

**CELEBRATION
OF STUDENT RESEARCH
AND CREATIVE ACTIVITY**

**XAVIER UNIVERSITY
APRIL 19, 2010**

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POSTER PRESENTATIONS

1. NOISE ON OUR LANDSCAPES: A SERIES OF SCREENPRINTS

Jake M. Ferry (Suzanne Chouteau)

Department of Art



This set of prints represents sound as shape in the environment around us. The sounds are printed to be visually intrusive shapes to mimic an environment's audibly intrusive sound pollution. The prints compare how sound pollution varies in man-made and natural environments from downtown streets to deep forests. The landscapes are screened using the CMYK photo emulsion process by exposing the photosensitive screen to transfer an ink-jet printed stencil onto the screen; one each for cyan, magenta, yellow and black. The shapes are then screened throughout and on top of the CMYK layers, representing how sounds emerge and interweave within the environment. By combining graphic shapes and photo-realistic images, unsettling feelings of noise pollution are evoked. The prints encourage viewers to reexamine their perception of everyday sounds.

2. ARTIFICIAL HUMANITY: A SERIES OF MONOPRINTS

Jenna Zavala (Suzanne Chouteau)

Department of Art



In the current medical field many advances have been made to ensure the longevity of the human life, but are these new technologies compromising our humanity? Human is currently defined as pertaining to, characteristic of, or having the nature of people. As failing human organs are replaced with more efficient robotic models, brains are given computer chips to ensure every memory and parents are provided with the choice of their child's DNA structure, the question arises: when are we no longer human? Medical literature about life saving technology was analyzed. Additionally, Thoratec Corporation, manufacturer of artificial heart devices, provided an artificial heart device for modeling purposes. A series of these advancements are analyzed through monotype printmaking in efforts to determine what defines the human. The prints are created through the process of layering thin layers of ink on wood and Plexiglas and transferring it to the paper, along with experimentation in combining woodcut and transferring ink through a hand-drawn process. The comparison between organic and inorganic takes place in both the subject and the process. The prints alone cannot determine the outcome of humanity, but they predict a change in how the human race defines itself and bring into question: at what cost is the longevity of the human life? Though these technologies can save lives, what is the quality of that human life going forward?

3. FRATAXIN LEVEL CORRELATES WITH INCREASED CARDIOMYOCYTE APOPTOSIS AND DECREASED CARDIAC FUNCTION

Emma J Cordes, Sonia Walton, Wendy Tomamichel, Mark Payne (Dr. Dorothy Engle)

Department of Biology



Friedreich's Ataxia is a genetically inherited disorder characterized by progressive degeneration of the nervous system and cardiac malfunction. The disorder causes a malfunction in the production of the protein frataxin which is essential for mitochondrial function. Lack of frataxin causes iron build-up in the mitochondria and leads to cell damage and death. Frataxin deficiency in cells eventually leads to apoptosis, or programmed cell death. Apoptosis of the myocardial muscle cells correlates to hypertrophic cardiomyopathy resulting in decreased cardiac function and often subsequent heart failure. Model mice that have the frataxin producing gene completely knocked out show a significant increase in apoptotic cells in the heart tissue and decreased cardiac function as observed through echocardiography. This experiment studied the correlation between the quantity of apoptotic cells and cardiac function in model mice.

4. MEASURING CHANGES IN ADHERENCE TO DIABETES MANAGEMENT IN YOUNG ADOLESCENTS

Kathleen O'Donnell Coy (Dr. Dorothy Engle)
Department of Biology



The management of type 1 diabetes is a lot of responsibility for any individual to handle. In the life of a young adolescent transitioning from childhood to adulthood, the tasks involved in controlling diabetes can be overwhelming. If proper adherence is not maintained however, the short and long term consequences can be very serious, including ketoacidosis, hypoglycemic episodes, and circulation problems leading to amputations and vision problems. Measurement of adherence can be done through blood sampling, interviews, and questionnaires, all of which have been employed in this study to investigate the change in adherence as a child progresses through adolescence. The hope is that if any changes are found, their causes can be addressed, and patients with type 1 diabetes will be able to lead healthier lives.

5. FOSSORIAL ADAPTATIONS IN THE FORELIMBS OF MAMMALS

Michael G. Boesken (Dr. William Anyonge)
Department of Biology



The Class Mammalia consists of many species that display a broad range of fossorial (digging) abilities. These species depend on digging for creating burrows and foraging for food and should exhibit similar forelimb skeletal structure that reflects their fossorial habit. In this study the anatomy of the forelimb in several specialized scratch diggers (aardvarks, armadillos, and anteaters) was compared to that of less fossorial species such as wolverines and badgers. A series of indices were computed from a set of forelimb linear measurements and analyzed to investigate how evolution has shaped the relationship between bone and muscle systems in the selected fossorial species. Results indicate that the species with the highest degree of fossoriality (aardvarks and armadillos) exhibit significantly longer moment-arms (large olecranon processes) and relatively shorter out-levers (shorter distal limb elements), which are indicative of increased force advantage in the forelimb musculature. The results also indicate that, in general, fossorial species tend to have similar limb morphology (robust limbs with pronounced processes for large muscle attachments) that has resulted from convergent evolution.

6. SKELETAL MORPHOLOGY OF MEDIUM-SIZED CAT SPECIES

Richard M. DeLano (Dr. William Anyonge)
Department of Biology



This study investigated the skeletal morphology among a group of four medium-sized cat species of the *Panthera* lineage, namely: Leopard (*Panthera pardus*), Jaguar (*Panthera onca*), Snow Leopard (*Panthera uncia*), and Clouded Leopard (*Neofelis nebulosa*). For comparison, Puma and Cheetah (*Puma puma* and *Acinonyx jubatus*) of the Puma lineage were also considered in the study. Limb bone measurements were analyzed to determine locomotor adaptations such as lengthening of bones for running or shorter bones for increased robustness. Also, a series of cranial characteristics were measured, analyzed, and compared among the cats. From this data, feeding adaptations could be determined such as bite force and preferential use of tooth types between species. Results were then used to infer ecological (niche) specializations among these medium-sized predators.

7. LIMB AND SKULL STRUCTURE IN RELATION TO HABITAT AND DIET AMONG THE PROCYONIDS

Kishundra Denise King (Dr. William Anyonge)
Department of Biology



This study investigated limb and skull morphology as it relates to habitat and diet among six species (*Bassaricyon*, *Potos*, *Bassariscus*, *Nasua*, *Nasuella*, *Procyon*) of the raccoon family (Procyonidae). Most of these species live in temperate and tropical areas of the western hemisphere. Many Procyonids shelter in hollow trees or in rock crevices. Typically their diets are omnivorous, with the exception of a couple of species that mainly depend on berries. It was hypothesized that the known diets and habits among the procyoninae should correlate to the dental and limb characteristics, respectively, and that these characteristics may indicate adaptations to specific niches

(microhabitats) for each of the selected species. An analysis of variance was performed on 12 cranial features and 5 limb measurements to test this hypothesis.

8.

LOCOMOTOR ADAPTATIONS IN PROSIMIANS

Elizabeth C. May (Dr. William Anyonge)

Department of Biology



Prosimians are Old World primates inhabiting Southeast Asia, Indonesia, and Africa with a particular concentration on the island of Madagascar. While their native geographies contain varying local habitats and ecosystems, the overall sizes and locomotor behavior of the different species of prosimians also vary. This study compares limb proportions in prosimians adapted for vertical activity that requires quick movements over large arboreal distances to those found in prosimians that dwell mostly at low tree levels or confine their movement to the ground. Preliminary results indicate that leapers have relatively short and robust limbs, with fore and hindlimbs of near equal length, whereas slow moving species exhibit elongated hindlimbs.

9.

THE IMPACT OF AMUR HONEYSUCKLE, *LONICERAMACKII* ON THE SOIL DYNAMICS OF SOUTHWESTERN OHIO'S FORESTS

Ravi Gupta, Nick King-Smith, Bashir Rawas (Dr. Brent Blair)

Department of Biology



Amur Honeysuckle (*Lonicera Maackii*) is an invasive woody shrub currently located in many forests of eastern North America. This shrub is considered an invasive species due to its negative impact on native species and other adverse environmental impact. One way that Amur Honeysuckle is thought to negatively impact the environment is through increasing nitrogen levels in the soil. Increased soil nitrogen may give a disproportionate advantage to some invasive plants which are able to quickly utilize the additional nutrients for increased growth but may be a disadvantage to native species that may be outcompeted. The current study seeks to determine the effects of Amur Honeysuckle on soil N availability in Mt. Airy forest in Cincinnati, OH. Soil samples were taken from numerous paired plots (one occupied by Amur Honeysuckle, the other by native forest plants) and tested for available nitrogen. Tests were conducted via spectrophotometry which produced nitrate readings through detection of KCl extractable nitrate in the soil samples. Results are pending but we expect to find higher levels of nitrogen Amur Honeysuckle plots which would support the hypothesis that this invasive species increases the availability of nitrogen in the surrounding soils.

