalline nanoparticles to form on this alloy through a process of manually crushing the sample and sending the particles through a filtering process. They will then undergo a process of chemical etching to reduce the particle size even further. Afterward, the particles will be analyzed with a Tescan scanning electron microscope. If nano-icosahedral structures are found in the alloy, then quasicrystals are present on the nanoscale.

Faculty Sponsor: Dr. Chunfei Li.

CARTER, E.L., HAMPIKIAN, H.J., PALMER, C.A., PHILLIPS, P.E., SHEEHAN, P.W., and REGESTER, K.J. Department of Biology and Geosciences. 2015. Detection of Batrachochytrium dendrobatidis (Bd) and Ranavirus in Eastern Red-spotted Newts (Notophthalmus viridescens) Using DNA Purification and PCR.

Global amphibian abundance and diversity are declining due to emerging infectious pathogens. Batrachochytrium dendrobatidis (Bd) is a pathogenic fungus implicated in many population declines. This fungus is the causative agent of chytridiomycosis, a disease that impairs the osmoregulatory function of amphibian skin. Ranavirus is a viral pathogen that may impact some amphibian populations and is also a conservation concern. This virus is highly pathogenic and causes lymphocystis disease which creates wart-like growths on the skin and internal organs. This project aims to establish a molecular screening protocol at Clarion University for
the detection of *Bd* from field collected swabs and *Ranavirus* from tissue samples. Ten Eastern Red-spotted Newts (*N. viridescens*) from a campus drainage pond were sampled for *Bd* using standard swabbing techniques. Kidneys and liver were dissected from the same specimens to screen for the presence of *Ranavirus*. DNA was extracted from swabs and organs using a QiaAMP DNA extraction kit according to the manufacturer's instructions (Qiagen) and used as a template for conventional PCR. To probe for the presence of *Bd*, PCR primers specific to 5S *Bd* rRNA were used in the reaction, while for *Ranavirus*, primers were designed to amplify a highly conserved region of the gene encoding the major capsid protein. Our preliminary results indicate that our screening method is accurate and functional for the detection of both amphibian pathogens. We plan to apply our molecular screening technique to a statewide amphibian pathogen surveillance project.

_Faculty Sponsor: Dr. Helen Hampikan._


Treating patients with bacterial infections is becoming exponentially more difficult for healthcare professionals. The increasing amount of antibiotic resistant pathogens has limited the spectrum of antibiotics effective in treating human bacterial infections; new antimicrobials are always highly sought after as a result. Our laboratory is interested in finding new classes of antimicrobial agents to help combat this crisis and treat patients with infections. Through our research we have exposed an antimicrobial activity in human urine. We have successfully isolated the activity using filtration, distillation, solid-phase extraction and elution laboratory techniques. After completing separation methods the activity still remains unaltered in its ability to kill many different types of bacteria. It is our plan to have The Huck Institute of the Life Sciences at Penn State University analyze the isolated fraction with a liquid chromatography–mass spectrometry (LC-MS) in the hope of identifying the molecule/molecules possessing the activity. If necessary, the sample will also be analyzed through the Metabolomics Core Facility at the Huck Institute, using Nuclear Magnetic Resonance (NMR). Once the molecule/molecules have been identified we will proceed with testing for the minimum inhibitory and bactericidal concentrations.

_Faculty Sponsor: Dr. Douglas M. Smith._


Amphibian population across the globe are experiencing catastrophic declines. It is estimated that approximately one-third of all amphibian species are suffering population declines, and even facing extinction. Because of this alarming trend, conservation biologists have been actively seeking potential causes for these declines. Much of this attention has focus primarily upon fungal (e.g., chytrid) and viral (e.g., ranaviruses) pathogens that have been linked to amphibian disease and death. Comparatively speaking, very few studies have examined macroscopic pathogen dynamics in relation to amphibian declines. Our study addresses this knowledge gap using a species of special concern within the Commonwealth, the eastern hellbender (*Cryptobranchus alleganiensis*), as our focal model. Our objective was to preliminarily ascertain the potential occurrence of a macroscopic protozoan parasite, *Trypanosoma*, in a
hellbender population in western Pennsylvania. Hellbenders were hand caught during the summer of 2014 as part of another disease investigation. The exact location of the population will be excluded from discussion since they are a species of concern. Upon capture, a small amount of blood was collected from the caudal vein. Once back in the laboratory, blood smears were made using Giemsa stain and visualized under a light microscope. We captured n=12 hellbenders, of which only n=3 were infected with a *Trypanosoma* parasite. Our preliminary results suggest that *Trypanosoma*, while not being common, is present. We recommend continued monitoring of this pathogen (and others) in our “at risk” hellbender population.

*Faculty Sponsor: Dr. David L. Chambers.*


*Toxoplasma gondii* is a protozoan parasite that can infect a multitude of mammals, including humans, throughout its rather complex life cycle. Despite its practically worldwide occurrence, we know precious little concerning *T. gondii* intermediate host dynamics compared to its definite host (domestic felids) dynamics. This knowledge gap is potentially life threatening to humans since we consume and/or come into contact with numerous intermediate hosts of this harmful protozoan parasite. One such intermediate host, black bears (*Ursus americanus*), has extraordinarily high serological prevalence at as much as 80%. However, most states with *U. americanus* are void of serological prevalence data. The objective of this study was to assess the serological prevalence rates of *T. gondii* from free-ranging *U. americanus* from Kentucky. This study represents the first documented serological prevalence of *T. gondii* in *U. americanus* in Kentucky. Free-ranging *U. americanus* were caught during the spring and summer of 2011 in Bell and Harlan counties, Kentucky using modified Aldrich spring-activated snares. Blood was collected from n=15 females and n=20 males from the femoral artery after proper anesthetization. Once back in the laboratory, blood samples were centrifuged and sera stored for serological screening. *T. gondii* screening is being conducted using commercially available agglutination test kits. Results of our study could add supportive yet novel evidence that *U. americanus* are an incredibly risky source of *T. gondii*, thus toxoplasmosis, to humans.

*Faculty Sponsor: Dr. David L. Chambers.*

**CHERRY, M.** Department of Biology and Geosciences. 2015. *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 Broker, D.M.*

**CLARION MODEL UNITED NATIONS CLUB.** College of Business Administration. 2015. *Addressing Global Issues with Diverse Students in the National Model United Nations Conference.*

The Model United Nations is a skill-based, collegiate preparatory program in which students represent one of the 193 UN member nations to discuss international issues. On March 29 through April 2, we participated in the National Model United Nations Conference in New York. More than 5,000 delegates from all over the world gathered at the conference to find resolutions that would make the world better. We represented the Republic of Costa Rica.
Some of the global issues we discussed at the conference were “Women in Development,” “Promoting Resource Efficiency in Urban Development,” and “Advancing International Human Rights to Protect against Discrimination Based on Sexual Orientation and Gender Identity.” Our poster shows the overview of the Model United Nations, the conference we attended, the world issues that the United Nations currently discuss, and what we learned from this unique experience.

Faculty Sponsor: Dr. Sandra Trejos.

CONFER, B., and MENDEZ, D. Department of Biology and Geosciences. 2015. Spatial Analysis of the Effluent from a Brine Treatment Plant.

The oil and gas industry produces salty waste water that must be disposed of. The brine water is sent to treatment plants, and after treatment, is discharged into local waterways. These discharges have a very high content of total dissolved solids (TDS) and have the potential to create local “dead zones,” but as the pollutants mix with the river they are eventually diluted to the level that they are not harmful to aquatic life. Regulatory agencies and others have long assumed that mixing occurs rapidly and that the salt plumes are rapidly diluted to near-background concentrations. However, there has been little empirical study of the actual spatial scale at which the brine mixes. It is possible that in wide rivers with laminar flow the brine effluent may not dilute rapidly but instead create a localized plume of elevated TDS.

We studied the effluent of a brine treatment plant entering the Allegheny River at Franklin, Pennsylvania, in order to determine the spatial extent of the dilution. A conductivity meter was used in conjunction with a Trimble GPS unit to record the concentration of salts at an array of sampling points located downstream of the effluent. The inverse distance weighted (IDW) interpolation method was used in order to estimate the conductivity of areas that were not sampled. The point of discharge had a conductivity of over 100,000 µs/cm and the baseline conductivity of the Allegheny was just 145 µs/cm. Conductivity was elevated up to a kilometer downstream. These results show that salt plume did not experience rapid dilution and suggest that there may be localized effects on the aquatic ecosystem.

Faculty Sponsor: Dr. Andrew Turner.

CONFER, B., and MENDEZ, D. Department of Biology and Geosciences. 2015. Spatial Analysis of Japanese Stiltgrass.

