Audra Black  
Faculty Sponsor: Jeff Hahn, Sociology  
“Causes of Depression”

This study examined the social causes of depression. The Detroit Area Study (Kessler, 1985) “Life Events in Everyday Experiences” was used as secondary analysis for the social causes of depression. Data for this study was taken from numerous questions used in the original research to measure the independent variables of financial strain, violent victimization, and non-violent traumatic events. It was hypothesized that the greater these types of social stress, the higher the level of depression. Results indicate partial support for the hypothesis.

Michael Blau  
Faculty Sponsor: Theresa Davis, History  
“Decade of Doom: Historical Causes Behind the Cleveland Indians’ Failure to Achieve the World Series Title”

Julia Bober  
Faculty Sponsor, Theresa Davis, History  
“Heavy Metal: The History of Metal Music and its Culture”

Laura Booth, Jon Zelasko and Eric Small  
Faculty Sponsor: Clark Archer, Computer Science  
“myMobileHome: A Mobile Internet Portal”

The proliferation of the Internet makes web access essential to our everyday lives. The Internet is no longer bound by wires, and mobile Internet capable devices are coming into the homes and pockets of consumers as the technology becomes more affordable. These users now have Internet access on the go, but desire the same Internet experience found on a regular browser. Recognizing that users want a better mobile Internet experience, we examine ways to deliver the Internet to mobile devices, formatted to fit a mobile screen without compromise.

Ryan Brooks and Steve Cotman  
Faculty Sponsor: Debra Boyd-Kimble, Chemistry  
“Studying the Effects of Oxidative Stress on LDH Isoforms”

The enzyme Lactate dehydrogenase (LDH) has a total of five isoenzymes that are known. LDH-1 is found primarily in heart muscle and red blood cells. LDH-2 is concentrated in white blood cells. LDH-3 is highest in the lung. LDH-4 is highest in the kidney, placenta, and pancreas. LDH-5 is highest in the liver and skeletal
muscle. LDH was isolated from bovine kidney and tissue through several purification methods including: centrifugation, dialysis, ligand exchange chromatography, and salting out. LDH assays and BCA protein assays were conducted to determine the amount of LDH and protein present in the samples. The samples were then pulled together to further purify with ion exchange chromatography and salting out. The extent of the purification goes to the identification of the proper isoenzyme of LDH and the testing of its resistance to oxidative stress. The resistance a compound has against oxidative stress goes a long way to preventing cell damage and cell death. The significance of this study will result in a better understanding of how oxidative stress affects LDH in biological systems.

Jessica Brutvan
Faculty Sponsor: Jeff Hahn, Sociology
“The Effects of Violent Video Games on College Students”

Research suggests that teenagers who frequently play violent video games have difficulty relating to others. Video games, especially heavily marketed violent games, may cause teenagers to develop problems in school, to become aggressive, to have trouble making friends and may cause teenagers to develop health problems. An online survey was sent to 300 Mount Union College students was conducted asking questions about various dimensions of their video game play and how it has affected them in everyday life. 121 students responded to the survey. Results are pending, but I hope to show a significant relationship between video game play and the overall development of the life of a college student.

Rachel Camargo, Amanda Cunningham and Renee Hein
Faculty Sponsor: Sarah Torok, Psychology
“Investigating Factors Related to Relational Aggression”

The purpose of this study was to determine which factor: age, grade level, self-esteem, or the presence of siblings had the strongest influence on the use of relational aggression. Females (n=60), over the age of 18, from a small, private liberal arts college participated in the study. Females (n=60), between the ages of 11-14 from a public middle school between grades 6-8 also participated in the study. Each participant received two anonymous self report measures. The first measure was the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The scale was designed to determine participant’s self esteem score by asking how strongly they agreed or disagreed to self esteem statements. The second measure consisted of two sets of vignettes; one set of five created specifically for middle school females and one set of five created specifically for college females. The vignettes presented hypothetical scenarios in which aggression was present. Because of the student population on the college campus and middle school, the results may not generalize well to other kinds of schools. This information is significant to schools and families in identifying risk factors that could lead to aggression in children. This information will also be useful in creating bully prevention and intervention programs in settings involving children.

Kurt Chonko
Faculty Sponsor: Len Epp, Biology
“Effects of Dioxin on Limb Regeneration in Ambystoma tigrinum”
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) is an organic toxin designated by the EPA as a carcinogen\(^1\). When treated with TCDD *Danio rerio* tail fin regeneration rate is impaired\(^2\). It is uncertain whether other organisms react in the same manner. The effects of TCDD on *Ambystoma tigrinum* were studied using *D. rerio* as a positive control. Salamanders receiving 200ng/g injection of TCDD following amputation showed no inhibition of regeneration in timing or morphology when compared to controls on sham injected animals. Zebrafish receiving 70ng/g did show impairment of tail fin regeneration after 14 day with treated animals. Over a period of 14 day’s regenerating 36% of their caudal fin, compared to controls which regenerated 63% over the same time period.