10.

RELAXATION OF BOVINE ARTERIES INDUCED BY TREATMENT WITH BRADYKININ AND HYPOXIA

Katherine Goetz, Nancy Gomez, Saura Henry, John Hoenemeyer, Allie Thompson,
Anne Marie Walters (Dr. Lisa Close-Jacob)



The principle mechanism for vasoconstriction and vasodilation of coronary arteries requires the presence of an intact layer of endothelium on the intimal surface (Furchgott). The effects of U46619, bradykinin and hypoxia on the contraction and relaxation responses of the bovine left anterior descending (LAD) artery and its left branch were tested. It was hypothesized that the left branch would display a larger percent relaxation in response to both bradykinin and hypoxia. Arterial rings were hung on force transducers in a 37°C Krebs solution with a 95%O₂-5%CO₂ gas mixture bubbled in and remained at a constant pH of 7.4. Arteries were treated with U46619, a receptor-mediated contracting agent. After equilibration, arteries were exposed either to bradykinin, a relaxing agent, or to hypoxia. The contraction and relaxation patterns of the arteries were recorded using Chart. Our data for bradykinin and hypoxia did not support our hypothesis. More specifically, the percent relaxation due to bradykinin was consistently and notably larger in the LAD than in the left branch. Under hypoxic conditions, the LAD and left branch displayed inconsistent percent relaxation with the left branch having a higher percentage, but only some of the time.

11. PHYLOGEOGRAPHIC COMPARISON OF TWO NORTHERN MOCKINGBIRD POPULATIONS

**Brian M. Carlson, Sean M. Gallagher (Dr. George Farnsworth)
Department of Biology**



In the past, taxonomic groupings have been defined, in large part, by comparison of easily observable characteristics, including morphology, range and behavior. However, with the advent and ever increasing availability of genetic sequencing technology, phylogenetic comparisons, when available, have rapidly become the accepted method for investigation and characterization of the genetic and evolutionary relationships between organisms. Recently, such inquiry has provided many surprising insights, especially with regard to avian taxonomy. One area of particular interest to ornithologists concerns the phylogenetic and phylogeographic comparison of avian subspecies, which has the potential to either support or challenge accepted taxonomy. In this study, the genomes of four individuals representing each of two Northern Mockingbird (*Mimus polyglottos*) populations (Cincinnati, Ohio and Raleigh, North Carolina) were tested for compatibility with sequencing primers for two mitochondrial and eleven nuclear loci. Those loci which were amplified satisfactorily across all eight individuals were then sequenced and the variability of the nucleotide sequences at these loci were used to facilitate phylogenetic and phylogeographic comparisons within and between the two populations. Ultimately, this study and the results obtained form the basis of an ongoing and more comprehensive study, in which multiple specimens from various localities, representing all three currently defined *M. polyglottos* subspecies, will be included. The results of the ongoing study have the potential to either support or challenge currently accepted taxonomy within the species.

12. LEAD CONCENTRATIONS IN FEATHERS OF *MEGASCOPS ASIO* IN HAMILTON COUNTY

Lauren A. DiBenedetto, Heather R. Garner, and Wade J. Hasenour (Dr. George Farnsworth and Dr. Barbara Hopkins)

Department of Biology and Department of Chemistry



This study presents the concentrations of lead in the feathers of twenty-three Eastern Screech Owls (*Megascops asio*) from Hamilton County, OH. The feathers were weighed, dissolved in 67% HNO₃ while heated, and then diluted to 1% HNO₃. Using a graphite furnace spectrophotometer, the concentrations of lead were determined by means of a standard calibration curve. We hypothesized that feathers taken from birds after 1996 would have slightly decreased lead concentrations due to the nation's effort to phase out leaded gasoline. Interestingly, no significant increase or decrease was found in feathers of birds from the years 1882 to 2010. According to our data, the use of *Megascops asio* feathers does not appear to be a reliable method of determining lead concentrations. However, differences in age should be considered in future studies to better validate results. Similar studies continue analyzing for copper as well.

13. NUMERICAL DISCRIMINATION DURING FORAGING IN WILD NORTHERN MOCKINGBIRDS

Emily TenBrink, Katie Radkowski, and Brendan Beck (Dr. George Farnsworth)

Department of Biology



According to optimal foraging theory, animals that can maximize their foraging opportunities are favored by natural selection. The most profitable foraging option is the one that maximizes energy intake by containing the most calories or requiring the least amount of energy to obtain, while also minimizing the risk of predation. Therefore, optimal foraging necessarily requires the discrimination between risk and reward. The purpose of our experiment was to investigate whether wild Northern Mockingbirds (*Mimus polyglottos*) could optimize their foraging outcome using numerical discrimination regarding risk and reward. We hypothesized that the mockingbird would preferentially choose a feeder following the tenants of optimal foraging theory. Using a custom plexiglass feeding apparatus and meal worms, (*Tenebrio* larvae) a mockingbird was tested in three separate experiments for his ability to preferentially differentiate high risk from low risk, high reward from low reward, and a combination of risk and reward. The results of our experiment found that the mockingbird

was able to preferentially discriminate high risk from low risk and high reward from low reward. However, when presented with a combination of risk and reward, the mockingbird did not exhibit a preference in his choice. Therefore, our results indicate that the Northern Mockingbird tested was able to numerically discriminate risk and reward separately, but not simultaneously.

14. THE EFFECTS OF OCEANIC SALT ON THE ABILITY OF THE SYMBIOTIC RELATIONSHIP OF *AZOLLA-ANABAENA* TO FIX NITROGEN

Samantha Choyke (Dr. Linda Finke)

Department of Biology



Azolla caroliniana is a freshwater fern from a genus very frequently used to fertilize rice paddy fields. *Azolla* incorporates nitrogen from the air into biological compounds through the process of nitrogen fixation. There must be a symbiotic relationship between the cyanobacterium *Anabaena azollae* and *Azolla* in order for this nitrogen fixation process to occur. Found in a central cavity on the topside of the fern, the blue-green alga: *Anabaena azollae* uses light as a source of energy. The organism converts dinitrogen found in air into ammonia through the action of the enzyme nitrogenase. Ammonia is then used to synthesize organic compounds. This process is very important due to the rise of agricultural salinity levels affecting nitrogen fixation. Therefore, this investigation focuses on the *Azolla-Anabaena* relationship and its sensitivity to salinity. Its goal was to determine how much nitrogen the *Azolla* is able to fix at salinity levels from 0 to 3%, supplied by Instant Ocean Sea Salt, an artificial seawater mix. An acetylene reduction assay was used to quantify nitrogenase activity. I predicted that the rate of production of the product should decrease as salinity levels increase from 0% to 3%.

15. JUGLONE: A POSSIBLE INHIBITOR OF NITROGEN FIXATION IN RED CLOVER

Amber Dent (Dr. Linda Finke)

Department of Biology



Nitrogen is an essential element needed for persistent plant growth. However, nitrogen cannot be readily used by plants in its elemental form, N_2 . Biological nitrogen fixation is the process by which nitrogen in the air is converted into a reduced form, the ammonium ion, which participates in the synthesis of proteins. The enzyme responsible for this process is nitrogenase. Red Clover, *Trifolium pratense*, is a leguminous plant that harbors symbiotic *Rhizobium* bacteria within its root nodules where these bacteria actually fix atmospheric nitrogen. Juglone is a brown-colored organic chemical found within the nuts of the black walnut tree. It is known to inhibit the growth of some plants that it comes into contact with, and often its effects are fatal by disturbance of chloroplast and mitochondrial function. The objective of this study is to determine whether juglone has an inhibitory effect on *Rhizobium*'s nitrogen fixation capability gradually as concentration levels increase, or if juglone inhibits nitrogen fixation only once a threshold concentration is reached, if such occurs. Ten pots of Red Clover seeds (approximately 14-16 per pot) were planted and allowed to grow for about 2 months. Juglone solutions at 0 (control), 10 μ M, 20 μ M, 30 μ M, and 60 μ M concentrations were applied once every week for 3 weeks to two pots each. The root systems of plants in each group were used to perform the acetylene reduction assay, a measure of nitrogenase activity, using gas chromatography and activity levels were compared.