Japanese stiltgrass, \( \textit{Microstegium vimineum} \), is an invasive species originally from Eastern Asia. Stiltgrass can take over the understories of forests and outcompetes other plants and trees for space and resources. It generally spreads through areas that are regularly disturbed, like floodplains and roadside ditches. Our objective was to map the extent of the stiltgrass invasion at Callen Run, Clear Creek State Forest, to better understand what factors actually contribute to the spread of stiltgrass. At Callen Run there are two different study areas that have been treated differently. One area is fenced to keep out deer and the other has no fence. Using GPS technology we mapped the main extent of the stiltgrass invasion at the study area. The stiltgrass invasion followed, for the most part, areas that were regularly disturbed by water,
e.g. ditches and streams, but only extended into the fenced area one time. We believe this implies that deer seem to have a large effect on the spread of stiltgrass.

Faculty Sponsor: Dr. Suzanne Boyden.


Throughout our two-week excursion through Europe, we were able to explore new countries while studying their business practices and cultures. Our preplanned itinerary provided us with many opportunities to see and learn from businesses while still giving us ample time to explore each country on our own. We learned and saw first-hand how European business practices relate to their culture and differ from American models of business. The experience counted as a three-credit class for most of us, however some students were able to make it count as a six-credit course. In order to earn the credits, we were evaluated on attendance, participation, general citizenship, as well as a final paper recounting our many excursions while overseas.

Faculty sponsor: Dr. Chad Smith.

CUNNINGHAM, A.L. Department of Biology and Geosciences. 2015. Examination of a Novel UPRE at a Protein Level Via a \(\beta\)-galactosidase Biochemical Assay.

See Boldt, K.R.


The purpose of this study was to observe the effect of grazing among deer in various treatments and with or without the presence of fern in Clear Creek State Park. These treatments included areas that were burned, thinned, or burned and thinned. The presence of a fence was also included in the observation. In each area the number of seedlings and their species, the percent fern cover, the percent seedling cover, the percent vegetation cover, and soil pH were measured. Red maple was abundant in areas where deer are present. There was a larger species richness inside the fence, than outside the fence where deer have access. There were also much less fern inside than outside. This can lead to red maple become the dominant tree species in Clear Creek State Park.

Faculty Sponsor: Dr. Suzanne Boyden.


See Connor, M.E.


We expand on the controversial court’s decision in Burwell v. Hobby Lobby Stores, 573 U.S. 22 (2014). The Greens, founders of Hobby Lobby, were successful in its attempt to prove the Health and Human Services (HHS) mandate placed a substantial burden on their religious beliefs in violation of the Religious Freedom Restoration Act (RFRA). This decision now takes
precedent for future cases on closely held for-profit corporations. The purpose of this paper is to take an in depth look at how the Supreme Court came to its decision, legal perspectives, its ramifications, and recommendations for future cases.

Faculty Sponsor: Dr. Miguel Olivas.


This is an annual competition held by the Society for the Advancement of Management. The objective is to develop a long-term strategic business plan for 3D Systems, the company that invented 3D printing technology. Our three strategies included a retail store with a wide range of products and services, a social network designed around users uploading designs to share as well as create a marketplace, and expanding their quickparts program to produce aftermarket parts. These strategies were developed after extensive analysis of the internal operations of 3D Systems as well as the external environment in which the firm operates. The overall goal being long-term market share. 3D printing is on the cusp of becoming a major industry, and these strategies are designed to grab market share from lead competitor Stratasys and their subsidiary Makerbot, as well as build the 3D Systems brand before HP enters the market in late 2016, as they will be highly disruptive.

Faculty Sponsor: Dr. Chad Smith.

DEMARK, R. Department of Physics. 2015. Synthesis of Silicon Oxide Nanowires by Chemical Vapor Deposition.

See Berrier, S.

DITTMAN, E. Effect of Deer Grazing within Various Forest Treatments. 2015. Department of Biology and Geosciences.

See Daily, A.


This presentation will discuss the presenter’s experiences reading and doing research on modern, popular novels that build from, borrow from, or retell Austen novels. They’ll address what they have concluded/learned about “the cult of Austen’s novels,” inter-textuality (the relationships and conversations between texts), and Austen when investigated through the lens of fan-fiction. Such an investigation helps students/scholars understand both Austen’s work and culture, but also our own, as a huge number of people from diverse backgrounds are deeply attached (fanatically, even) to “Jane” or “Jane Austen” but also often shift the focus or emphasis away from Austen’s realist satire and social critique to other concerns, especially romance. The presentation will focus on P.D. James’s Death Comes to Pemberley as well as Jo Baker’s Longbourn, both of which respond to Austen’s Pride and Prejudice. When originally presented at the EC/ASECS conference, all four students actively participated in the presentation and presented in a session that included papers given by three professors.

Faculty Sponsor: Dr. Melissa K. Downes.
DONLICK, M.E. Department of Biology and Geosciences. 2015. *Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils by Human Macrophages.*

*See Beary, M.*

DORRENBACHER, M.F. Department of Social Sciences (History) 2015. *Guy Fawkes and the Attempted Assassination of James I.*

The attempt of Guy Fawkes to kill King James I of England in 1605 is one of the most famous attempted assassinations in history. James I had united England and Scotland in 1603, but had a very unpopular reign. Guy Fawkes began to plot his attempt at James' assassination while serving as a member of the Spanish army. Fawkes, while fighting for Spain in a war in the present-day Netherlands, had handled heavy artillery and had become an expert in explosives. King Philip II of Spain would be thoroughly impressed with Fawkes while he was in the Spanish Army and discussed plans to invade England with him. Fawkes agreed with this idea of invading England and returned to England in 1604. Once in England, Fawkes met with his co-conspirators and began to plan the actual details of the assassination of James I. Fawkes would have approximately nine months to plan the assassination attempt and get all the supplies needed to carry out the mission. To thoroughly understand this assassination attempt, one must examine Fawkes' life and why he became upset with the reign of James I. This attempted assassination would not go as planned and would go on to become celebrated in English history as “Treason Day” or “Guy Fawkes Day.”

*Faculty Sponsor: Dr. Robert M. Frakes.*


*See Burke, C.*

DUSCH, M., FRANK, M., and PLANTE, N. Department of Psychology. 2015. *The Effects of Induced Self-Esteem on Stop-Distance.*

This study sought to determine how temporarily reducing or increasing a person’s self-esteem affects that person’s physical interactions with authority figures. Specifically, we intended to identify whether a self-esteem induction causes differences in the amount of personal space a student will allow when approaching a person of perceived authority. Participants (N=31) were solicited from General Psychology courses at Clarion University of Pennsylvania. They were randomly assigned to one of two groups: Positive Self-Esteem Induction (PSI) or Negative Self-Esteem Induction (NSI). After completing the self-esteem induction, each participant filled out a 20-item State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991), and was instructed to walk down the hall toward another experimenter, who discretely measured stop-distance using a laser distance-measurer. The participants then rated that experimenter on a series of characteristics and reported their own demographic information. No significant differences were found in stop-distance between the two groups. Further, the NSI group reported a significantly greater overall self-esteem score than the PSI group, rather than lower as predicted. Other results include correlations between certain participant behaviors and the participant ratings of the experimenter. Results indicated that as responses generated by the participants increased, they rated the authority figure as less approachable even as they approached that
figure more closely. This study raises questions about the effectiveness of these inductions as a reliable method of manipulating self-esteem.

Faculty Sponsor: Dr. Jeanne Slattery.

DUSCH, M., FRANK, M., and PLANTE, N. Department of Psychology. 2015. Enhancing Self-Esteem by Directed Thinking Tasks: Methodological Questions.

McGuire and McGuire (1996) described a method of enhancing or decreasing self-esteem by making certain aspects of self-concept more salient. They developed four tasks where the participant was asked to write a list of either desirable or undesirable characteristics that they believed they either possessed (affirmational task) or lacked (negational task). The present study investigated the applicability of these tasks as a tool for manipulating self-esteem and attempted to identify an effective neutral task. Study 1 (N=54) compared a positive self-esteem induction, a neutral self-appraisal, and neutral event recall conditions. Study 2 (N=36) eliminated the neutral event recall, removed the negational task from each group, and added clarifying language. Study 3 (N=46) retained the design of Study 1 without the neutral event recall, and added clarifying language. Study 4 (N=29) compared the positive and negative self-esteem inductions. Study 1 showed the neutral event recall method to be non-equivalent and subsequently, in Studies 2 and 3, the remaining groups were modified to attempt to account for design flaws. Ultimately, the overall State Self-Esteem Scale (Heatherton & Polivy, 1991) scores were not significantly different between any of the tested groups with exception to Study 4 in which the negative self-esteem induction group reported higher self-esteem scores than the positive self-esteem induction. Our findings are contrary to McGuire and McGuire’s; however, they might be accounted for by variations in experimental design.

Faculty Sponsor: Dr. Jeanne Slattery.

EDMONDSON, M. Department of Biology and Geosciences. 2015. Trypanosome Infection in Eastern Hellbenders (Cryptobranchus alleganiensis) in Pennsylvania.

See Chambers, D.L.


See Bessey, S.A.


See Burke, C.

ELLINGER, K. Department of Visual and Performing Arts. 2015. A Publication on Aviation in Clarion County for the Airport Authority.

See Alviani, R.