Elizabeth Crawford  
Faculty Sponsor: Jeremy Ervin, Education  
“A 4th Grade Language Arts Teacher’s Perspective”

No Abstract Submitted

Caitlin Crowell  
Faculty Sponsor: Brandon Sheafor, Biology  
“Comparison of Cutaneous Bacteria in Wild versus Captive Salamanders”

Within the past twenty plus years, an alarming decline among amphibian populations has been observed throughout the world. One of the major culprits behind these rapid amphibian declines and extinctions is the pathogenic fungus *Batrachochytrium dendrobatidis (Bd)*, which invades amphibian skin and causes the infectious disease chytridiomycosis. Previous research has investigated antimicrobial properties of cutaneous bacteria flora isolated from wild salamanders and found that some genera of the isolated microbial flora were successful at inhibiting the growth of *B. dendrobatidis*, which suggests that cutaneous bacteria flora may impact an amphibian’s resistance to chytridiomycosis. This study sampled cutaneous bacteria from both wild and captive *Ambystoma maculatum* (the Yellow Spotted salamander) and *Desmognathus fuscus fuscus* (the Northern Dusky salamander) in an attempt to compare the species of bacteria found on these wild and captive salamanders and to compare the anti-chytrid properties of the different bacteria flora. DNA extraction was performed on pure bacterial isolates, the DNA was amplified using PCR thermocycling and then sequenced. Additionally, for each isolate a challenge assay was performed to determine antifungal properties. Numerous bacteria were isolated from each salamander species; however, only some of the isolates exhibited weakly antifungal properties. Overall, there was not a profound difference between the bacteria flora of the wild and captive salamanders of the two species utilized within this study; thus, captive conservation does not appear to have any major effects on the bacterial flora’s effectiveness against the potentially deadly fungus *B. dendrobatidis*.

Brent Davis, Dan Lopez and Eric Wansitler  
Faculty Sponsor: Clark Archer, Computer Science  
“Notre Dame School Website”

The Notre Dame School in Hermitage, PA wanted to refresh the look of their outdated website. They also wanted additional functionality for visitors and easy-to-use methods for school faculty and staff to update
various content on the website. WordPress, a free, open-source blog-building software http://www.wordpress.org, was used to design the website and offer interfaces for updating it. The website has a user login for authenticated school faculty and staff. Using these user accounts, they can update various content on the website, including various pages that display textual information about the school, announcements and alerts, calendar of events, newsletter, school handbook, and online donations via PayPal. Throughout our project we learned how to incorporate WordPress into website development. The main obstacles for our project were finding what requirements were needed for WordPress to function properly. Our team found that WordPress is a helpful tool in developing interactive websites. The supplemental tools were also helpful when implementing various features on the website.

Kara Ditlevson  
Faculty Sponsor: Len Epp, Biology  
“Time Needed for Reinnervation to Occur Following Denervation in Upper Limbs of Notophthalmus viridescens (Eastern Newt)”

Limb regeneration is a property unique to the Order Urodela, to which newts and axolotls belong. It is accepted that the peripheral nervous system is the driving force behind limb regeneration, although much remains to be learned about the correlation between nerves and regeneration. Once a time frame has been established in which the denervated limb is reinnervated by the growth of nerve stumps, further studies can be conducted concerning the mechanisms of reinnervation and regeneration. This study examined the behavior of nerves in the denervated limbs of Notophthalmus viridescens, in an attempt to identify the time needed for reinnervation to occur following denervation. Regenerating nerves were detected by an antibody to the nerve membrane protein, neuritin. The limbs were reamputated at five day intervals post-denervation (PD) for one month. The tissue was studied for nerve presence and progression. Positive and negative controls were used to ensure proper staining techniques were implemented. The results found that nerves were degenerated at ten days PD. However, by day 15 PD, it was observed that nerves have reinnervated the limb stump and by 30 days PD, the tissue appeared to be infiltrated by darkly stained nerves.

Shane Edwards  
Faculty Sponsor: Theresa Davis, History  
“Home of the Gods: Egypt as the main influence for the gods of Ancient Greece”

Greece is seen as the birthplace of western civilization, the cradle from which all learning was able to grow. Through the arts which have survived throughout the ages, we have been able to learn about their religious cults, their mythology. But from where did their system of beliefs spring? A belief has risen over time that many of their polytheistic ideas arose through cultural exchanges and with their far older contemporary, Egypt. Through analysis of the writings of ancient scholars ranging from Herodutus to Plato, as well as works ranging from mosaics to works of the theater, I have concluded that interaction with Egyptian culture had an undeniable impact on the development of Greek mythology.