16. EXPLORING *Nostoc commune*'s ABILITY TO FIX NITROGEN USING FIVE DIFFERENT pH MEDIA

Kyle Sierra, Nicholas Sacksteder (Dr. Linda Finke)

Department of Biology



Nostoc commune, a colonial cyanobacterium, plays a vital role in nature by supplying other organisms with essential nitrogen through its nitrogenase activity. This study was undertaken in order to explore the effects of exposure to a range of pH values from 4.5 to 11 on *N. commune*'s ability to fix nitrogen. Samples of *N. commune* colonies were obtained from Otto Armleder Park and grown in a nitrogen-free nutrient medium. Three cork borer sized samples were assayed for nitrogenase activity at each of five pHs in buffered solution. Nitrogenase activity was measured using gas chromatography and an ethylene standard curve. The study was pursued in order to determine optimal and sub-optimal pHs which facilitate this organism's nitrogenase activity in natural settings.

17. **CORRELATION OF VOCALIZATION AND SPECIFIC BEHAVIORS OF THE
TRICHECHUS MANATUS**

**Amanda Elizabeth Stevens, Cooper Lloyd Sawyer, Eloise Wall, Lan Hoang Nguyen,
Rachel Elizabeth Grady (Dr. Charles Grossman)
Department of Biology**



Our group researched Florida Manatees (*Trichechus manatus*), Stoneman and Douglas, at the Cincinnati Zoo and Botanical Gardens who were kept in a tank together. The purpose of our study was to see if there was any correlation

between vocalizations and specific behaviors. The behaviors we studied included barrel rolling, surfacing, and digging in the gravel. We watched previously recorded 40 to 45 minute videos, dating from July 2003 to November 2003, and documented number of squeaks and behaviors for a given 15 second interval. For our research, a correlation is indicated by a certain behavior and squeak within a 15-second interval. Based on past studies and initial interactions with manatees, both on video and at the Columbus Zoo, we predicted that increased activity would lead to increased vocalization. Our preliminary results indicate that there seems to be a positive correlation between the number of squeaks and barrel rolling, surfacing, and gravel digging. Barrel rolling seemed to be the greatest squeak inducer followed by surfacing and then gravel digging. Statistical analysis is in the process of verifying our initial hypothesis.

18. **QUALITY OF LIFE OF PEDIATRIC PATIENTS WITH NEWLY DIAGNOSED
EPILEPSY**

**Avnish Dhamija (Dr. Avani Modi, Cincinnati Children's Hospital)
Department of Biology**



Several studies in the past have documented the impact of antiepileptic drug therapy on the HRQOL of patients with epilepsy. Few studies have been performed among pediatric patients with newly diagnosed epilepsy. The primary purpose of this study was to compare HRQOL scores from baseline to a 4-month interval after the initiation of antiepileptic drug (AED) therapy in children and adolescents recently diagnosed with epilepsy utilizing a well-validated generic HRQOL measure (PedsQL). The secondary exploratory aim of this study was to examine gender differences in HRQOL scores at the 4-month interval after the initiation of AED therapy. Seventy four children with newly diagnosed epilepsy were recruited from the New-Onset Seizure (NOS) Disorder Clinic at Cincinnati Children's Hospital Medical Center. A retrospective medical chart review was conducted for these pediatric patients. No significant differences were found in HRQOL from the diagnosis date to the 4-month interval after the initiation of AED therapy on Physical, Social, School, Psychosocial and Total PedsQL scores. Although, an improved PedsQL score trend was found in the Emotional functioning scale. In addition, no significant differences were found in HRQOL scores between males and females at the 4-month interval. Short term changes in HRQOL cannot be expected. Evaluation of HRQOL at regular intervals can be utilized by clinicians to monitor impact of epilepsy on patient daily life in order to provide effective treatment.

19. **SOCIO-ECONOMIC FACTORS EFFECTING HIV/AIDS INCIDENCE IN
METROPOLITAN COMMUNITIES**

**Jeffrey P. Docena, Brenda K. Ratemo, Dr. Max Buot, Dr. Jennifer Wies (Dr. Jennifer Robbins)
Department of Biology**



The purpose of this study was to employ biostatistical techniques to examine distal factors which may strongly correlate with HIV incidence and may allow the possibility of predicting up and coming cities and demographics of the transmission risks of HIV infection. Socioeconomic factors were studied as important determinants of HIV risk in the United States which will allow for better prediction of at risk communities. US Census data across ~100 cities were correlated with HIV incidence data collected from the Centers for Disease Control for those same cities and analyzed by regression and ANOVA. Each category of independent variables was comparatively combined and analyzed. Analysis of the obtained data shows strong correlations between increased HIV incidence and the region where one lives, the type of housing one lives, and the education level one attains. Southern states

analyzed had twice the HIV incidence rates as the northern states and within these regions increased unemployment doubled likelihoods of HIV incidence. Doubling correlations were also noted with education and housing. An increase in vacant housing and female head-of-households nearly doubles the HIV incidence rate; while increased percentages of owner occupied housing decreases HIV incidence by almost two-thirds. Furthermore, receiving a bachelor's degree did not provide sufficient data as a factor which decreases HIV incidence. Rather, graduating high school showed a stronger correlation to decreasing HIV incidence. Biostatistical analyses indicated show strong correlations of HIV incidence as dependent not on race or sexual orientation and sexual activity per se; rather upon the location and status of one's living conditions accompanied with the education level attained which may predispose an individual to increased HIV risk factors.

20. SOCIO-ECONOMIC FACTORS AFFECTING THE SPREAD OF HIV IN RURAL AND URBAN CITIES IN THE UNITED STATES

Brenda K. Ratemo, Jeffrey P. Docena, Dr. Max Buot (Dr. Jennifer Robbins)

Department of Biology



The purpose of this study was to identify associative relationships between socioeconomic factors and HIV Incidence in different cities in the United States. A large amount of attention and research is concentrated on the primary causal factors of HIV while not taking to account the role played by distal causal factors. Abundance of research shows that HIV is linked to poverty and is therefore linked to the social factors that contribute to poverty or are a sign of poverty. If socioeconomic factors can be used as important determinants of HIV risk in different cities in the US, this would enable the prediction and identification of communities prone to this disease. In carrying out this research study, data of HIV Incidence was obtained from the Centers for Disease Control and sociodemographic data from the US Census for the year 2002 for 93 cities. The Microsoft Excel program was used to tabulate the data and to construct comparative graphs of each independent socioeconomic variable with HIV Incidence. ANOVA tests were also performed for each independent variable to account for significant differences. The Gini coefficient was used to determine the household inequality of each city and was found to range between 0.4-0.5 for most of the cities. Analysis of the graphs indicated that the income brackets of \$15000 and under and variables of individuals in poverty and female householders with no husband present showed a significant positive correlation. The income bracket of \$50,000-\$100,000 showed a significant negative correlation. It was also observed that the further away from 1 the male to female ratio was, the higher the incidence of HIV in the city. The data analysis showed that HIV Incidence is affected by particular socioeconomic factors acting together, not in isolation.

21. OXYGEN-ACTIVATING NICKEL (II) COMPLEXES

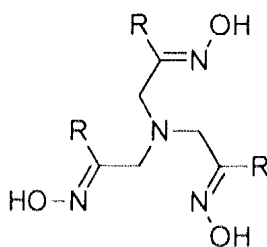
Richard J. Head and Kathleen A. Rudokas (Dr. Craig M. Davis)

Department of Chemistry



It is desirable to develop a catalyst that can activate molecular oxygen. Our collaborators, Michael Baldwin and co-workers at the University of Cincinnati, have synthesized a nickel (II) complex with the TRISOX ligand (which contains three oxime functional groups and three methyl side-chains). This catalyst promotes the oxidation of methanol, but stops functioning after ten turnovers. To limit possible side reactions of the catalyst our group synthesized bulkier ligands. The TRIPHOX ligand replaces the three methyl groups on TRISOX with phenyl groups while the TRITOX ligand replaces the aromatic phenyl groups with *tert*-butyl groups. The TRIPHOX and TRITOX ligands have been synthesized and then characterized by NMR spectroscopy. Catalytic function of the Ni-TRIPHOX complex has been probed; specifically, oxidation of methanol and benzyl alcohol has been observed qualitatively via IR spectroscopy.