FAULKNER B.M. Department of Biology and Geosciences. 2015. Assessing Stream Siltation and Sediment Transport Associated With a Hillside Development Project.

See Brozenick, M.M.
FAULKNER, B.M. Biology and Geosciences. 2015. Impact of BPA, an Environmental Estrogen, on Zebra Fish Aggression.

See Berry, R.G.

FAULKNER, B., FAZIO, E., and HENRY, B. Department of Biology and Geosciences. 2015. An Assessment of Variability in Epidermal Microbial Communities on Spotted Salamanders (Ambystoma maculatum) During Mating Migration.

Amphibian populations are declining worldwide for reasons such as habitat loss and disease. Batrachochytrium dendrobatidis, is one of the most detrimental pathogens to amphibians worldwide. Amphibians have a unique way of defending themselves against disease; each amphibian has a wide range of microbial communities on their skin, which have a chance of being altered during mating season with the variety of individuals in the mating pools. The spotted salamander is a mole salamander that isolates itself underground for most of the year. They emerge above ground in the spring to mate in small temporary or permanent forest pools. We decided to compare the microbial communities of spotted salamanders before and after they have entered a permanent pool to mate. Spotted salamanders are common in Western Pennsylvania and have limited climbing and jumping abilities that allow them to be easily captured. A partial drift fence was constructed around a highly productive pool and salamanders will be caught going to and leaving the pool. After they have been captured, we will be accessing the epidermal microbial communities of each salamander using a metabolic fingerprinting technique, known as EcoPlating. We should be able to determine changes in the functional diversity in microbial communities that exist among and between groups of spotted salamanders. We expect that the microbial communities of those going to the pool will be different from those leaving the pool due to the contact within the pool to other amphibians.

Faculty Sponsor: Dr. Andrew Keth.

FAZIO, E. Department of Biology and Geosciences. 2015. An Assessment of Variability in Epidermal Microbial Communities on Spotted Salamanders (Ambystoma maculatum) During Mating Migration.

See Faulkner, B.


See Berry, R.G.


See Connor, M.E.

FRANCETTE, A.M. Department of Biology. 2015. Culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.

See Ali, N.

FRANK, M. Department of Psychology. 2015. The Effects of Induced Self-Esteem on Stop-Distance.

See Dusch, M.
FRANK, M. Department of Psychology. 2015. Enhancing Self-Esteem by Directed Thinking Tasks: Methodological Questions.

See Dusch, M.


See Brozenick, M.M.


Understory regeneration is an invaluable part of healthy forest system functioning, by which young trees replace aging and dying ones by joining them in the canopy. Clear Creek State Forest in Pennsylvania is a 120 year old Northern Hardwood Forest, but the last time a tree successfully grew into the canopy was in 1940. In addition to the lack of regeneration, the Callen Run Research Area within the forest contains an invasive species, Japanese Stilt Grass (*Microstegium vimineum*). The Stilt Grass is a native species of Asia, introduced to the United States and is found in the moist wetlands, on stream banks, along the road, and at any place that land was disturbed. One plant can produce 100-1,000 seeds that can be stored in the seed bank for up to 3 years before germinating. Because of these life traits, Stilt Grass has the ability to persist in the understory reducing the success of other species. The Callen Run Research Area contains plots being managed by burning, thinning, and burning/thinning in order to assess strategies for promoting forest regeneration. Our study assessed both factors affecting the presence of Stilt Grass and the effects that presence or absence of this invasive species has on forest regeneration treatments. We hypothesized that certain environmental factors would be predictive of the presence of Stilt Grass and its presence would negatively affect understory regeneration.

*Faculty Sponsor: Dr. Suzanne Boyden.*

GEER, R.J. Department of Biology and Geosciences. 2015. Assessing Stream Siltation and Sediment Transport Associated With a Hillside Development Project.

See Brozenick, M.M.


Atmospheric chemistry involves the study of volatile organic compounds (VOCs) that are emitted from anthropogenic and biogenic sources at an estimated rate of 1.2 Pg of carbon/year. Once in the atmosphere, the VOCs can react and produce compounds such as ozone, NOx, and aerosols, all of which can impact air quality. Analysis of these VOCs and their products is important and requires specialized instrumentation that can measure them in the gas phase. One instrument commonly used in the analysis is a gas chromatograph (GC). A GC can separate a complex sample with multiple compounds (typical of the atmosphere). To be separated, the sample has to be in the gas phase, either through vaporization of a liquid sample in the injector of the instrument or through direct gas phase injection. Direct gas phase injection is ideal.
because it decreases loss of sample due to sample preparation or transport. Originally, the department’s GC was configured for liquid samples and did not allow for gas phase samples to be analyzed. So the objective of this research was to convert a liquid injection system to a direct gas phase injection system and characterize the instrument.

Faculty Sponsor: Dr. Amanda Lockwood.

**GORMLEY, M.** Department of Visual and Performing Arts. 2015. *A Publication on Aviation in Clarion County for the Airport Authority.*

See Alviani, R.


Fungi are absorptive heterotrophs that enzymatically digest food externally before absorbing the nutrients into their mycelium. Consequently, fungi take in substances from the environment that were not intended and potentially harmful. To compensate, many have the ability to expel accumulated toxins from the below ground mycelium into the mushrooms produced above ground. In northwestern PA, a legacy of past coal mining activities are habitats contaminated by Acid Mine Drainage (AMD). AMD occurs when mineral rich sedimentary rocks are exposed to oxygen and water from the atmosphere. Under these conditions, the minerals dissolve to form sulfuric acid which alters the ecology of the habitat by lowering the pH and raising the concentration of metallic ions in the soil. To determine if fungal community structure and or composition is affected by AMD, we collected and identified mushrooms from three sites with varying AMD histories. We predicted that we would observe differences in fungal species richness, diversity and composition between these sites. Specimens were collected over a two-week period from an undisturbed forested site with no history of mining, an unreclaimed strip mine, and a reclaimed strip mine site. We found that the reclaimed site had the greatest diversity while the other two sites had equally lower diversities. The unreclaimed and undisturbed sites had similar levels of species richness, but were dominated by a single species. In contrast, the reclaimed site had lower species richness, but the abundance of individual species was much more even. Overall, the undisturbed and reclaimed sites were most similar in species composition. While our results suggest differences in fungal community structure and composition, further studies will need to be conducted to determine whether these are indeed the result of AMD.

Faculty Sponsor: Dr. Shannon Nix.

**HAMPKIAN, H.J., JAMES, S.R., SHEEHAN, P.W., and ZOCCOLA, K.M.** Department of Biology and Geosciences. 2015. *Detailed Analysis of Protein-Protein Interactions within the Type-III Secretion System of the Deadly Human Pathogen, Chromobacterium violaceum.*

Most virulent bacteria are equipped with proteins capable of causing destruction of host cells and facilitating, for example, proteolysis, hemolysis, cytotoxicity, and phosphorylation/ dephosphorlatyion reactions. In order for bacteria to infect a host, the pathogens must be able to transport and translocate virulence factors from the bacterial cytosol to the host cell.
cytoplasm. The evolution of bacterial secretion systems have allowed for this type of movement.
Out of the six known pathways, we have chosen the type-III secretion system (T3SS) as our
main topic of inquiry. T3SS are found only in Gram negative bacteria and resemble a molecular
syringe. This syringe-like configuration consists of approximately 25 proteins housed in the cell
envelope. Collectively they form a hollow conduit spanning the inner membrane, periplasmic
space, and outer membrane. Distal to this basal apparatus is an extracellular needle-like
structure which facilitates interaction with the host cell plasma membrane, and allows for the
translocation of anti-host effector proteins directly into the eukaryotic cell. Recently a new
emerging opportunistic pathogen of humans with a high mortality rate, Chromobacterium
violaceum, has been shown to harbor genes encoding two T3SSs. Further bioinformatics
analysis of these gene clusters reannotated them as Chromobacterium pathogencity islands 1
and 2 (Cpi-1 and Cpi-2 respectively). While some research pertaining to Cpi-1 has been
accomplished, very little is known about Cpi-2. This project aims to begin delineating the
structure and function of Cpi-2 by investigating 11 putative inner membrane and needle
apparatus components of the Cpi-2 T3SS system.

Faculty Sponsor: Dr. Helen Hampikian.

HAMPIKIAN, H.J. Department of Biology and Geosciences. 2015. Detection of Batrachochytrium
dendrobatidis (Bd) and Ranavirus in Eastern Red-spotted Newts (Notophthalmus viridescens) Using
DNA Purification and PCR.

See Carter, E.L.

HAMPIKIAN, H.J. Department of Biology and Geosciences. 2015. Pathogenic Pets, A Study of the
Prevalence of Staphylococcus aureus in Domestic Versus Feral Cats in Clarion Pennsylvania.

See Andrews, C.E.

HARANCHER, M.R. Department of Biology. 2015. Culturing of Mesenchymal Stem Cells and Fresh
Bone Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.

See Ali, N.

HATCH, M.M. Department of Biology. 2015. Culturing of Mesenchymal Stem Cells and Fresh Bone
Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.