Matt Ferguson  
Faculty Sponsor: Ron Mendel, HPSB  
“Comparison of Creatine and Carbohydrate Supplementation on Vertical Jump Height”
Creatine is arguably the most used sport supplement on the market today. It has shown to be quite effective in high intensity, short duration and explosive exercise. Although relatively cost effective with little to no side effects, a negative perception of creatine supplementation still exists in the mainstream. One alternative to creatine in a few specific movements/exercise are carbohydrates. Therefore, the purpose of this study is to compare the effects of creatine supplementation to a carbohydrate and determine which has a greater effect on jump height and jump power. The results could be of some significance if the carbohydrates show to have an equal or greater effect as creatine and so may serve as an alternative supplement to creatine. Pre-testing will include subject height, weight and vertical reach measurement. Once the pre-testing measurements are complete, each subject will perform 10 countermovement static jumps with 6 seconds of rest between each jump. Each jump consists of the subject starting in a standing position and making a countermovement into the jump. The results will be recorded with a Ballistic Measurement System. Jump height will be measured pre and post supplementation. Supplementation will consist of the creatine (Cr) group ingesting 25 grams of creatine per day and the carbohydrate (CHO) group ingesting 300 kCal of a sucrose based carbohydrate supplement daily. Each group will ingest their respective supplement for five days. Each supplement will be mixed with water and both will have the same flavor to prevent a noticeable difference between the two. Post-testing will occur on the sixth day and will repeat the pre-testing protocol. Twelve Mount Union College students, all males, between the ages of 18 and 23 years will be recruited as subjects.

Dustin Ford
Faculty Sponsor: Brandon Sheafor, Biology
“Survey of Cutaneous Bacteria from Panamanian Golden Frogs (Atelopus varius) by Non-Plating Methods”

Populations of the Panamanian golden frog (Atelopus varius) are critically endangered due to the emerging infectious disease of chytridiomycosis. Some amphibians, like A. varius, have been shown to be more susceptible to infection due to their weak immune defenses to this pathogen. To improve defenses, amphibians possess naturally occurring bacteria that have been shown to inhibit chytridiomycosis. The purpose of this research was to survey the composition of the natural bacterial flora of captive A. varius and compare the bacterial community to leopard frogs (Rana pipiens) by using culture independent methods of bacterial analysis. DNA from the bacteria was isolated and analyzed by denaturing gradient gel electrophoresis (DGGE). Two bands from the DGGE gel (2.32cm and 6.63cm) were distinct to both leopard frogs and golden frogs and may indicate a helpful bacterium. One golden frog did show a band that no other frog displayed. The findings of this research could help with conservation of A. varius. Differences and similarities in bacterial communities could be due to factors such as behavior or geographic location. Understanding what controls cutaneous bacteria and what components of the bacterial community are essential for host survival is critical in helping populations recover from declines.

Stacey Fox
Faculty Sponsor: Jamie Capuzza and Govind Shanadi, Communication
“Communication Satisfaction, Technology, and Parent-Child Communication”

The growth of modern communication technology influences interpersonal exchanges. Specifically, the goal of this study was to investigate how these technologies influence communication satisfaction between children
and their parents. Communication satisfaction is defined by Hecht as the positive reinforcement provided by a communication event that fulfills positive expectations. A communication satisfaction survey was distributed to approximately 300 college students at Mount Union College electronically. In addition to questions about communication satisfaction, respondents identified patterns of technology use. The findings will expand our knowledge of factors that improve communication satisfaction between students and their parents when using different forms of technology.

Emily Gerken, Kristin Kane, Michael Marino and Dennis Lammers  
Faculty Sponsor: John Strefeler, EABA  
“Institute of Management Accountants National Student Case Competition”

Teams of students respond to a published case in the Strategic Finance Magazine by preparing and submitting a videotaped presentation to judges selected from IMA members. The student case competition provides an opportunity for students to interpret, analyze, evaluate, synthesize, and communicate a solution to a management accounting problem. The 2009 case competition required evaluating the budget of a hypothetical College of Business Academic Advising department. The problem asked for the budget to be dispensed to each activity that the Academic Advising department performed. Also the goal was to eliminate fifteen percent of the budget while increasing student satisfaction within the college. By analyzing the breakdown of the budget a monetary value was dispersed to each activity. After evaluation of the overall budget total, fifteen percent was deducted from travel expenses and salaries. This allowed the College of Business to meet its financial goals while still increasing certain activities that helped improve overall student satisfaction.

Amanda Gula  
Faculty Sponsor: Kim Risley, Biology  
“The Analysis of Antibiotic Treatment of Streptomycin-resistant Acinetobacter calcoaceticus Biofilms”

Acinetobacter calcoaceticus, a pathogen that can cause nosocomial infections has become increasingly more resistant to a variety of antibacterial treatments. It has become more common in intensive care units and can cause urinary tract infections, ventilator associated pneumonia, bloodstream infections and surgical site infections. In this experiment, the effects of antibiotic treatment on streptomycin-resistant Acinetobacter calcoaceticus biofilms were analyzed. Rifampicin and ciprofloxacin were both tested on A. calcoaceticus biofilms. These antibiotics were each tested for the ability to prevent biofilm formation as well as to treat established biofilms. A ratio of O.D.580/O.D.600 was generated to determine effectiveness. Based on the results, rifampicin was effective at killing early biofilm formation as well as planktonic cells. Rifampicin was also more effective than ciprofloxacin at preventing biofilm formation. For 48 hour old biofilms of A. calcoaceticus that were established then treated with antibiotic, it was just the opposite. Ciprofloxacin was more effective than rifampicin on biofilms that had been established and then treated. However, ciprofloxacin’s overall ability to kill the biofilms was not greatly effective.