TRISOX, R = methyl; TRIPHOX, R = phenyl; TRITOX, R = *tert*-butyl



22. THE DEVELOPMENT OF A HIGH PERFORMANCE LIQUID CHROMATOGRAPHY METHOD TO DETERMINE THE CONCENTRATIONS OF ROXARSONE AND OF *p*-ARSANILIC ACID

Margaret Mulligan (Dr. Barbara M. Hopkins)

Department of Chemistry



The focus of this research is to develop a method to detect and determine the concentration of roxarsone and *p*-arsanilic acid using high performance liquid chromatography. Roxarsone and *p*-arsanilic acid are organoarsenic compounds that are widely used as food additives to promote growth and control intestinal parasites in swine and poultry. As such, individuals stationed in feed-producing factories may be exposed to an unknown amount of these compounds throughout the workday. Due to the toxicity of arsenic, it is clear that these compounds may pose a serious threat to the workplace. Several methods have already been developed for the detection of these compounds including high performance liquid chromatography/inductively coupled plasma as well as gas chromatography/mass spectroscopy. Yet, HPLC-ICP is not commonly found in typical laboratories and roxarsone is not detectable at a low enough concentration with the GC-MS method. However, in the current research, using HPLC with a mobile phase of 64% methanol/34% water/2 %acetic acid and a detection wavelength of 325 nm allowed for the successful detection of roxarsone concentrations as low as 1% of the permissible exposure limit (PEL) as determined by the Occupational Safety and Health Administration. Similarly at a wavelength of 264 nm *p*-arsanilic acid was determined at a concentration that was 2.5% of the PEL.

23. THE SIMULTANEOUS DETERMINATION OF ACETLYSALICYLIC ACID, ACETAMINOPHEN AND CAFFEINE IN ANALGESIC TABLETS

Ruby Leyendecker (Dr. Daniel McLoughlin)

Department of Chemistry



Caffeine, Tylenol, and Aspirin are some of the most widely used over the counter medications. They range in use from fever reducers to relieving everyday mild aches and pains to being stimulants for our bodies.

Acetaminophen and acetylsalicylic acid are the chemical names of Tylenol and Aspirin. Caffeine, Tylenol, and Aspirin are often found compounded together in drugs such as Excedrin. These medications each have their own absorbance at a pH of 6. If a pure acetylsalicylic acid tablet is taken and mixed with a buffer then the absorbance can be found. The same can also be done with finding the amount of acetaminophen in commercial Tylenol and Ibuprofen in Motrin. Once all their individual absorbencies are found then Beer's Law, $A=abc$, can be used. Beer's Law can help to figure out the three concentrations simultaneously. However, instead of doing the long extended version, a quicker method can be used. This method allows for you to pick a wavelength where one is present and the other two are at a minimal. Therefore allowing you to calculate the absorbencies quickly and understand how the numbers came about.

24. IDENTIFICATION OF THE FATTY ACID COMPOSITION OF PORCINE AND CHICKEN FAT VIA GAS CHROMATOGRAPHY

Brad Schilling and Anna Zunick (Dr. Daniel McLoughlin)

Department of Chemistry



Gas chromatography, specifically one using a capillary column, is used to identify the composition of porcine and chicken fat. The Varian-SE-30 column type 30 meters by 0.32mm, non-polar detector thermal conductivity detector and flame ionization detector are being used. The capillary column typically gives more accurate results than the packed column, however, they are more easily overloaded. Fats are triesters of glycerol and long chain carboxylic acids (fatty acids). The saponification of the fat is done by treating the fat with a base, followed by a treatment with an acid. In order to make the sample compatible with the gas chromatograph, the fatty acids are treated with boron trifluoride and methanol to form methyl esters that are ready to inject into a gas chromatograph. The outputs from both detectors (flame ionization and thermal conductivity) will be used to show which one is better for different kinds of molecules. The second part of the experiment involves optimizing experiments used in the undergraduate organic chemistry laboratories, by monitoring the temperature of the column, detector, or injector, and changing the temperature accordingly.

25.

NOVEL SYNTHESIS OF A BLATTELLAQUINONE ANALOGUE**Carolyn D. Banks (Dr. Daniel McLoughlin)****Department of Chemistry**

The compound gentisyl quinone isovalerate, or blattellaquinone is a sex pheromone produced by adult female German cockroaches. Pheromones are species specific and do not lose effectiveness unlike bait-and-trap methods and can thus be used as part of an innovative pest control system. The pheromone (3,6-dioxocyclohexa-1,4-dien-1-yl)-methyl-3-methylbutanoate was isolated, characterized and given the common name of blattellaquinone in 2005 by Nojima et. al. Employing the procedure outlined by Feist, we have repeated their synthesis and designed two new synthetic pathways to make analogues of the compound that lack the ether linkage in blattellaquinone. Our first method employs a Friedel-Crafts alkylation reaction and our second method utilizes two conjugate addition Grignard type reactions. Results with these synthetic methodologies will be discussed. The non-ether pheromone analogue can potentially improve the cost efficacy and also hinder the degradation of the pheromone.

26.

DEVELOPING AN AIR SAMPLING METHOD FOR ORGANOTIN COMPOUNDS BY ANALYSIS USING HPLC AND A GRAPHITE FURNACE**Jennifer E. Grabo (Dr. Barbara M. Hopkins)****Department of Chemistry**

Organotins are often described as R_NSnX_{4-N} with the R group usually a butyl or phenyl group and the X group a chloride, fluoride, oxide, or hydroxide. They are widely used in industry in numerous products and manufacturing methods. Unfortunately, organotins are toxic and the safety of the workers is a concern. In order to ensure the safety of workers exposed to organotin compounds, the National Institute of Occupational Safety and Health has developed a method for sampling and analysing them in the workplace. Using High Performance Liquid Chromatography (HPLC) and a Graphite Furnace, organotins can be analysed and a sampling method can be determined. Using tropolone to complex with the organotin a noticeable separation can be attained. To determine the amount of tropolone needed to completely complex with the organotin, the method of continuous variation was used. Different mixtures of *n*-butyltin chlorides were analyzed using the HPLC and the graphite furnace. The HPLC was used to separate the *n*-butyltin compounds. Each compound had a different retention time which allowed for the separation of tributyltin, dibutyltin and monobutyltin. After the compounds were separated, the samples were transferred to the graphite furnace to analyze the amount of tin in each sample. This could be used to determine the amount of *n*-butyltin transferred.

27. ELECTROCHEMISTRY EXPERIMENTS FOR THE UNDERGRADUATE LABORATORY**Maily Pham (Dr. Barbara M. Hopkins)****Department of Chemistry**

An important aspect of the analytical chemistry laboratory curriculum for undergraduate students is doing experiments based on electrochemistry. In addition to traditional ways of collecting the data from such experiments, students can also use a networked electronic data collection system known as MeasureNet whereby data from all students in a laboratory are monitored and stored on a central computer. This system provides high quality data collection with individual group monitoring without the cost and maintenance of individual personal computers for each group. This project evaluates the use of MeasureNet for acid-base titrations and for various amperometric and potentiometric titrations using an optical drop counter and when appropriate an electrochemical probe. Factors influencing the accuracy and reproducibility of the results of such experiments are studied with the goal of developing guidelines for the performance of these experiments in a typical undergraduate analytical laboratory course.

28.

APPLICATION OF ASYMMETRIC CONJUGATE ADDITION REACTIONS FOR SYNTHESIS OF (+)KALKITOXIN**Nina R. Collins and Amy L. Feck (Dr. Richard J. Mullins)****Department of Chemistry**

The lipopeptide (+)-kalkitoxin, a metabolite produced by a member of the *Lyngbya majuscula* family of cyanobacteria, has been shown to exhibit

several antiproliferative biological properties. The most noteworthy of these properties is its cytotoxicity to an array of aquatic creatures as well as toxicity to rat neurons and human colon cancer cell lines. On the basis of this interesting bioactivity profile, we have worked to develop an efficient, and highly stereoselective synthesis of the parent molecule. Our efforts have focused on utilizing the conjugate addition of an allylic stannane and the catalytic asymmetric conjugate addition of a Grignard reagent for preparation of the aliphatic core. Our progress, which has thus far resulted in preparation of the aliphatic core of the parent molecule, will be presented.