See Ali, N.


My paper focuses on the response of Japanese-Americans to internment camps during World
War II. Internees offered wide-ranging responses to President Roosevelt’s Order #9066,
including outrage, acceptance, and cooperation. Utilizing a diverse source base of personal
narratives, oral histories, legal cases, and government sources, I argue that a gendered analysis
offers an important lens into resistance strategies implemented by internees.

Faculty Sponsor: Dr. Kathleen McIntyre.

Spending a semester abroad can help you discover a lot about yourself and the world. This past fall, I spent four months in the French Riviera. While in France, I lived with a host mother and another American roommate. Living with a host mother was a learning experience for me because I did not know French and she did not know English. While it was hard to communicate with her, we both worked hard and eventually found a way to have conversations. While I was abroad, I attended a business school that taught classes in both English and French. This made the classes more difficult because the professors did not always answer questions in English. There were many instances that I found myself lost, both in location and conversation. I used these instances to embrace the idea of flexibility and just kept on walking or listening until I ended up knowing either where I was or what was going on. I also had the chance to travel around Europe. During my travels, I was able to explore nine different countries and the cultures associated with these countries. Each of these countries had something different to offer me and taught me more about myself and the world. Overall, my time in France was an amazing learning experience and I would recommend studying abroad to anyone.

*Faculty Sponsor: Dr. Tony Johns.*

HENRY, B. Department of Biology and Geosciences. 2015. *An Assessment of Variability in Epidermal Microbial Communities on Spotted Salamanders (Ambystoma maculatum) During Mating Migration.*

See Faulkner, B.

HENRY, B.L. Department of Biology and Geosciences. 2015. *Effect of Chemical Stressors on Crayfish Food Cue Response.*

See Berry, R.G.

HENRY, B.L. Department of Biology and Geosciences. 2015. *An Assessment of Japanese Stilt Grass Presence and Impacts on Understory Regeneration in Clear Creek State Forest.*

See Geer, L.A.


Atrazine, a chemical that doubles as both an herbicide and pesticide, is often found in aquatic ecosystems and sources of drinking water at levels higher than the EPA’s Maximum Contaminant Level Goals of 3ppb. In addition to affecting aquatic ecosystem dynamics, studies have shown that chemical pollutants like atrazine can effect individual aquatic organisms on a cellular level. Of particular concern are chemosensory (olfactory) cells, which are the gateway through which all stimuli must travel in order to reach higher neuronal processing and, consequentially, cause behavioral reactions. This is particularly important for aquatic organisms such as crayfish that use olfaction to locate food, sense predators, and engage in social interactions. Should this pathway be disrupted by damage to olfactory cells from chemical pollutants, these processes could be inhibited as well, altering behavior and effectively limiting an organism's ability to survive. Although few studies have assessed the effects of chemical pollutants on the behavior or sensory structures of crayfish, prior undergraduate research
conducted at Clarion University has demonstrated the possibility that atrazine exposure affects crayfish responses to predator and food cues. As a possible explanation for this change in behavior, we will examine crayfish chemosensory cell structures with a scanning electron microscope (SEM) after exposure to either 3ppb or 25ppb solutions of atrazine for one or six days. Specimens will be assessed for structural changes, such as variations in the size or number of sensory hairs and cells. We hypothesize that prolonged exposure to higher concentrations of atrazine will cause notable changes to chemosensory cells and structures.

Faculty Sponsor: Dr. Shannon Nix.


North America contains the highest diversity of freshwater mussels in the world, with most of the species diversity centered in the Ohio River watershed. Recent studies show that approximately 70% of North America’s mussel species are threatened, endangered, or extinct. The dramatic decline in mussel diversity can be linked to water quality impairment such as sedimentation, impoundments, and contaminants from industrial activity, resource extraction and agriculture. In the past, water quality of the Clarion River was very degraded, but has now recovered. However, the status of mussels in the river is not completely known. There has been some survey activity on the upper Clarion River, but the lower river below Piney Dam has not been surveyed. In the fall of 2014 we conducted a mussel survey in the lower Clarion River, from below Piney dam in Clarion, PA, to the confluence into the Allegheny River near Foxburg, PA. The Allegheny at Foxburg is home to approximately 14 different species of mussels including two federally endangered species. Surveys were conducted from kayaks and on foot in the survey sections, looking for live mussels as well as shells of mussels. Both banks of the river were surveyed for muskrat middens that would also indicate the presence or absence of mussels in the river. No mussels or mussel shells were found in the river or on the banks, suggesting an absence from surveyed area. This could be due to many factors including temperature fluctuation of daily flows, absence of host fish species, toxicity of pollutants, and/or siltation. We are currently testing these hypotheses for the absence of mussels in the lower Clarion River.

Faculty Sponsor: Dr. Andrew Turner.


Universal Healthcare is a contemporary issue that has gained substantial attention globally over the past decade. The implementation of welfare benefits, in the form of universal health care and other forms in developed (OECD) countries over the past 15 years has caused the question of economic impact to surface. This research will discuss the impact of government funded universal healthcare benefits as well as other welfare benefits on economic labor productivity in OECD countries. Our preliminary results lend support to a statistically significant positive effect of health care expenditure on workers’ productivity. In particular, we find both the public and private health care financing method to exert near identical positive effects on labor productivity.

Faculty Sponsor: Dr. Inoussa Boubacar.
HORNER, Z., OWENS, J., SMITH, M., and ZOLA, C. Department of Finance. 2015. **FAStech Cup.**

In February 2015, a team of Clarion University Finance majors competed in the 2015 FAStech Cup in Dallas, TX. They participated in both a jeopardy style competition and a rigorous case study competition. In developing the case study, they created their own fictitious financial advisory firm, Golden Eagle Financial, a comprehensive financial plan using MoneyGuidePro software, a Skype presentation of the plan to clients, and answered questions in person with the clients at the conference. The team took first-place in the case study portion of the competition and returned to Clarion winning the 2015 FAStech Cup Trophy that will be housed here for the next year. They topped several other universities in this competition including Texas Tech, Texas A&M, William Patterson, Utah Valley, and St. Joe’s University.

*Faculty sponsor: Dr. Jeffrey D. Eicher.*

HORRELL, B.S. Department of Psychology. 2015. **Recall of Information Under Different Learning Conditions.**

*See Brown, M.S.*

ISSCAO, S. Department of Physics. 2015. **The Examination of the Microstructures of Snail Development.**

*See Ban, J.M.*

JAMES, S.R. Department of Biology and Geosciences. 2015. **Detailed Analysis of Protein-Protein Interactions within the Type-III Secretion System of the Deadly Human Pathogen, Chromobacterium violaceum.**

*See Hampikian, H.J.*

JOHNSON, E.E. International Program. 2015. **International Scholars Award: Veritas University, San Jose, Coast Rica.**

Clarion University of Pennsylvania, through an international scholar’s award provided me with the opportunity to study at Veritas University in San Jose, Costa Rica, for five weeks in the summer of 2015. The agroecology and Spanish courses revealed to me where my education can take me in pursuing work in the international agriculture field. I provide a presentation of the experiences I had in Costa Rica and how these experiences helped me pursue my professional goals.

*Sponsor: Lynn Hepfl, Clarion International Program.*

KEALEY, M.N. Department of Education: Social Studies. 2015. **The Cause and Course of the Black Death.**

The Black Death (1348-1350) left a substantial mark on history. As a pandemic it wiped out a huge portion of Europe’s population, and scholars wrestle with how exactly it did that. To understand just how epic the Black Death is, one must examine the historical background of the Black Death: what was life like in Europe before it, where did it come from, how did it make its way through Europe? Equally as important as the background of the Black Death would be the analysis of the impact of the Black Death: what was life like after the Black Death, and what exactly was the Black Death? Moving forward from those questions helps one understand the
significance of the Black Death as an historic event. The Black Death lasted roughly two years, and in that time, it made its way from Italy almost all the way to Scandinavia. It had no mercy, and took ill anyone it could. No matter the precautions people took, they could not avoid it. Entire families were lost, both God and sins were blamed, and people did not understand what was happening around them. Examination of primary sources and scholarly theories regarding the Black Death can help us analyze how views of this important development have changed over time.

**Faculty Sponsor: Dr. Robert M. Frakes.**

**KERR, R.** Department of Biology and Geosciences. 2015. *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 Broker, D.M.