Anna Hardy  
Faculty Sponsor: Kim Risley, Biology  
“Herpes Simplex Virus Type 1: The Role of the UL6 Protein in the Cleaving, Packaging and Encapsulation of the Virus”
There are nine different types of herpes viruses that are found in humans. This project focuses only on herpes simplex virus type 1, which causes cold sores. When the virus infects an individual, it takes over host cells and uses them to produce more viruses, which are processed and sent out to infect other host cells. The goal of this project was to determine the role of a gene called UL6 in the processing and packaging of these new viruses. In order to establish the amount of DNA required for molecular studies, a method called the polymerase chain reaction (PCR) was used to amplify the DNA. The appropriate enzymes, buffers and temperature needed for PCR of the UL6 gene were initially unknown, but were identified through experimentation. The PCR conditions that were identified in this study will be used in future studies to quickly replicate UL6 viral DNA. Ultimately, a better understanding of the processing and packaging of the herpes virus may lead to a new approach to its treatment and prevention.

Lindsay Hayes
Faculty Sponsor: Brandon Sheafor, Biology
“The Effects of Batrachochytrium dendrobatidis on Lungless and Lunged Salamanders”

*Batrachochytrium dendrobatidis* is a fungal pathogen that is causing population declines in amphibian species worldwide. The infection is observed on the skin of amphibians and survives best in moist environments. This research examines the effects of *B. dendrobatidis* on two lungless species of salamanders; *Desmognathus fuscus* and *Eurycea bislineata* and two lunged species; *Ambistoma tigrinum* and *Ambistoma mexicanum* to observe how each group tolerates the infection. It is hypothesized that lungless salamanders would have a lower infection rate but a higher death rate because respiration is strictly cutaneous, whereas lunged salamanders are able to respire through their lungs if the infection interferes with cutaneous respiration. The specimens were infected with $10^5$ *B. dendrobatidis* zoospores per milliliter and swab samples were taken weekly and analyzed with qPCR in order to show the infection level of salamanders. Quantitative measures of *B. dendrobatidis* load can indicate whether or not the organisms can tolerate the infection or rid themselves of it completely. Behavioral observations show that infected salamanders spend minimal time in contaminated water, possibly in an attempt to dry out their skin to minimize the infection. This work adds to the accumulating research on both the epidemiology of fungal infection as well as how the organisms themselves cope with *B. dendrobatidis*.

Tyree Johnson, Jeannette Silvernail and Brittany Quinn
Faculty Sponsor: Sarah Torok, Psychology
"How Anime Affects Same and Opposite Sexes' Body Perceptions"

Previous studies have shown that media affects how people view themselves. The goal of this research is to see how sexually charged anime could affect someone’s view of their body image and that of the opposite sex. There were 40 Mount Union College male and 40 female students used as participants. The participants viewed one of two videos: one contained sexually and gender-neutral content, and one that contained sexually charged and gender-stereotyped content. Participants were then be asked to complete a survey, that asks them to judge how they feel about their bodies and judge how they feel about the opposite sex’s bodies. It was hypothesized that viewing anime with overtly sexualized images of women and hyper-muscular men would have negative effects on both sexes in their self-perception and how they view the opposite sex. We also expected to find that women will show a greater difference in ratings of self-esteem (as rated by the State Self-
Esteem Rating Scale (SSES; Heatherton & Polivy, 1991)) between each anime condition compared to ratings of self esteem in men from each anime condition. Finally, we expected to find that men will show a greater difference between ratings of attractiveness for physical features in the opposite sex (as rated by the modified Physical Appearance State and Trait Anxiety Scale (PASTAS; Franzoi & Shields, 1984)) between each anime condition compared to ratings given by women in each anime condition. Results are discussed and, since body image is a concern that people face, the study shows how certain media could affect how people feel about themselves and others.

Kendall Koons
Faculty Sponsor: Jeff Hahn, Sociology
“A Content Analysis of Sexual Health Advertisements in Popular Men’s Magazines”

This research analyzes the content in sexual health advertisements in three different genres of American men’s magazines: a lad magazine, a popular culture magazine, and a health and fitness magazine. Data collection was conducted through multiple copies of one magazine for each genre and coding the advertisements and cover teasers into categories including: birth control (other than condoms), condoms as birth control, condom as STI protection, STI treatment, and male enhancement. In addition, the categories are further analyzed by the ad themes of comedy, parody, informational, and medical. Results from the data support the hypothesis that advertisements found in men’s magazines regarding sexual health matters promote practices that enhance performance over reproduction and disease control.