29. APPLICATION OF ASYMMETRIC CONJUGATE ADDITION REACTIONS FOR SYNTHESIS OF (+)-PILOCARPINE AND (+)-PILOSININE

Reid M. Faylor and Michael W. Danneman (Dr. Richard J. Mullins)

Department of Chemistry



(+)-Pilosinine and (+)-pilocarpine are naturally occurring alkaloids produced by a member of the *Pilocarpus jaborandi* family of plant leaves found in the Amazons. A synthetic strategy has been developed which exploits the reversal of stereoselectivity observed when utilizing allylic organocopper and organostannane nucleophiles in asymmetric conjugate addition reactions to nonracemic 4-phenyl-*N*-enoyl-1,3-oxazolidinones. An alternate strategy focuses on the direct introduction of a hydroxymethyl equivalent via an asymmetric conjugate addition. These complementary reactions allow for the synthesis of both enantiomers of pilosinine, as well as the synthesis of pilocarpine and isopilocarpine from a common late stage intermediate. The flexibility of these multiple routes will be highlighted as providing ample opportunity for preparation of potentially important analogs of the parent compounds.

30. THE INFLUENCE OF EDUCATION IN REDUCING THE HIV EPIDEMIC

Renee Margevicius (Dr. Hem Raj Joshi)

Department of Mathematics and Computer Science



Throughout the world, the HIV epidemic continues to pose major problems for healthcare. While researchers are still trying to find a cure, other efforts are being made to decrease the spread of HIV by increasing awareness in education. One of these campaigns presented by the Uganda's government has shown positive results. This particular campaign, the ABC campaign, promotes Abstinence, Be Faithful, and Condoms to decrease the spread of HIV. The HIV/AIDS infection rates have decreased significantly due to organizations promoting this campaign and other educational information. A SIR model will be used to evaluate the effectiveness of these organizations on the HIV epidemic of Uganda. The campaigns change people's behavior in which the susceptible class will be divided into four different subgroups. These four susceptible subgroups will have different infection rates due to their differing beliefs on sexual conducts. The model is a system of ordinary differential equations in which data from Uganda about the epidemic and educational influences will be used to help estimate the parameters of infection rates. This model will be analyzed and compared to a standard SIR model.

31. THE EFFECT OF SATURDAY NIGHT LIVE POLITICAL PORTRAYALS ON PUBLIC PERCEPTION

Andy J. Bilyk (Dr. Mack Mariani)

Department of Political Science



This article examines the effect that Saturday Night Live political parodies have on the viewers who watch them. Two SNL parodies were used to test participants' views on President Barack Obama and former-Vice Presidential candidate Sarah Palin. Although the results were inconclusive, there is some evidence for a possible SNL effect and article shows that the SNL effect deserves further research.

32.

THE ACCELERATING UNIVERSE
Patrick Albaugh (Dr. Gregory Braun)
Department of Physics



The purpose of this research project is to verify the expanding, accelerating nature of the universe. While it is difficult to imagine a way to study something as such from our comparatively limited vantage point on Earth, there are methods by which we can do so through analysis of a specific type of supernovae, known as type 1A supernovae, whose luminosities are always the same because of the way they form. Since that luminosity is constant, we can determine how far away from Earth the supernova was when it occurred based on how bright it appears to us. As the light from the supernova reaches us, it exhibits a doppler redshift, which is evidence that the supernova had a velocity away from Earth when it occurred. As it turns out, the supernovae that originated farther away had higher redshifts, leading to the conclusion that those farther away from Earth are moving away faster than those closer to Earth. Comparison of the redshift to the observed brightness of the supernovae yields a mostly linear relationship, indicating the velocity at which the supernova moves away from Earth is proportional to the supernova's distance from Earth. This relationship is not perfectly linear, however, as the supernovae that are farthest away appear dimmer than expected based on their redshifts. This means these supernovae are moving faster than expected, which points to an accelerating, expanding universe. General relativistic considerations are taken into account throughout the analysis.

33. **3D PHOTONIC CRYSTALS FABRICATED THROUGH DIRECT LASER WRITING**
Meredith Henstridge¹ Timothy Gerke², (Dr. Rafael Piestun²), (Dr. Heidrun Schmitzer¹)

¹Department of Physics, Xavier University

²Department of Electrical and Computer Engineering, University of Colorado at Boulder



The propagation of light can be controlled in three dimensions by guiding it through a three dimensional photonic crystal. Controlling light in this manner may allow for optical circuitry, the analog to integrated electrical circuitry, to become a reality. We developed a procedure using a direct laser writing system and a subsequent electroplating process to fabricate gold photonic crystals. The substrates were prepared in two steps. First, a three boat thermal evaporator was used to deposit a 50nm layer of titanium and a 50nm layer of gold onto a 145 μm thick glass microscope coverslip. The gold layer serves as the seed layer necessary for the electroplating process, and the titanium layer is needed in order for the gold to adhere to the substrate. Next, AZ P4210 positive photoresist was spin-coated on top of the gold layer. From writing multiple test structures into these substrates, it was determined that scanning 75 microwatts of optical power through the photosensitive material at a speed of 25 nanometers/second yielded features with a desired size between 100 nanometers and 300 nanometers. Investigation into the gold electroplating process revealed that a time duration ranging between 5 and 30 minutes is required to fill a 6 micrometer tall structure.

34. **THE APPLICATION OF NUCLEAR MAGNETIC RESONANCE TO MEDICAL IMAGING**
Karen Moebius (Dr. Justin Link)

Department of Physics



The Physics senior project focuses on nuclear magnetic resonance, specifically its application in medical imaging with magnetic resonance imaging, MRI. The first part of the project includes an in-depth study of the background of MRI. The physics behind obtaining the signal to be imaged is studied in depth. This includes the study of the production of the magnetic field, varying the magnetic field, and administering radio frequency pulse to the patient. The study includes an understanding of how these affect the nucleus of the hydrogen atoms in the patient. Understanding how the signal is administered, including methods of administering the radio frequency pulse, the method for recording and measuring the signal from the patient is explored and understood. Given the signal from the patient it is shown how the signal becomes an image. The project explores MRI from producing the signal, measuring it, and explains the black box of converting it to an image.

**35. DEVELOPMENT AND TESTING OF A HIGH-TEMPERATURE SUPERCONDUCTOR:
SINGLE CRYSTAL BISMUTH STRONTIUM CALCIUM COPPER OXIDE**

Grant Spitler (Dr. Steven Herbert)

Department of Physics



Superconductivity holds many interests in the scientific community. Imagine having a compound that, under the right conditions, will induce a supercurrent; an electrical current which does not dissipate energy while being implemented. Bismuth Strontium Calcium Copper Oxide (BSCCO - 2212) is a popular form of high-temperature superconductor. Even more necessary for testing, is the ability to create a single crystal form of this superconductive material. A single crystal form can present information about superconductive and thermal properties where a sintered polycrystalline cannot. The necessary operating temperature exceeds the boiling point of liquid nitrogen, making it more cost effective to operate. Under proper sintering specifications, a single crystal of the compound can be formed. From this crystal, electrical specifications can be tested as it travels across the copper oxide plane under varying temperatures within the critical temperature (T_c) threshold.

36. EL IMPACTO DE LOS NARCOCORRIDOS SOBRE LOS JOVENES

Anna Canelas (Mrs. Maria Dolores Goddard)

Department of Spanish



Corridos are folkloric songs that describe events or popular people who have had an impact on the Mexican community. These types of songs have always been a part of Mexico's culture. During the Mexican Revolution corridos became exceedingly popular in describing the events of the war and the heroes that emerged from the Revolution. However nowadays corridos that tell stories of "narcotraficantes" or drug dealers have gained in popularity so much that this genre of corridos has been given the name "narcocorridos." The "at risk" adolescents who listen to this music are often seduced by the lyrics that lure them into the world of drug dealing. The lyrics appeal to the poor communities especially affecting the young adults who are tired of living in poverty and ready to do anything to live the luxurious lifestyle often described in the narcocorridos. Other young adults who are discriminated based on their low social class join "el narcotrafico" seeking acceptance and a sense of belonging. Lower class women who are also targeted in narcocorridos are lured into drug dealing finding it more respectable than prostitution. Mexican states that find narcocorridos threatening to society's wellbeing are utilizing censorship to prohibit these songs from playing on the radio. Despite this censorship, narcocorridos manage to reach its target population – the poor – recruiting more people into the world of drugs and violence.

**37. FEMALE GENDER IDENTIFICATION AS A FACTOR IN USING HUMOR AS A
SEXUALLY SELECTED TRAIT**

Erica M. Rosario (Dr. Cynthia Dulaney)

Department of Psychology



Evolutionary psychologists typically regard humor as a viable sexually selected trait because of its underlying predictive value of intelligence and social adeptness. Thus, both males and females characteristically regard humor positively within the context of a romantic relationship. Males commonly use humor as an intersexual advertisement, and therefore are more likely to value humor receptivity in their partners. Females, on the other hand, are expected to subscribe to this male intersexual advertisement, and are therefore more likely to value humor production in their partners. This study examines the relationship between degree of gender identity, valuation of humor in a relationship, and the extent to which gender identity predicts valuation of humor production or humor appreciation in a romantic partner. It is hypothesized that females who are typically more masculine in their gender identity will desire partners who are highly receptive to their humor, and that females who are more feminine in their gender identity will desire partners who are highly productive of humor. An analysis of results from the BEM Sex Role inventory and two other questionnaires indicated that there is indeed a correlation between gender identity and using humor as a sexually selected trait. Both feminine females and masculine females regard humor positively in romantic relationships. In addition, feminine females reportedly preferred humor producing mates, and masculine females reportedly preferred humor appreciating mates.