**KETH, A., NIX, S.S., STAHR, M.N., and WILSON, E.S.** Department of Biology and Geosciences. 2015. *Assessing the Effects of Batrachochoytrium dendrobatidis and Disinfectants on the Microbial Communities of Spotted Salamanders.*

Amphibians are important to their ecosystem because of their assistance in energy transfer from aquatic and terrestrial systems. One of the largest factors contributing to the decline of amphibian populations is the fungal pathogen *Batrachochoytrium dendrobatidis* (*Bd*). *Bd* is found commonly in a number of freshwater aquatic ecosystems, travelling through direct contact with infected waters. Once an amphibian has contracted the pathogen, it immediately embeds itself into its skin, resulting in a dermatomycosis. Due to the effects that this pathogen has shown in wild populations of amphibians, it is necessary to use a disinfectant that would treat both the animals themselves and their surrounding habitat. Microbial communities protect amphibians from many diseases—a benefit that could be lost if disinfectants were to disrupt them. A range of disinfectants will be tested in the presence and absence of *Bd*. The impact of the disinfectants on microflora will be demonstrated using BIOLOG Ecoplates, which measure carbon utilization of microbial communities and produce metabolic fingerprints. Previous undergraduate research at Clarion University concentrated on disinfectants in absence of *Bd*. Our study examines the effects of the disinfectants when *Bd* is present within microflora. I hypothesize that the metabolic fingerprint of the microbial community will change when inoculated with *Bd* and thus, alter the cultures treated with disinfectant.

**Faculty Sponsor: Dr. Andrew Keth.**

**KETH, A.C.** Department of Biology and Geological Sciences. 2015. *Effects of Atrazine on Rusty Crayfish (Orconectes rusticus) Chemosensory Cell Structure.*

See Henry, B.

**KILWEIN, M.** Department of Biology and Geosciences. 2015. *The Effect of an Unidentified Antimicrobial Activity Isolated from Human Urine on Human Promyelocytic Leukemia Cells.*

See Carter, E.
KILWEIN, M.D. Department of Biology and Geosciences. 2015. *Isolation and Identification of an Unknown Antimicrobial Activity Found in Human Urine.*

See Carter, E.L.

KIRITCHENKO, V. Department of Physics. 2015. *The Examination of the Microstructures of Snail Development.*

See Ban, J.M.

KIRITCHENKO, V. Department of Physics. *Plasmid Introduction through Electrospray Apparatus.*

See Ban, J.M.

KNAUER, A.J. Department of Biology and Geosciences. 2015. *Isolation and Identification of an Unknown Antimicrobial Activity Found in Human Urine.*

See Carter, E.L.


See Bare, K.

KOPPER, M. and STAUB, K. Department of Communication Sciences and Disorders. 2015. *An Examination of Socio-Communicative Aspects of Aphasia Therapy.*

This project examined the attitudes and opinions of practicing speech-language pathologists (SLP) toward socio-communicative aspects of therapy sessions when treating individuals with aphasia. A researcher-designed survey, based on the work of Brown, Worrall, Davidson, and Howe (2012) pertaining to therapeutic outcomes (e.g. participation, meaningful relationships, communication, positivity), was distributed to SLPs nation-wide using an American Speech-Language-Hearing Association list-serve. Data analysis provided information on therapeutic targets, methodologies, and considerations that were considered most important for achieving satisfactory socio-communicative client outcomes. These results may potentially shed light on those factors important for the delivery of more “realistic” programs of intervention aimed at increasing the post-intervention quality of life for those with aphasia.

*Faculty Sponsor: Professor Kenneth Staub, M.S., CCC-SLP.*


See Henry, B.


In Pennsylvania, forest ecosystems surround us. These areas are a wealth of nature, providing us with several services that are irreplaceable. However, the forests are suffering from the over herbivory of deer, who are selective browsers capable of picking and choosing their food
Young tree seedlings are eaten constantly, while deer avoided species, particularly the hayscented fern or Dennstaedtia punctilobula, remain to flourish and can even act as native invasive species. As the hayscented fern has been shown to be allelopathic towards other fern species, the question remains as to whether the fern is allelopathic towards tree species. Allelopathy occurs in three ways: exuding chemicals through the roots, exuding chemicals through decaying leaf litter, and exuding chemical vapors during photosynthesis. First, this study will determine whether the hayscented fern uses allelopathy to suppress its competitors, focusing on the root and leaf litter exudation. Second, this study will determine if the fern is simply preventing seed germination or actually inhibiting growth of established plants. To test this, seeds and seedlings of four different tree species were divided into groups, and each group given a treatment to replicate the different forms of allelopathy. Seed germination and seedling growth will continue to be measured over a maximum of 3 months to determine if any negative effects due to fern. It is my hypothesis that the fern will concentrate its allelopathic abilities in one form of exudation, reducing the survivorship of competing tree species through lowered growth and germination rates.

Faculty Sponsor: Dr. Suzanne Boyden.

LANINGA K. Department of Biology and Geosciences. 2015. *Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils by Human Macrophages.*

See Beary, M.


Nanodiamonds have many potential applications in many fields; especially in electronics and wear resistance. One use for nanodiamonds is in alloys, where nanodiamonds can be used as additives to materials such as copper to control behaviors such as thermal diffusivity, wear resistance, and electrical conductivity. In this study, we model the thermal diffusivity behavior of nanodiamonds and macro-scale copper that have been compacted into a solid alloy using pressure without melting it to the point of liquefaction. We look at the effect of size magnitude, concentration, and heat transfer between copper and diamond. Assessing the model from the atomic level, the copper atoms will transfer heat differently whenever they are integrated with the interstitial nanodiamonds. As a result, the alloys themselves may transfer heat at a different rate than a typical copper alloy. Because of this, it is useful to use model the physical behaviors as to compare theoretical values to experimental values.

Faculty Sponsor: Professor Benjamin Legum.


Diamonds are a very common material made of carbon used in industry due to their abrasiveness. However, nanoscale diamond particles have been demonstrated to exhibit lubricating properties that make them useful in several applications like lubricant additives, dental implants, and tissue scaffolds. In order to optimize their application, nanoscale diamond particles are required to exist as single particles. However, due to the high surface to volume ratio at such
tiny length scales, these particles tend to aggregate to form agglomerates. In this work, using frequency resolved scanning probe microscopy, we investigate the interparticle forces that cause agglomeration. Using high resolution images, we show quantitatively that agglomerates of nanodiamond reduces lubrication by increasing adhesive forces.

Faculty Sponsor: Dr. Vasudeva Rao Aravind.

LITHULI, K. Department of Biology and Geosciences. 2015. 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 Broker, D.M.


See Gibson, D.


This paper revisits the determinants of CO2 emissions with a particular focus on five emerging countries based on data spanning 1970–2010. More specifically, the paper shows how population growth, real per capita GDP, real per capita GDP square, openness, industrial production, and agricultural production contribute to the observed increased in CO2 emissions. The topic is of particular interest because most empirical evidence points to the fact that human activity, through CO2 emissions, is the major contributor to climate change. To test the hypothesis, a two-ways fixed effects approach is estimated on data pertaining to Brazil, China, India, Indonesia and Mexico. The estimated results support the existence of the well-documented inverse U-shape between CO2 emissions and income. Nevertheless, the analysis yields unexpected results of population growth and both industrial and agricultural productions.

Faculty Sponsor: Dr. Sandra Trejos.

LUTZ, M.A. Biology and Geosciences. 2015. Impact of BPA, an Environmental Estrogen, on Zebra Fish Aggression.

See Berry, R.G.

MCMILLEN, M.E. Department of Physics. Plasmid Introduction Through Electrospray Apparatus.

See Ban, J.M.


See Bessey, S.A.

See Holman, Jr., T.

**MENDEZ, D.** Department of Biology and Geosciences. 2015. *Spatial Analysis of the Effluent from a Brine Treatment Plant.*

See Confer, B.

**MENDEZ, D.** Department of Biology and Geosciences. 2015. *Spatial Analysis of Japanese Stiltgrass.*

See Conner, B.

**MEYER, K.** Department of Biology and Geosciences. 2015. *Toxoplasma Gondii Seroprevalance in Free-Ranging Black Bears (Ursus Americanus) of Kentucky.*

See Chambers, D.L.

**MIDDAUGH, L.D.** Department of Social Sciences. 2015. *Oral History Project of Clarion University.*

See Arellano, M.L.


My paper examines Keith Thomas’s 1971 book *Religion and the Decline of Magic.* I analyze how he shows the means by which magic had become closely intertwined within the everyday life of the English people but then fell out of their lives. Thomas stated that academic and intelligent changes may have led to the decline of magic because with the rise of the industrialism was able to come about because people no longer relied on magic to explain the world that was happening around them. When people were able to explain nature with the use of natural and social sciences they were better able to understand the way the world actually worked without adding supernatural aspects. These advancements made it so that astronomy no longer seemed like sorcery but had an actual foot-hold in the sciences. The other forms of magic, like witches, charms, and fairies, began to lose creditability in society. Since the English people could not prove, with fact, that witchcraft was possible, they wrote it off as false and added it into English children’s stories and fairy-tales. To this day *Religion and the Decline of Magic* is still one of the forefront works on religion and magic.

*Faculty Sponsor: Dr. Robert M. Frakes.*

**MIKNIS, C.** Department of Biology and Geosciences. 2015. *The Effect of an Unidentified Antimicrobial Activity Isolated from Human Urine on Human Promyelocytic Leukemia Cells.*

See Carter, E.

**MINICH, C.L.** Department of Biology and Geosciences. 2015. *Examination of a Novel UPRE at a Protein Level Via a β-galactosidase Biochemical Assay.*

See Boldt, K.R.