Kaytlin Kovach, Nate Hofacre, Kelli Miller and Emily Strohmeyer
Faculty Sponsor: John Strefeler, EABA
“Contemporary Issues in Financial Accounting”

The scope of this poster session includes four research papers which were prepared as a part of a senior-level advanced course in financial accounting. The topics include issues which have recently received national attention within the accounting profession. For example, “Revenue Recognition” involves considerable judgment and is easily the largest area resulting in financial restatements of filings with the Securities and Exchange Commission [SEC]. Likewise, “New IFRS Standards” concerns the rather sudden and swift movement by the SEC to change its long-standing policy and to accept international accounting standards in place of those developed by the U.S. accounting profession. Third, “Fair Value” relates to the difficulty of using subjective (but relevant) fair value numbers in accounting statements which have historically stressed objectivity as an important characteristic. Finally, “Locked-Up Assets” concerns the timely topic of how basic accounting concepts should be used to account for assets which are intangible in nature.

Kathleen Kovarik
Faculty Sponsor: Robert Buganski, Art
“Drawing SCE: Vices and Demons”

For my senior culminating experience, I proposed to do a series of drawings in charcoal. My subject would be caricatures of Vices and Demons, such as Vanity or Greed. I wanted to personify these characteristics in a humorous but thought provoking way. I also planned to set it up in a mandala format. In a mandala, a
person’s eye travels from the outer layers to the inner ones and when you reach the center, the person is supposed to have learned something about the path to enlightenment. While enlightenment will probably not be my end result, the format allows me to connect and sum up the body of work with a central piece. Throughout the year, the visual language I used to describe the vices changed from complex and precise to looser and more expressive. I began with a very narrative drawing style but found that it did not always connect with the viewer the way I wanted it to. This presentation will be about the process of learning and changing that is such an integral part of an art SCE.

Jason Latimer  
Faculty Sponsor: Brandon Sheafor, Biology  
“Repeatability of Antimicrobial Peptide Effectiveness in Panamanian Golden Frogs (Atelopus zeteki)”

Panamanian golden frogs, Atelopus zeteki, have experienced a drastic population decline since the 1980’s and are currently critically endangered. The primary factor contributing to the decline is the pathogenic skin fungus Batrachochytrium dendrobatidis. One of the primary goals of conservation efforts is to breed captive individuals that display a heightened resistance to B. dendrobatidis, with the intention of ultimately reestablishing a stable wild population. Resistance to infection has been linked to the production of cutaneous antimicrobial peptides and previous studies have indicated that peptide effectiveness varies among A. zeteki. However, repeatability of peptide efficacy has yet to be demonstrated, which may have implications in studies examining the heritability of resistance conferred by peptides. Prior to heritability studies, it must first be demonstrated that peptide efficacy remains relatively constant within an individual frog. In order to determine the regularity of peptide effectiveness, antimicrobial peptides were collected from A. zeteki at the Columbus zoo. A standard concentration of peptides was added to cultures of B. dendrobatidis zoospores and the growth inhibition of the fungus was measured via optical density. The procedure was repeated on a monthly basis, and the change in growth inhibition by each individual’s peptides was used to analyze the regularity of peptide effectiveness.

Callie Livengood  
Faculty Sponsor: Jamie Capuzza and Govind Shanadi, Communication  
"A Content Analysis of Gay Window Dressing Advertisements"

Gay window advertising is a marketing strategy that allows gays and lesbians to read into certain sub textual elements within an advertisement. The gay population can recognize, read and interpret these gay sub textual elements, while heterosexual consumers on the other hand remain unaware that these elements even exist. Some tactics include using a single person instead of an opposite-sexed couple, showing a “good-looking crowd scene,” where one can’t tell if there are opposite-sexed couples included, or only featuring the product or service and not including anyone at all in the advertisement. This business strategy is important to study because it’s a relatively new marketplace phenomena and more companies are adding the lesbian and gay segments to their existing efforts. Research has shown that more than half of the gay and lesbian market in the United States does not read any form of gay-targeted media. This exploratory and interpretive study coded for the visual tactics used within advertisements. Through content analysis, advertisements were coded from six different mainstream magazines over the span of 2008.
Valerie Locker  
Faculty Sponsor: Lin Wu, Biology  
“Restoration of Bluegill Growth in Nature Center Pond: A Biomanipulation Approach”

Bluegill is the most common fish in the Nature Center pond, located 6 miles south of Mount Union College Campus in Ohio. Previous studies of bluegill from the Nature Center pond concluded that the bluegill population’s growth condition in the Nature Center Pond was “poor”, according to the Bennet Classification (Bennet 1970). The purpose of this project is to improve the growth condition of the bluegills in the Nature Center Pond using the method called biomanipulation. A total of 137 bluegill were removed in May 2008. The average growth condition for this group of bluegill was considered “poor.” The Nature Center pond was revisited and a total of 25 bluegill were removed during the months of September and October. The average growth condition for this group of bluegill was also considered “poor.” In this experiment, the condition of the bluegill did not improve. The bluegill caught in September and October did not respond to the manipulation simply because not enough bluegill were removed.