38. ALEXITHYMIA, INTERPERSONAL PROBLEMS, AND SYMPTOMS OF BORDERLINE PERSONALITY DISORDER

Erica M. Rosario (Dr. Nicholas L. Salsman)
Department of Psychology

This study examined the relationships among alexithymia, interpersonal problems, and borderline personality disorder (BPD). Alexithymia is defined as decreased ability to describe and express emotions. Previous research indicates that individuals high in alexithymia display insecure attachment styles and are more likely to engage in cold and socially avoidant behaviors which may lead to interpersonal problems. Research also indicates that alexithymic symptoms including difficulty describing and identifying emotions damage ability to properly regulate emotions, a problem common in individuals with BPD. In addition, Individuals with BPD often have trouble resolving conflicts which could lead to interpersonal problems. It was hypothesized that there would be significant positive relationships between interpersonal problems and BPD, between interpersonal problems and alexithymia, and between alexithymia and BPD. In addition, it was hypothesized that the relationship between BPD and interpersonal problems would be mediated by alexithymia. Significant, positive relationships were found between all constructs, but a mediational relationship could not be confirmed. Inability to establish alexithymia as a mediator in the relationship asserts that a construct other than the ability to describe and identify emotions influences the relationships between interpersonal problems and BPD.

39. ACADEMIC PERFORMANCE OF EARLY JUVENILE OFFENDERS

Sarah E. Bucher (Dr. Kathleen J. Hart)
Department of Psychology



Intellectual and academic deficiencies have been identified in male offenders as important contributing factors to delinquent behavior (Cornell & Wilson, 1992; Hoyt & Scherer, 1998; Wong & Cornell, 1999). However, the rate of juvenile offending among girls has risen dramatically over the last two decades (FBI, 2006), and little is known about the intellectual and academic functioning of this group. It is well established that girls who engage in juvenile offending are different from male juvenile offenders in a variety of ways (e.g., Pasko, 2006), and it seems likely that their intellectual and academic functioning also may differ from boys. We analysed the IQ test (WISC-IV) and academic test (Woodcock-Johnson Tests of Academic Achievement) scores of male and female offenders who had just entered the juvenile justice system. Descriptively, most mean scores were in the Low Average range for the summary scores of the Woodcock Johnson and the WISC-IV. Independent samples *t*-tests found significant differences between boys' and girls' mean scores for both instruments, with girls' mean scores higher than boys' for nearly all scores. These findings replicated the results of previous studies in finding significant delays in academic skills for our large sample and also found significant difference in some areas when comparing boys with girls.

40. PERCEPTIONS TOWARD OVERWEIGHT JOB APPLICANTS: DO QUALIFICATIONS MATTER?

Gail M. Cengia, (Dr. Christian End)
Department of Psychology



Overweight employees are subjected to more workplace discrimination than average-weight employees (Roehling, Roehling, & Pichler, 2007). Much of this stems from perceptions that overweight individuals possess negative personality traits compared to the average-weight individual (Polinko & Popovich, 2001). The current study aims to examine if qualifications and weight impact job selection decisions and perceived work-related attributes. Participants were randomly assigned to one of four conditions. A job description, resume, and picture were given to participants to evaluate. Participants rated applicants according to a personality assessment scale using a 7-point Likert scale (Larkin & Pines, 1979) including variables such as "decisive; indecisive, active; inactive". Two manipulation checks were used to ensure that participants perceived the overweight applicants and qualified applicants correctly. A two-way ANOVA was used to determine whether there was an interaction between weight and qualification. The hypothesized main effect of qualification was confirmed along with the hypothesized main effect of weight. The hypothesized two-way interaction between weight and qualifications was disconfirmed. The results indicate that qualifications have an impact

on the hireability of an applicant and that overweight qualified applicants are less hireable than average-weight qualified applicants. Further research should investigate applicant gender and ethnicity.

**41. CAN A SMILE ENHANCE THE PERCEPTIONS OF PEOPLE WITH FACIAL ACNE?
A QUANTITATIVE ANALYSIS**

Elizabeth A. Craig (Dr. Christian End)

Department of Psychology



The current study examined if a smile can positively impact the perceptions of an individual with facial acne. Participants ($n=140$) were randomly assigned to one of the four smile and facial conditions. They completed the Sentiments of People Questionnaire (SPQ), Attribute Questionnaire, and Reysen Likeability Scale pertaining to self-reported perceptions and judgments of the photograph. Higher total scores indicated higher positive attributes and likeability and lower scores indicated more negative attributes and likeability perceptions. Consistent with the hypothesis, the results indicated statistically significant main effect of smile and main effect of acne on the SPQ and the Attributes Questionnaire. Post hoc analyses indicated those in the smile acne condition ($M = 46.67$, $SD = 10.47$) and the neutral acne condition ($M = 41.41$, $SD = 9.80$) rated the target as being higher than the neutral clear target ($M = 39.71$, $SD = 10.76$). The results of the Attribute Questionnaire did not indicate significant interaction effect. The results supported the hypothesis that a smile can enhance perceptions of the photograph with facial acne to at least the perceived impressions and attributes of the neutral clear skin photograph. Future research should explore the role of acne severity and perceptions.

**42. EXAMINING THE INFLUENCE OF REALISTIC JOB PREVIEW ON JOB ACCEPTANCE
AND VOLUNTARY TURNOVER**

Lauren E. Hurley (Dr. Christian End)

Department of Psychology



Imagine interviewing for a job as a clown for a circus then discovering during training employees are also responsible for taming lions. Every day employees quit their jobs after realizing their duties are not what they expected. The current field experiment investigated the effectiveness of implementing a realistic job preview (RJP) to decrease job acceptance and voluntary turnover. Forty-eight employees at a Midwest university's phonathon (19 men, 29 women) were assigned to a RJP or favorable job preview condition. During interviews, all applicants completed a work simulation modeled after a phone conversation with an alumnus. In the RJP condition applicants completed three mock phone conversations. The "alumnus" provided a scripted response of agreement to donate, refusal to donate, and agreement to donate but refusal to commit to a specific amount. Both positive and negative aspects of the job were emphasized. In the favorable job preview condition applicants completed one mock phone call in which the "alumnus" agreed to donate. Only positive aspects of the job were presented. A Chi Square Analysis was used to compare job acceptance rates for both conditions. The turnover rates for both conditions were compared after two, four, and six weeks of employment. Inconsistent with the hypotheses, there were no statistical differences found between both conditions. Future research should examine larger sample sizes over a longer period of time. The influence of other forms of RJP should also be studied.

**43. SOCIAL CONTAGION IN COLLEGE: THE POSITIVE AND NEGATIVE EFFECTS ON
COLLEGE STUDENTS**

David M. Kelly (Dr. Christian End)

Department of Psychology



Social contagion is a prevalent factor in a college environment (Conway, 2003; O'Neil 2008; Levy, 2001). This study examined whether the valence of behaviors and attitudes, as well as participant's year in school, influences the level of "contagiousness". Based on the high prevalence of harmful contagion effects, harmful behaviors and attitudes were hypothesized to be more contagious than pro-social behaviors and attitudes. Additionally, because of their extended experience and adaption to a college campus, upperclassmen were predicted to be less susceptible to contagion effects than underclassmen. Participants completed a survey indicating their responses and the responses of the people in their living environment to the frequency of certain behaviors, including littering and recycling, as well as their attitudes toward these behaviors. The results yielded significant positive

correlations between the participant's and his/her peers' pro-social (recycling) and harmful (littering) behaviors and attitudes. There were no significant differences, however, in the correlations between self and others for pro-social and harmful behaviors and attitudes. Furthermore, there were no significant differences in group means between upperclassmen and underclassmen with the exception of attitudes toward littering. The results suggest that contagion affects all college students and can be utilized as a positive tool to promote pro-social behavior.