See Andrews, C.E.


See Connor, M.E.

MOONLEY, S. Department of Psychology. 2015. *Effectiveness of a Community Learning Workshop in a Rural Area.*

See, Anderson, K.R.

MOONLEY, S. Department of Psychology. 2015. *Questioning Mother: Examination of Feminist’s Perspectives of Abortion.*

Feminists for Life (FFL) began breaking ground amid the Roe vs. Wade controversy in 1972 as proponents of the anti-abortion movement, promoting their campaigns utilizing historical feminist figures including Susan B. Anthony and Elizabeth Caddy Stanton. However, the faces of FFL literature potentially misappropriate the founding feminist values. This paper clarifies the impact of the suffragist movement through examining the history of abortion alongside aspects of contraception with the intention to find their relation to the foremost opposing feminist perspectives. Although many researchers look into the suffragist movement in response to feminists values, this paper particularly addresses the uncommon issue of how historical feminist values concerning reproductive freedom impacted the early 20th-century feminist perspectives concerning abortion.

*Faculty Sponsor: Dr. Kathleen McIntyre.*

MOONLEY, S. Department of Psychology. 2015. *Walk A Mile In Her Shoes.*

See Bailey, N.E.


See Andrews, C.E.


See, Boniger, C.A.


See DiVito, K.N.


This paper addresses the organization of unions in the West Virginia coalmines from the 1920s to the 1940s. My research includes an analysis of union documents from the Industrial Labor
Council, United Mine Workers, and the Congress of Industrial Organization. I also analyze newspaper articles from the period and contemporary scholarly journal articles. My paper illuminates the difficulty of various unions’ attempts to form in the coal-mining region of West Virginia, a region replete with company violence against union members.

Faculty Sponsor: Dr. Kathleen McIntyre.


See Bessey, S.A.


See Andrews, C.E.

NIELSEN, B.M. Department of Biology. 2015. Culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.

See Ali, N.

NIX, S.S. Department of Biology and Geosciences. 2015. Assessing the Effects of Batrachoctyrium dendrobatidis and Disinfectants on the Microbial Communities of Spotted Salamanders.

See Keth, A.


See Henry, B.


See Hall, R.M.

OGLIETTI, G.N., SASENARINE, V.D., and THIES, L.R. Department of Social Sciences. 2015. Stratigraphic Analysis of Native American Occupations at the State Road Ripple Site (36Cl52).

State Road Ripple (36Cl52) is an archaeological site located near the Clarion River that was excavated over ten years. Undergraduates enrolled in a field school uncovered evidence of occupations spanning from the Paleoindian period (14,000-10,000 BP) through the late nineteenth century based on radiocarbon dates and diagnostic artifacts. Our project focused on determining the nature of occupation within the higher strata (Stratum I and Stratum II) in a selected excavation unit by examining the distribution of diagnostic artifacts, such as pottery, projectile points, and refuse from stone tool making. The high yields of flakes created during the stone tool making process, the presence of fire-cracked rock, and fire pits indicated that this area was more than just a temporary location used by Native Americans. By focusing on the artifacts found in each stratum we were able to determine the age of these strata. Stratum
I was occupied from the Woodland Period through the Historic period. This is evident because there are glass trade beads present as well as Late Woodland (AD 800-1,550) projectile points. However, Stratum II is characteristic of a Late Archaic (6,000 BC-2,000 BC) occupation based on radiocarbon dating of a hearth and the presence of a Brewerton projectile point. During analysis, we brought part of the collection up to modern curation standards by creating a digital catalogue, digitizing the field records and their associated maps, reorganizing the artifacts by provenience, and drafting plan views and stratigraphic profiles. This process allowed us to determine the relationship among artifacts, strata, features, and radiocarbon dates.

*Faculty Sponsor: Dr. Susan C. Prezzano.*

**OGURA, R.** College of Business Administration Housing. 2015. *Mortgage Risk Analysis.*

This study analyzes the housing mortgage loans default and prepayment risk to determine the link between the level of default risk and independent variables, such as credit score, interest rate, debt-to-income ratio, loan age, and loan-to-value ratio. The total record used in this analysis comes up to 769,839,037 since 1999 through 2013, which is composed of 16,624,657 records from origination data-set, and 753,214,380 records from performance data-set. Data is collected from Freddie Mac, a public government-sponsored enterprise. In order to handle the significantly large amount of data-set, this study utilizes MySQL, a relational database management system, and R, a statistical computing and graphics software. The logistic regression provides the model that explains the probability of default as a function of various factors.

*Faculty Sponsor: Dr. Sandra Trejos.*

**OWENS, J.** Department of Finance. 2015. *FAStech Cup.*

*See, Horner, Z.*

**PALMER, C.A.** Department of Biology and Geosciences. 2015. *Detection of Batrachochytrium dendrobatidis (Bd) and Ranavirus in Eastern Red-spotted Newts (Notophthalmus viridescens) Using DNA Purification and PCR.*

*See Carter, E.L.*

**PAPE, R.** Department of Biology and Geosciences. 2015. *Trypanosome Infection in Eastern Hellbenders (Cryptobranchus alleganiensis) in Pennsylvania.*

*See Chambers, D.L.*

**PAREDES, M.** Department of Biology and Geosciences. 2015. *Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils By Human Macrophages.*

*See Beary, M.*

**PHILLIPS, P.E.** Department of Biology and Geosciences. 2015. *Detection of Batrachochytrium dendrobatidis (Bd) and Ranavirus in Eastern Red-spotted Newts (Notophthalmus viridescens) Using DNA Purification and PCR.*

*See Carter, E.L.*

See DiVito, K.N.

PLANTE, N. Department of Psychology. 2015. *The Effects of Induced Self-Esteem on Stop-Distance.*

See Dusch, M.

PLANTE, N. Department of Psychology. 2015. *Enhancing Self-Esteem by Directed Thinking Tasks: Methodological Questions.*

See Dusch, M.

PORTER, F. Department of Biology and Geosciences. 2015. *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 Broker, D.M.


See Connor, M.E.


The International Business Seminars involves students from participating universities traveling to different countries and cities all over the world. The seminar that I participated in was 21 days long. We visited Italy, Austria, Germany, France, and the UK. To receive credit for the seminar every student in the program must write a 25 to 35-page research paper about their experience and the company they were assigned. While overseas every student is assigned a company to conduct research and give a brief presentation. While overseas students had the chance to tour different companies and meet with top executives from those companies. Some of companies that we visited included the Hard Rock Café in Rome, Swarovski Crystal, Riedel Glassworks, Lloyd’s of London, and BMW. The International Business Seminars give students the chance to travel the world, learn from foreign business leaders, and earn college credits from an experience that they will never forget.

*Faculty Sponsor: Dr. Jeffrey D. Eicher.*

PRICE, J. Department of Physics. 2015. *The Examination of the Microstructures of Snail Development.*

See Ban, J.M.

PYLES C. and SCOTT, C. Department of Biology and Geosciences. 2015. *Molecular Effects of DNP on Eukaryotic Microorganisms.*

The chemical compound 2,4-Dinitrophenol (DNP) is a simple organic compound with a sorted and interesting past. DNP, in its purified solid state, is a yellow crystal structure containing adhesive properties and a musky odor. DNP was initially used as an explosive (being only two functional groups short of Trinitrotoluene or TNT) as well as a short-lived commercialized weight loss supplement. The latter of which initiated this line of inquiry. When introduced into a eukaryotic organism, DNP has been shown to affect the mitochondria during Adenosine
TriPhosphate (ATP) synthesis, specifically influencing the electron transport chain. DNP behaves as an uncoupler of oxidative phosphorylation by disrupting the proton motor force essential for efficient ATP synthesis. For the past two years, the overall purpose of this project is to elucidate the molecular mechanics of DNP by examining its effect on the growth on eukaryotic microorganisms. A genetic screen was developed to identify mitochondrial genes that influenced cellular growth in the presence of DNP supplemental media. To date we have identified 130 non-essential mitochondrial genes applicable for testing, and have identified seven knockout strains that consistently differ from the baseline growth rates. The next stage of the project is to check the validity of the screen by ‘rescuing’ the phenotypically altered strains observed by one of the seven candidates (YRL001C) pulled from the original assay. This stage of the project is to clone the desired gene of interest into a shuttle vector with a constitutive promoter. After successfully cloning the gene of interest, the plasmid construct will be transformed into a yeast strain lacking YRL001C and assay for growth in media supplemented with DNP. We predict that the transformed cells will demonstrate a phenotype similar to the base line control strains.

*Faculty Sponsor: Dr. Craig M. Scott.*

**REGESTER, K.J.** Department of Biology and Geosciences. 2015. *Detection of Batrachochytrium dendrobatidis (Bd) and Ranavirus in Eastern Red-spotted Newts (Notophthalmus viridescens) Using DNA Purification and PCR.*

See Carter, E.L.