Edward Mackiewicz  
Faculty Sponsor: Santosh Saha, History  
“The Problems and Challenges faced by China and India as Emerging Economies: Lack of Infrastructure.”

Among the developing countries, China and India have taken some significant economic steps toward material development. Today, China is the third largest economy. However, India’s technological and soft-war related industries are remarkable. Yet, both of these countries face innermost challenges in developing infrastructures such as roads, electricity, water, and rural reconstruction. Even in education, at the primary level, there are serious problems to be dealt with. This research addresses these issues in order to establish a thesis, that for proper development, there must be an interpretation of various sects. This study is a comparative analysis between these two countries and show what each lacks. The primary conclusion is that India is ahead in democratic progress, where as China is advanced in economic strategies.

Josh Maurer  
Faculty Sponsor: Mark McNaught, Geology  
“Tectonic Evolution of Billion Year Old Calcium Silicate Metamorphic Rocks of the Adirondack Lowlands, New York”

Calcium Silicate rocks from the Adirondack Lowlands were examined to see if the rock unit represented a continental scale suture onto the proto-North American continent over a billion years ago. Forty-five samples were collected in the field and analyzed using microscopes and analytical instrumentation at Colgate University and Mount Union College. Structural data was collected in the field and plotted using stereonets to determine the trend of deformation. Results suggest the structural deformation is a result of a regional metamorphic event and not the primary constituent of a suture zone. Chemical analysis suggests the original material was an impure sedimentary rock that formed in a deepwater basin that got pushed onto the continent, deeply buried, metamorphosed, and then uplifted to the surface. The results do not correlate with a major suture zone; however the whole rock chemical data closely mirrors that of a previously described unit, the lower marble. If the rocks are actually a part of the lower marble then stratigraphic relations can be implemented to fit time constraints to deformation.
Hailey Mills  
Faculty Sponsor: Jamie Capuza and Govind Shanadi, Communication  
“The Effects of Communication Technologies on Communication Satisfaction in Long Distance Relationships”

The purpose of this study is to measure communication satisfaction in long-distance relationships when using new communication technologies. An increasing number of couples are working to maintain long distance relationships, thus facing unique communication challenges. Also, more people are adopting new communication technologies and these technologies may be influencing communication patterns. This survey was conducted by asking students who are in long distance relationships to answer questions regarding their satisfaction using phone, electronic mail, instant messenger, and text messenger. A description and analysis of the findings and their implications are presented.

Kelly Neale  
Faculty Sponsor: Lin Wu, Biology  
“Using Real-time qPCR to track Batrachochytrium dendrobatidis presence in aquatic environments over time”

The fungus Batrachochytrium dendrobatidis is parasitic to amphibians, taking residence in the keratinized cells of the amphibians’ skin to mature and reproduce, potentially causing death of the host organism. Recent years have seen a pandemic-scale spread of the infectious organism, decimating many amphibian populations. The intent of this study was to investigate the changes in B. dendrobatidis prominence in two aquatic environments from early May to late August. Water was sampled and filtered monthly from various sites at the Huston-Brumbaugh Nature Center Pond in Alliance, Ohio and the Strongsville Wildlife Area in Strongsville, Ohio. DNA was extracted from each of the filters for assessment by quantitative polymerase chain reaction (qPCR). A measurable amount of B. dendrobatidis DNA was not found in any of the water sampled. The concentration of B. dendrobatidis zoospores suspended in the water of the sites investigated may then be concluded to have been very low during the time sampled. Future research is necessary to fully assess the seasonality of B. dendrobatidis outbreaks, ideally utilizing sites where the organism is already seen to be causing disease among amphibians, or taking advantage of more sensitive detection techniques.

Marissa Philips  
Faculty Sponsor: Brandon Sheafor, Biology  
“The Heritability of Antimicrobial Peptides in the Panamanian Golden Frog”

Amphibian populations and Panamanian golden frogs in particular, are declining due in large part to chytridiomycosis, an amphibian disease caused by the fungus Batrachochytrium dendrobatidis. Amphibians have some innate defenses against chytridiomycosis, including antimicrobial peptides (AMPs) in their skin secretions. The role that AMPs play in fighting chytridiomycosis is not completely understood and varies between species. For my research, peptides of both parent and offspring golden frogs were collected from zoos around the country. The peptides were dried and their effectiveness analyzed to determine if golden frogs can pass on resistance to their offspring via AMPs and thus help them fight chytridiomycosis. If the antimicrobial peptides are indeed heritable, this research opens the door for conservation possibilities. Golden frogs could
then be selectively bred to combat the amphibian chytrid fungus. The two species of golden frogs, *Atelopus varius* and *Atelopus zeteki*, have been declared critically endangered and are all but extinct in the wild. My research may provide further insight into fighting chytridiomycosis in the wild as no treatment against this fungus currently exists.