44. DANCING IT OUT: THE USE OF DANCE TO ENHANCE MOOD AND SOCIAL SKILLS

Courtney A. Kohlhepp (Dr. Christian End)

Department of Psychology



The current study investigated the effects of partnered dancing on mood and social skills. The researcher hypothesized that taking partnered dance classes would lead to a significantly higher positive mood in both the short-term and long-term, and greater social competence in the long-term. Before taking a 1-hour partnered dance class, 26 undergraduates completed the Positive and Negative Affect Schedule (PANAS) and the Social Performance Survey Schedule (SPSS), and only the PANAS scale after class. Participants learned a new style of partnered dance for one hour each week. After four weeks, participants completed the PANAS before and the PANAS and the SPSS after class. Consistent with the hypothesis, results of a paired samples *t*-test revealed a significant difference on the PANAS. Compared to pre-class, participants reported a significantly higher positive mood after taking the dance classes in both sessions, as well as from before the first session to after the second session. The results did not support the hypothesis that dancing leads to the development of greater social skills, for there was no statistically significant difference in scores before and after the month of classes. While dancing may not improve social skills, it is an effective means to enhance one's mood.

45. THE EFFECT OF JESUS' ETHNICITY AND PARTICIPANTS' RELIGIOSITY ON ARTIST LIKABILITY AND MOOD

Elyse M. Krause (Dr. Christian End)

Department of Psychology



This exploratory study examined depicting a non-Caucasian Jesus image effect on artist likability and positive mood. The researcher hypothesizes 1) high religiosity levels will correspond to higher levels of positive feelings and artist likability for a Caucasian depiction of Jesus than the African American and Middle Eastern depictions and 2) positive feeling and mood scores for the Caucasian Jesus image will be significantly higher than the other Jesus conditions. Undergraduate participants (65 male, 125 female) viewed one iconic Jesus image and completed scales measuring: artist likability, mood, and religiosity. Results were reverse scored and summed into categories: positive mood, artist likability and religiosity level. Jesus Condition x Religiosity ANOVAs were run for each summed score. Inconsistent with past racial preference research there were not statistical differences on positive mood and artist likability for Jesus Condition. The lack of statistical differences between the Jesus Conditions may be explained by participants' affiliation with a religiously liberal university. Religiosity had a significant positive effect on artist likability and mood. The interaction effect between Jesus Condition and Religiosity found statistically significant differences for artist likability and positive mood. Results suggest high religiosity has stronger effects on artist likability and mood than low religiosity.

46. THE EFFECTS OF AGE AND JOB TYPE ON UNDERGRADUATES' PERCEPTIONS OF PEOPLE IN THE WORKPLACE

Adam D. Peterson (Dr. Christian End)

Department of Psychology



The current study examines the effects of age and job type on undergraduates' perceptions of job applicants. It is hypothesized that undergraduates will exhibit an in-group bias, perceiving younger applicants as more hireable than older applicants, regardless of the type of job the applicants are applying for. Participants' perceptions of applicant characteristics and hireability were measured using the Controllability Ratings for Abilities and Parton et al.'s Hireability scales respectively. The hypothesis was disconfirmed, as the only significant age effects indicated that participants favored the older applicants when compared to younger applicants. Particular characteristics

with significant differences opposed indications of past research. Future research might benefit from exploring the perceptions of more specifically defined age groups.

47. OPTIMISM AND REALISM: COPING MECHANISMS FOR A DAILY STRESSOR

Catherine K. Phillips (Dr. Christian End)

Department of Psychology



The effect of stress in a college setting can have devastating results especially when little coping is utilized. Past research indicates that optimistic coping strategies can be beneficial. Specifically, individuals with an optimistic outlook have a better perceived sense of internal control over a stressful situation (Ruthig, Haynes, Stupnisky & Perry, 2009). The current study hypothesizes that the optimistic condition will predict a higher number of completed anagrams than both the realistic and control conditions. In addition, the optimistic condition will actually complete more anagrams. Participants were 99 undergraduate students who were randomly assigned into an optimism, realism or control condition. Participants were given a practice test that would prime them to think in terms of their respective condition. After estimating how many anagrams they would complete, participants were primed with a stressor and then given five minutes to complete a standardized anagram task. Surveys evaluating current state anxiety, life-orientation and self-efficacy were completed. Results indicate that the optimistic condition predicted a higher number of completed anagrams than the control, but there was no statistically significant difference between the optimistic and realistic condition. In addition, there was no statistically significant difference between conditions regarding actual completed anagrams.

48. GENDER DIFFERENCES AMONG THE EFFECTS OF ALCOHOL BASED VIDEO STIMULUS ON THE EXPECTANCY OF ALCOHOL BEHAVIOR

Joshua L. Prickett (Dr. Christian End)

Department of Psychology



Previous research strongly indicates gender differences among expectancies while intoxicated (George & McAfee, 1987). The current study expands previous research and examines if an alcohol based video stimulus depicting various alcohol-related situations affect the expectancy of behavior while intoxicated between males and females. Participants ($n = 101$) were randomly assigned to one of two video conditions, a positive and a negative condition. The same video was used in both conditions, but only the first half of the video depicting a female enjoying alcohol was shown to the positive condition and in its entirety showing consequences of her drinking to the negative condition. Participants completed the Stimulation Subscale, Disinhibition Subscale, and Behavioral Impairment Subscale (Southwick et al., 1981) after the assigned video and were summed separately where higher scores indicated higher levels of expected behavior. When scored separately, the hypothesized main effect of gender was confirmed in regards to the expectancy of perceived dominance and stimulation $F(1,97) = 4.23, p < .05$. The hypothesized two-way interaction between type of video and gender was confirmed on the behavioral impairment subscale $t(49) = 2.59, p < .01$. Because the video stimulus had a female character in the alcohol related situations, future research should use a more gender inclusive video clip to increase the overall applicability of the featured situations to all participants, specifically male participants.

49. THE EFFECT OF RELIGIOUS PRIMING ON SELF-ESTEEM AND SATISFACTION WITH LIFE

Keara Sherman (Dr. Christian End)

Department of Psychology



Past research indicates a positive correlation between religiosity and self-esteem and satisfaction with life. However, the majority of the research conducted has been correlational in design, necessitating a need for an experimental design. The researcher hypothesized that Catholic and Confucian priming devices increase self-esteem and satisfaction with life, in comparison to non-religiously primed individual, and also that because the majority of the participants sampled would be Christian, the highest levels of self-esteem and life satisfaction would be in the Christian condition. The participants, 115 college students, 70 female and 40 male, were randomly assigned to one of the three conditions and read a comparable passage from each faith tradition, Christian, Confucian, or non-religious. They took a memory test to hide the manipulation, then took the Rosenberg

self-esteem scale and Satisfaction with Life scale. Using a one-way between groups ANOVA there was found to be no significant difference between the conditions in levels of self-esteem or life satisfaction. This result may be due to a ceiling effect, as participants scored high on both scales across conditions or because the qualities of self-esteem and life satisfaction are not easily changeable in a short time period. Future research should consider increasing the priming device and constructing a more long term study with more participant variance.

50. THE IMPACT OF ATTRACTIVENESS AND TEAM AFFILIATION ON FIRST IMPRESSIONS

Elizabeth Fichtel, Gerald P. McDonnell, Amy Karbasi, Elyse Krause (Dr. Christian End)

Department of Psychology



The study examined the impact that sport team affiliation has on the perceptions of an individual's attractiveness. People tend to favor members of the ingroup compared to the outgroup. Additionally, people harbor more favorable impressions of physically attractive individuals compared to less attractive individuals. The study sought to determine which bias is stronger. Utilizing a 4 (team affiliation: same, rival, general basketball, or none) x 2 (attractiveness: attractive or unattractive) design, 220 males viewed an image of an attractive or unattractive female wearing a t-shirt that reflected her team affiliation, and then completed a scale assessing their impressions of the female. To assess how team affiliation and level of attractiveness impact how one is perceived, a MANOVA with affiliation and attractiveness functioning as independent variables was executed on three groupings of measures: first impressions, likelihood of friendship, and likelihood of interaction. Consistent with the black sheep effect, the less attractive female with an ingroup affiliation was labeled with significantly more negative adjectives compared to the attractive female, regardless of the attractive female's affiliation. The attractive female with a rival affiliation was also considered a more desirable friend to have compared to the less attractive female with an ingroup affiliation.