**REYNOLDS, D.A.** Department of Biology and Geological Sciences. 2015. *Species Diversity and Composition of Basidiomycete Fungi Occurring In Acid Mine Drainage Affected Sites in Clarion County Pennsylvania.*

See Hall, R.M.

**RHOADES, N.J.** Department of Social Sciences. 2015. *Oral History Project of Clarion University.*

See Arellano, M.L.

**ROBINSON, M.B.** Department of Biology and Geosciences. 2015. *Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils by Human Macrophages.*

See Beary, M.

**SASENARINE, V.D.** Department of Social Sciences. 2015. *Stratigraphic Analysis of Native American Occupations at the State Road Ripple Site (36Cl52).*

See Oglietti, G.N.


During our 17-day experience in Costa Rica, we had the opportunity to immerse ourselves in the everyday culture of the country. We learned about the history, ecology, and culture of the people. We had the opportunity to visit various businesses to learn and witness first hand how business is conducted in a foreign country. The experience simply cannot be replicated in a classroom. The experience counted as a three-credit class. In order to earn the credits we each
chose a topic related to Costa Rica and our area of study. We kept detailed journals and a Wiki page to track our daily activities.

Faculty Sponsor: Dr. Sandra Trejos


See Schierberl, E.L.

SCHETTLER, W.J., and YUSKO, B.A. Department of Biology and Geosciences. 2015. *Expression of A1PiZ to Genetically Link ERAD and the UPR.*

A number of genetic disorders lead to the accumulation of mis-folded proteins within the eukaryotic Endoplasmic Reticulum (ER). One such disorder is Alpha-1 Antitrypsin Deficiency (ATD), which can lead to both cirrhosis of the liver as well as emphysema of the lung. The exact mechanism of mis-folded protein accumulation and clearance is not fully understood. Two different biochemical mechanisms have been linked to the clearance of aberrant proteins: Endoplasmic Reticulum Associated Degradation (ERAD) and the Unfolded Protein Response (UPR). ERAD is a multi-step process in which aberrant proteins are retro-translocated to the 26S proteasome for degradation. In situations of extreme protein aggregation, ERAD may become overwhelmed, and thus initiating the UPR. The UPR signaling pathway regulates those gene products that facilitate the clearance of the ER. In a previous study, Add66p was characterized as a proteasome assembly chaperone for the 26S proteasome. Thus the deletion of ADD66, add66Δ, would disrupt proteasome assembly and function. We are currently developing a genetic screen that uses A1PiZ as a stress-inducing agent and examine the effect of growth in various yeast strains (wild type as well as add66Δ). We predict that the combination of the add66Δ strain background and the expression of the mutant form of A1Pi can lead to a visible growth defect. Ultimately, this allows us to gain a better understanding of how a cell deals with stress.

Faculty Sponsor: Dr. Craig M. Scott.


See Demczak, A.D.

SCOTT, C. Department of Biology and Geosciences. 2015. *Examination of a Novel UPRE at a Protein Level Via a β-galactosidase Biochemical Assay.*

See Boldt, K.R.

SCOTT, C. Department of Biology and Geosciences. 2015. *Molecular Effects of DNP on Eukaryotic Microorganisms.*

See Pyles, C.

SHEEHAN, P.W. Department of Biology and Geosciences. 2015. *Detailed Analysis of Protein-Protein Interactions within the Type-III Secretion System of the Deadly Human Pathogen, Chromobacterium violaceum.*

See Hampikian, H.J.
SHEEHAN, P.W. Department of Biology and Geosciences. 2015. *Detection of* Batrachochytrium dendrobatidis (Bd) and *Ranavirus in Eastern Red-spotted Newts* (Notophthalmus viridescens) Using DNA Purification and PCR.

See Carter, E.L.


See Daily, A.

SHETTY, M. Department of Biology and Geosciences. 2015. *Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils by Human Macrophages.*

See Beary, M.


As the first line of defense against the elements, human skin can undergo a significant amount of damage and trauma. In the case of burns or other injuries which leave extensive breaches in the skin, damage can be limited by grafting. Grafting is the excising of a thin portion of skin from an undamaged site on the body (usually on the thigh or buttocks), and transferring it to the affected area, allowing more normal healing to occur. Though the result is often successful, the donor site of a skin graft suffers extensive damage. This study focuses on the development of a porous scaffold, into which the skin cells can grow, composed of two FDA approved biocompatible and biodegradable substances – polylactide/polylactic acid (PLLA), and poly(lactic-co-glycolic acid) (PLGA). Both PLLA and PLGA are degraded through ester bond breakages, which occur naturally in water over time. The by-products – lactic acid and glycolic acid – are also naturally found as cellular metabolites, minimizing cytotoxicity. A thin porous scaffold can be achieved through the successive flash freezing and lyophilization processes of PLLA/PLGA solutions. In order to test the scaffolds formed in this preliminary project, primary human keratinocytes were seeded onto each of the scaffolds, allowed to grow, and then assessed for cell viability using an MTT assay.

Faculty Sponsor: Professor Benjamin Legum.


See DiVito, K.N.


See Buell, C.E.

SKRABA, A. Department of Visual and Performing Arts. 2015. *A Publication on Aviation in Clarion County for the Airport Authority.*

See Alviani, R.
SMERKAR, A. Effect of Deer Grazing within Various Forest Treatments. 2015. Department of Biology and Geosciences.
   See Daily, A.

SMITH, D.M. Department of Biology and Geosciences. 2015. Annexin 1 Facilitates Phagocytosis of Senescent Neutrophils By Human Macrophages.
   See Beary, M.

SMITH, D.M. Department of Biology. 2015. Culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.
   See Ali, N.

SMITH, D.M. Department of Biology and Geosciences. 2015. The Effect of an Unidentified Antimicrobial Activity Isolated from Human Urine on Human Promyelocytic Leukemia Cells.
   See Carter, E.

SMITH, D.M. Department of Biology and Geosciences. 2015. 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 Broker, D.M.

SMITH, M. Department of Finance. 2015. FAStech Cup.
   See Horner, Z.

   See Kurtz, T.

STAHR, M.N. Department of Biology and Geosciences. 2015. Assessing the Effects of Batrachochytrium dendrobatidis and Disinfectants on the Microbial Communities of Spotted Salamanders.
   See Keth, A.

   See Daily, A.

STAUB, K. Department of Communication Sciences and Disorders. 2015. An Examination of Socio-Communicative Aspects of Aphasia Therapy.
   See Kopper, M.

See Demczak, A.D.

STINER, L. Department of Visual and Performing Arts. 2015. *A Publication on Aviation in Clarion County for the Airport Authority.*

See Alviani, R.


Oaks are a very important component of our forests. They provide a great food source for many organisms and they also provide housing and protection to many species of wildlife. Deer over-browsing of oak saplings is becoming more and more of a problem in PA forests, therefore we wanted to survey forest stands undergoing different management methods to see which oak regeneration efforts were most successful. We quantified red and white oak sapling abundance in thinned and unthinned, burned and unburned, and fenced and unfenced areas in Clear Creek State Forest. We concluded that burn treatments had little to no impact on oak regeneration due to the timing of the burns. However, we did see an increase in oak regeneration in the fenced areas with no deer, and a greater richness of oak species in the thinned areas, regardless of fencing.

*Faculty Sponsor: Dr. Suzanne Boyden.*


The objective of Urban Understandings is too illustrate how cultural and family traditions define who we are and to create interest in the community for further study of heritages. In order to help the urban student understand and tolerate different cultures in the school and neighborhood environment, opportunities for interacting with peers outside their gang or social circle should start in public schools. A cultural project where students interview a classmate they do not normally associate with and research the country of origin for that student can help these students discover the similarities and embrace the differences between the two cultures. The research project should include political, economic, and religious backgrounds of their peer’s country of origin and the neighborhood the student lives in. To make this a community event, teachers can host an after school event, inviting the families of the students to see their projects and get to know the people in their community. The purpose of this evening event is to bridge the gap of intolerance among the adults in the students’ lives and try to end some of the intolerance and violence that is prevalent in inner city neighborhoods.

*Faculty Sponsor: Dr. Jesse Haight.*

STRAUSBAUGH, S.E. Department of Physics. 2015. *Exocomets and Variable Circumstellar Gas Absorption in the Debris Disks of Nearby A-Type Stars.*

See Bukoski, B.
STRAUSER, K.A. Department of Psychology. 2015. Effectiveness of a Community Learning Workshop in a Rural Area.
   See, Anderson, K.R.

SWEIGERT, D. Department of Human Services, Rehabilitation Sciences. 2015. Medical Uses of Arsenic and Long Term Effects.