Eric Popczun and Robert Surbella  
Faculty Sponsor: Ben Burlingham, Chemistry  
“Methodology for the Synthesis of α-β Unsaturated Aryl Sulfonates”

A recent study into the development of antibiotics was hampered by the inability to synthesize aryl esters of unsaturated sulfonates. The currently reported methodology for the synthesis of α,β-unsaturated sulfonate esters is a multistep process, and no aryl esters of α,β-unsaturated sulfonate have been reported in the literature. We have recently developed methodology using the Horner-Wadsworth-Emmons approach to address this problem. By treating phenyl α-diethylphosphonomethanesulfonate (recently reported in our lab) with butyllithium followed by benzaldehyde at -78 °C, phenyl 2-phenylethylensulfonate was isolated in 59% yield. The scope of this methodology has been determined by treating a variety of aryl α,β-unsaturated sulfonate esters with a series of aldehydes and ketones and is reported herein.

![Chemical structure](attachment:chemical_structure.png)

Abigail Prentice  
Faculty Sponsor: Theresa Davis, History  
“Truth and Consequences”

The terrorist attacks of September 11, 2001 devastated the US. There was little known about who was attacked the United States and why they did it. This research provides a comprehensive examination of the various parts of the 9/11 attacks including religion, training and preparation, and the events themselves. More importantly, it also addresses the most difficult question: Did the government fail to stop the terrorists? Many scholarly sources were used to answer this question. This study concluded that the attacks occurred under the radar of the CIA, FBI, and other government agencies. Since current US policy is dominated by concerns with terrorism, it is essential to carefully examine the people and reasons involved, so that we can have a better understanding of those involved.

Stephanie Sage  
Faculty Sponsor: Jeremy Ervin, Education  
“An 8th Grade Language Arts Teacher’s Perspective”
Brielle Sautter
Faculty Sponsor: Jeff Draves, Chemistry
“The Incorporation of Videos in Science Classrooms”

Previous research has shown that using videos in classrooms have a positive correlation with student progress. The goal of this work is to assess the effect that videos will have in an introductory chemistry class. A series of videos showing chemistry homework problems being solved was prepared. The videos were made available online to one of two classes, and students in this class were encouraged to watch these videos. The students’ use of the videos was monitored using an online classroom management system. Pre- and post-testing of chemical problem solving and conceptual understanding of the material presented in the videos was conducted in both classes. The progress will be compared between the two classes based on the results of the two tests and the usage of the videos. Preliminary results suggest that these videos were beneficial to students.

Andrew Schneller
Faculty Sponsor: Jeff Hahn, Sociology
“What are some of the Factors that Cause Intimate Partner Abuse?”

This research examines some of the factors that may cause Intimate Partner Abuse. This study is a secondary analysis of data from, “Violence and Threats of Violence Against Women and Men in the United States, 1994-96” (Nancy Thoennes and Patricia Tjaden, 1998). In the original research, a telephone survey of over 16,000 men and women in the United States was conducted, asking about violent acts committed against them. My research examines how gender, alcohol use, and military experience affect an individuals’ likelihood of committing abuse towards their partners. The results indicate some correlations among these factors.

Kevin Shadrach
Faculty Sponsor: Beth Canfield Simbro, HPSB
“Northeast Ohio Sexual Education: Who’s Teaching What”

There is a controversy about how sex education should be taught in schools. Clear logic can be used to argue that a comprehensive sexual education curriculum should be used to prepare students to make knowledgeable and responsible choices concerning their sexuality. This however is not enough to coax many school districts into adopting such a style of teaching about sexuality. The national statistics back the argument for comprehensive sexual education, but the local statistics are absent. This project retrieved the data necessary to promote the Ohio Prevention First Act which will require sexual education to be provided to students with information about abstinence, contraception, and sexually transmitted disease including HIV/AIDS. In collecting this information a list of northeast Ohio school districts was compiled and interviews were conducted. Information collected included the administrative position holders at each school, the curriculum currently being used, the text book currently being used, and the pregnancy rate in that particular school. By looking at the pregnancy rate compared to the type of curriculum, the effectiveness of the school’s sexual
education can be evaluated. This evaluation of each program’s effectiveness will hopefully provide legislators with more leverage in passing a law which will increase awareness and responsibility in students across Ohio.

Travis Todd  
Faculty Sponsor: Len Epp, Biology  
“The Effects of Benzocaine and MS-222 on Ambystoma tigrinum and Ambystoma mexicanum”

Benzocaine and MS-222 are both commonly used anesthetics for cold-blooded animals. However, little is known about the effects each might have on animals when used over an extended period of time. Nor is it known what concentration levels are best used to anesthetize the animals. Two different concentrations of benzocaine (0.05% and 0.1%) and MS-222 (0.025% and 0.05%) were applied to Ambystoma tigrinum and the effectiveness was determined. Each of the higher concentrations were favored and found to be the most effective. To determine what if any effects these anesthetics might have on the animals one set of five animals was exposed to each drug everyday for four weeks and compared to a control group that was never anestitized. Some effects that were observed included an increase in weight, length, and duration of anesthesia. The most obvious effect was the time it took for benzocaine to anestitize animals. Ambystoma tigrinum seemed to show a developing resistance to benzocaine anesthesia, taking about 5 minutes longer for complete anesthesia at the end of the experiment compared with the beginning. These same calculations were performed for Ambystoma mexicanum and the results are being interpreted for presentation.

Melissa Turk, Toni DeSanto, Ashley Webb and Brandon Wray  
Faculty Sponsor: Kristine Turko, Psychology  
“Motivation among Athletes: Its effects on Satisfaction and Performance of the Sport”

There are different motivational components that an athlete can execute to achieve better performance and satisfaction within a sport. The purpose of this research was to determine what motivates college athletes in a team setting and to determine if those factors relate to performance and satisfaction. Previous research has suggested that intrinsically motivated individuals with a goal oriented outlook are more successful in their performance, and are also more satisfied with their participation in the sport. Our research investigates male and female basketball, softball and baseball players to help us draw correlations between types of motivation, performance and satisfaction. The methods used in the research include a two part survey which will measure the athletes’ motivation and satisfaction. The experiment also evaluates performance based on the athletes’ goals and the ratings of those goals. The results of the measures will be used to assess whether intrinsically motivated athletes have a higher level of satisfaction and performance. The findings of this research can be used to guide those individuals who are not satisfied with their sport to focus on different motivational components.

Danielle Vaughan  
Faculty Sponsor: Jeremy Ervin, Education  
“A 6th Grade Social Studies Teacher’s Perspective”

No Abstract Submitted
Kevin Watkins  
Faculty Sponsor: Kim Risley, Biology  
“Herpesviridiae: Using Bioinformatics to Determine Conservation and Function of Herpes Virus Proteins”

Human herpes viruses are divided into three families based on pathogenesis and genome organization. During viral replication, the viral DNA that was produced by the host is cleaved and packaged into the viral capsid. There are seven proteins involved in this: UL6, UL15, UL17, UL25, UL28, UL32, and UL33. The purpose of this experiment was to determine the conservation of these proteins and compare them to proteins of other viruses to help determine function. The tools used to complete this were the statistical databases of Swiss-Prot and TrEMBL and basic local alignment search tool (BLAST). The most conserved protein was UL15 and the least was UL17. UL25 was found to be similar to another viral protein involved in the stabilization of DNA in the viral capsid. UL15 contains the Walker A and Walker B boxes, indicating that it binds to ATP, which is necessary for the ATPase activity of terminases. UL15 was also found to contain a putative nuclear localization sequence (NLS). These findings will direct future research to better understand the function of these conserved protein regions.

Ruby Watts, Haley Cappa, Karen Rudibaugh, and Mari Ballentine  
Faculty Sponsor: Brian Woodside, Psychology  
“How Priming Affects the Motivation of College Women in Regards to their Career Future”

The purpose of this study was to examine how the career motivation of college age females was influenced by negatively or positively biased information. Motivation was defined as the drive and desire for women to accomplish their career goals as well as the perceived likelihood that they will accomplish said career goals. The research design presented one group of college age women with negative information on women in the career world, one group with positive information on women in the career world, and one group with no information. Then, each participant completed a survey to measure their career motivation. The results and implications are discussed.

Lauren Weber  
Faculty Sponsor: Len Epp, Biology  
“Regeneration of Nerves in Denervated Limbs of Ambystoma tigrinum”

Urodele amphibians are capable of limb regeneration. However, it is well known that the presence of nerves is required for regeneration. Denervated amphibian limbs do not regenerate. The goal of this project was to investigate the possible regeneration of nerves in the denervated and amputated limbs of tiger salamanders (Ambystoma tigrinum). Regrowth of nerves was investigated by staining nerves with an antibody to neuritin, a neuronal membrane protein. Nerves that had not yet undergone degeneration were seen up to Day 5. A loss of intensity of the nerve staining from Day 5 through Day 15 indicated degeneration of the severed nerves. Intense staining at Day 20 may indicate reinervation of the wound epidermis. No observed staining at Day 25 indicates either degeneration or no regrowth. Intense staining reappeared at Day 30. These results may represent the variability of regrowth suggesting that the time frame of reinnervation differs with the individual. It could not be determined if severed nerves ever re Angioplasty; nor how long this process takes.
Steve Williamson  
Faculty Sponsor: Jeff Hahn, Sociology  
“Respectability and Crime”  

This research examines the prominence of social stereotypes in making judgments about criminals. Specifically, it was hypothesized that the greater one’s perceived respectability, the less likely one would be perceived as a criminal. Respectability was operationalized as an alleged offender’s gender, race, and age. Data were collected via an online survey of Mount Union College students in which students were asked to match photos of alleged offenders with the descriptions of various types of crimes. Results show that some types of people were more likely to be identified as criminals than were others.