In today’s society, you rarely hear about arsenic, but that does not mean it is not being used. Arsenic has always been known as a poison and rightfully so from its many documented effects. What people do not know is that arsenic, for as long as it has been a poison has also been used as a tonic. One of the most successful uses of arsenic was invented in the 1700s by Thomas Fowler and is still used today. His solution of arsenic trioxide in potassium bicarbonate was used to treat multiple ailments including asthma, psoriasis, anemia, and leukemia. Today arsenic is used for leukemia patients in IVs and is known as Trisenox. This successful treatment was approved by the FDA because of its high remission rates. Trisenox is strictly used in lower doses because arsenic is best used as a tonic. High and long-term doses can have damaging effects including skin lesions and hard patches on the palms and soles and may damage red blood cells, liver, nerves, and brain. Acute doses of arsenic can cause vomiting, abdominal pain, diarrhea and death. Despite being one of the most notorious poisons known in our culture, arsenic has had a surprisingly mixed history but continues to play a positive role in some medical treatment.

Faculty Sponsor: Dr. Mark Kilwein.

TALLEY, J. Department of Biology and Geosciences. 2015. The Effect of an Unidentified Antimicrobial Activity Isolated from Human Urine on Human Promyelocytic Leukemia Cells.
   See Carter, E.

TALLEY, J.S. Department of Biology and Geosciences. 2015. Isolation and Identification of an Unknown Antimicrobial Activity Found in Human Urine.
   See Carter, E.L.


The Eastern Hellbender (Cryptobranchus alleganiensis) is a large, permanently aquatic salamander inhabiting streams throughout the Allegheny and Susquehanna River drainages in Pennsylvania. Although hellbender populations are declining in many areas within their range in the eastern and mid-western United States, hellbender abundance is relatively high in localized high quality streams throughout western Pennsylvania. Many biologists refer to the Eastern Hellbender as a keystone species, one that has a disproportionate effect on stream community structure and ecosystem function, but few studies have provided quantitative evidence to support their status as a keystone species. To assess the relative importance of hellbenders in stream communities, we quantified hellbender population biomass for 10 streams during five years (2010-2014). Hellbender surveys were conducted in each stream, each captured salamander was weighed for wet mass (kg), and GIS was used to estimate surface area for each stream survey. Based on published values of biomass (kg/ha) for stream-dwelling
populations of organisms, including other vertebrates, hellbender biomass was relatively high in four streams but considerably lower than the biomass of macro-invertebrates and fish in six streams we examined. Our results support the status of the Eastern Hellbender as a keystone species in stream reaches where they are abundant but highly localized. Additional studies are required to assess how hellbender biomass varies with environmental factors at local and landscape scales. Studies further quantifying the ecological roles of hellbenders and their importance in stream structure and function will provide a rationale for the conservation of this unique salamander.

Faculty Sponsor: Dr. Kurt J. Regester.

THIES, L.R. Department of Social Sciences. 2015. Stratigraphic Analysis of Native American Occupations at the State Road Ripple Site (36Cl52).

See Oglietti, G.N.

TIMASHENKA, P.C. Department of Biology and Geosciences. 2015. Assessing Stream Siltation and Sediment Transport Associated With A Hillside Development Project.

See Brozenick, M.M.

TOFANI, M. Department of Biology and Geosciences. 2015. 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 Broker, D.M.


See Brown, M.S.

TWOEY, J. Department of Visual and Performing Arts. 2015. A Publication on Aviation in Clarion County for the Airport Authority.

See Alviani, R.

VASBINDER, I. Department of Biology and Geological Sciences. 2015. The Impacts of White-Tailed Deer on Oak Regeneration.

See Stragand, J.N.

WARNER, K.E. Department of Biology and Geosciences. 2015. Development of a Biodegradable Scaffold for Skin Regeneration.

See Sikora, S.


See Schierberl, E.L.


See Connor, M.E.

See Demczak, A.D.


See Bailey, N.E.


This paper seeks to provide deeper insight into the underlying factors that existed prior to World War I so as to help us better understand the war itself. Modern Americans are often mislead as to the reality of the First World War, and a popular myth has arisen that the arrival of American forces in 1917 led to a speedy end of the war. By examining the political, economic, and agricultural factors, in addition to the military factors that are more often discussed when studying the First World War, a more clear understanding or how and why the German Empire was defeated can be understood. This paper serves as a case study of the Germany Empire from its inception, leading up to, and through, the war to show that through poor planning, Germany economically defeated itself before the war even began.

*Faculty Sponsor: Dr. Robert Frakes.*

WERNER, J.J. Department of Biology. 2015. *Culturing of Mesenchymal Stem Cells and Fresh Bone Marrow Preparations Influences Differentiation in Hematopoietic Stem Cells.*

See Ali, N.

WILSON, E.S. Department of Biology and Geosciences. 2015. *Assessing the Effects of Batrachochytrium dendrobatidis and Disinfectants on the Microbial Communities of Spotted Salamanders.*

See Keth, A.

WILSON, D. Department of Biology and Geosciences. 2015. *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 Broker, D.M.

YAROSZEWSKI, N.C. Department of Biology and Geosciences. 2015. *Back From the Brink? Assessing the Freshwater Mussels in the Lower Clarion River.*

See Hepfl, N.S.


See Stragand, J.N.

See Gibson, D.

YUSKO, B.A. Department of Biology and Geosciences. 2015. *Expression of AlPiZ to Genetically Link ERAD and the UPR.*

See Schettler, W.J.

ZOCCOLA, K.M. Department of Biology and Geosciences. 2015. *Detailed Analysis of Protein-Protein Interactions within the Type-III Secretion System of the Deadly Human Pathogen, Chromobacterium violaceum.*

See Hampikian, H.J.

ZOLA, C. Department of Finance. 2015. *FAStech Cup.*

See, Horner, Z.

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**GRADUATE Abstracts**

**BRUNDAGE, MEGAN.** Masters of Education: Reading Specialist. *A Historic Perspective: Connecting History, Reading, and Writing.*

The project was designed to assist social studies teachers to connect their content with reading and writing in a more meaningful fashion. The project specifically looks at methods designed for social studies content that can be easily integrated into many types of lessons. The history content in-service project gives teachers guidance and suggestions as they integrate common core state standards into social studies lessons and curriculum. The project was made available to certified teachers participating in the graduate course as well as the possibility of other social studies teacher participating in the professional development opportunity in the future. The overall significance of the project aimed at providing more information to colleagues about incorporating reading and writing into social studies lessons and helping teachers to give students the proper tools to better understand history. Teachers can take what they learned and apply it to their classroom.

Participants will 1) gain an understanding of reading and writing techniques that apply to social studies content, 2) gain knowledge of methods, strategies, and resources to assist and improve their instruction, 3) acquire strategies to integrate reading and writing into their instruction to adhere to common core state standards, and 4) be given opportunities to reflect upon their perspective on reading and writing in the history classroom.

*Faculty Sponsor: Dr. Kathleen Murphy.*
Several cognitive screening tools are available to help practitioners identify cognitive impairments (American Speech-Language-Hearing Association, 2012). With the development of new tools, consideration of their consistency with existing standardized screening measures is critical. The study purpose was to compare performances of young and old neurotypical adults on two cognitive screening tools. Twenty-one neurotypical adults age 21 to 85 years old completed the Brief Cognitive Assessment Tool (BCAT) (Mansbach, MacDougall, & Rosenzweig, 2012) and the Mini-Mental Status Exam (MMSE) (Folstein, Folstein, & Fanjiang, 2001) as part of another study on language abilities. The researchers formed three groups of eight participants each: 20 to 29 years old, 60 to 74 years old, and 75 to 85 years old. All participants passed the MMSE. A between-groups analysis of variance suggested no significant differences in performance among the age groups on the two measures (BCAT p=0.17; MMSE p=0.30). Both groups over the age of 60 years had greater performance variability than the young adults. Despite no significant differences between the groups, a t-test indicated significant differences between MMSE and BCAT scores when all participants were grouped together (p=0.0). The BCAT scores were lower than the MMSE scores (MMSE M=85.24% accuracy versus BCAT M=80.76% accuracy). These results suggest that although the BCAT and MMSE are equally accurate when administered to young and old neurotypical adults, the BCAT may result in lower overall accuracy scores and therefore may better distinguish slight differences in cognition. These findings should be examined in adults with cognitive impairments.

Faculty Sponsor: Dr. Mary Beth Mason-Baughman.

The purpose of this quantitative research was to examine the knowledge of palliative care among registered nurses (RNs) in a large, acute care hospital in northwestern Pennsylvania. A convenience sample of N = 140 RNs volunteered to participate in the study. A demographic questionnaire and the palliative care quiz for nursing (PCQN) was administered, following ethical standards. Descriptive and inferential statistical analysis was conducted to summarize the results and to determine if there were significant relationships between the knowledge level of palliative care and the five stages of nursing posited by Benner’s (1982) novice to expert theory. Statistical evidence was presented to support the research hypothesis that there is a significant relationship between Benner’s five stages, and the RNs’ knowledge of palliative care. The level of nursing experience was positively correlated with palliative care knowledge, whereby novice RNs displayed the least knowledge, and expert RNs displayed the most. The PCQN identified commonly held nursing misconceptions regarding palliative care. The recommendation for further research is an evidence-based quality improvement (QI) project with the goal of enhancing the knowledge and skills of less experienced RNs (novice and advanced beginners) regarding palliative care.

Faculty Sponsor: Dr. Nancy Falvo
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