51. VALIDATION OF A TEAM IDENTIFICATION MEASURE

Elizabeth A. Fichtel, Gerald McDonnell, Krysten Knecht, Kate E. Saunders & Elyse Krause (Dr. Christian End)

Department of Psychology



The current study seeks to validate a perceived team identification measure which would allow researchers to assess a romantic other's team identification, increasing the feasibility of studying sports and relationships. 37 heterosexual romantic couples (M age = 21.30 years SD = 7.57 years) completed the Sport Spectator Identification Scale (SSIS; Wann & Branscombe, 1993) for themselves and their significant others, as well as a scale assessing the participant's and the participant's significant other's willingness to consider various acts of hostile aggression against the opposing team and players (Wann, Haynes, McLean, & Pullen, 2003). Results revealed significant positive correlations between the actual and perceived scores on both the SSIS and aggression scales. Consistent with the hypothesis, this finding indicates that participants can accurately predict the perceived identification of their significant others. The validation of this scale will allow future researchers to gather data from one romantic partner rather than requiring data from both partners. Future research should examine how this model can be applied to other studies where the dyad model would otherwise be used.

52. INDEPENDENT VERSUS INTERDEPENDENT SELF: HOW SELF-CONSTRUAL LEVELS IMPACT SOCIAL ANXIETY

Gerald P. McDonnell (Dr. Christian End)

Department of Psychology



Previous research has examined the impact that self-construals have on fear of negative evaluation, embarrassability, and self-esteem, all predictors of social anxiety. In addition, research has supported the notion that individuals from collectivistic cultures with an

interdependent self-construal are more anxious than their individualistic (independent self-construal) counterpart. It was hypothesized that individuals primed to perceive their self as interdependent will have higher rates of anxiety than those primed with an independent self. 92 undergraduate students (28 males, 64 females) completed two priming task to activate either the independent or interdependent self-construal. In “Study 2”, participants completed the Social Phobia Scale and Singelis’ Self-Construal Scale. A one-way ANOVA was used to compare the level of anxiety across the conditions. No main effects occurred between the participant’s self-construal level and social anxiety. To determine whether a relationship exists between self-construals and social anxiety scores regardless of the priming activity, a bivariate correlation analysis was conducted on interdependent self-construal scores, independent self-construal scores, and anxiety. In support of the hypothesis, social anxiety scores were significantly positively correlated with the interdependent self, $r(90) = 0.41, p < .001$ and significantly negatively correlated with the independent self-construal, $r(90) = -0.40, p < .001$.

53. STANDARIZED SPORT MEMORIES: HOW RECOLLECTION OF A LOSS IMPACTS SPORT FANS

Gerald P. McDonnell, Elyse Krause, Carolyn Mack (Dr. Christian End)

Department of Psychology



The study examined if the recollection of a standardized sport memory impacts a fan’s mood, self-esteem, self-competencies, and performance. It was hypothesized that participants who recollected a negative sport memory would report less positive affect, more negative affect, lower self-esteem, lower perceived competencies, and poorer performance than the control condition. 93 participants (53 females, 40 males) were randomly assigned to the loss or control condition. Participants completed a sport identification scale and then read an article summarizing Xavier’s loss to Butler. Participants then watched the final minutes of that game. Participants in the control condition did not read the article or watch the clip. When finished, all participants completed a mood and self-esteem scale. In an “unrelated study” participants first estimated their performance, and then completed a motor, mental, and chance task. To assess whether recollection affected the dependent measures, MANOVAs with memory type were executed on three groupings: mood/self-esteem, estimated competencies, and performance. There were statistically significant main effects for memory type. Participants in the loss condition reported greater negative affect, less positive affect, and decreased motor skills in comparison to the control condition, but did not differ in regards to self-esteem, perceived competences, chance skills, or mental skills.

54. A LOSS IN THE PAST, STAYS IN THE PAST: THE ABILITY OF SPORT FANS TO OVERCOME PAINFUL MEMORIES

Gerald P. McDonnell, Jeffrey Meinert, Greg Mauntel,

Kate E. Saunders, Jana Dykas (Dr. Christian End)

Department of Psychology



The study examined if the recollection of a favorite team’s performance affects a fan’s mood, self-esteem, self-competencies, and performance. It was hypothesized that participants who recollected a worst sport memory would report less positive affect, more negative affect, lower self-esteem, lower perceived competencies, and perform worse compared to those who recollected their favorite team’s best memory. 222 undergraduate students (92 males, 130 females) participated in what they perceived to be two unrelated studies. In “Study 1” participants completed a sport identification scale and were then randomly assigned to write about either their favorite team’s worst or best sport memory. When finished, participants completed a mood scale (Sloan, 1979) and a measure of self-esteem (Rosenberg, 1965). In “Study 2” participants first estimated their performance on four tasks. They then completed a motor skills, social skills, mental skills, and chance task. To assess whether recollection of a best or worst team performance affected mood, self-esteem, personal competencies, and performance, MANOVAs with memory type and identification functioning as independent variables were executed on three groupings of measures: mood/self-esteem, estimated competencies, and task

performance. Contrary to the hypothesis, no main effects or interactions occurred between the participant's level of identification and type of memory.

**55. WILL PACKERS' FANS STILL BUY THE PRODUCTS THAT FAVRE PEDDLES?
THE EFFECT OF A TRADE ON PLAYER MARKETABILITY**

**Elizabeth A. Fichtel, Krysten Knecht, Shaye Worthman, Jennifer L. Yurko, Martin S. Williams
(Dr. Christian End)**

Department of Psychology



Professional athletes change teams, transforming players from ingroup to outgroup members. A positive relationship exists between a fan's psychological commitment to team, attitudinal loyalty and consumerism (Mahony, Madrigal & Howard, 2000).

This study examined the effect of player mobility on consumerism. Following the departure of Brett Favre, Packers fans ($n = 87$) completed measures of psychological commitment to team, player interest, and player loyalty to determine if his release would impact the perception of Favre's marketability, as well as fan allegiance to the team. A fan's psychological commitment to the team was the only significant predictor of his/her perception of Favre's trustworthiness ($\beta = .26$, $F(1, 83) = 5.91$, $p < .05$, $R^2 = .07$) and expertise ($\beta = .29$, $F(1, 65) = 5.82$, $p < .05$, $R^2 = .08$). Player interest ($\beta = -.46$) and player loyalty ($\beta = .27$) predicted Favre's attractiveness, $F(2, 79) = 8.41$, $p < .001$, $R^2 = .18$. Contrary to previous research regarding the ingroup/outgroup bias, results revealed that Favre's transformation from an ingroup to an outgroup leader did not have an aversive impact on his marketability. Future research should examine other factors that may impact fans' responses to mobile team members.

**56. THE EFFECT OF GENDER AND IDENTIFICATION LEVEL OF SPORT FANS ON COPING
A. Sobieralski, J.L. Yurko, K. Wetterau, J.L. Meinert, G.J. Mauntel (Dr. Christian End)**

Department of Psychology



Sport team's victories have the ability to enhance a fan's sense of self, while team losses can threaten a fan's sense of self. This study explored how sport fans cope when their preferred team experiences a negative outcome. 128 undergraduate students from Xavier University described three instances where their preferred team was defeated, they completed the Cope Scale (Carver, Scheier & Weintraub, 1989), which assesses the frequency one utilizes 14 different coping strategies (e.g., active coping, denial, acceptance, etc.). Participants then completed the Sport Spectator Identification Scale (SSIS; Wann & Branscombe, 1993), which assesses team identification. Following losses, high identifying fans reported using 6 of the 14 coping mechanisms significantly more than low identifying fans. These coping mechanisms were active coping, planning, suppression, religion, venting, and denial. Gender differences were also observed for two of the coping mechanisms. When faced with defeat, women reported seeking social support more frequently than men, while men reported utilizing alcohol-drug disengagement methods more often than women. Future studies should continue to examine how sport fans cope with their teams' defeats as additional research may be used to prevent fans' use of maladaptive coping mechanisms such as alcohol-drug disengagement.

57. MECHANISMS OF COPING WITH INTERPERSONAL VIOLENCE

Jennifer Yurko L. (Dr. Cynthia Dulaney)

Department of Psychology



Interpersonal violence refers to any instance of violence that occurs between individuals. Exposure to episodes of interpersonal violence has the ability to drastically affect people's lives mentally and emotionally, causing victims to utilize coping strategies. This study examines the three categories of interpersonal violence: intimate partner violence, community and school violence, and collective violence. Using these three categories, this study examines which methods of coping are used most frequently by victims of each type of interpersonal violence. 118 Xavier University students were recruited and randomly distributed one of three descriptive scenarios involving three subcategories of interpersonal violence. Using the Cope Scale (Carver, Scheier, & Weintraub, 1989) to measure 14 dimensions of coping (e.g., active coping, denial, acceptance, etc.), results showed

participants used 3 of the 14 coping mechanisms more frequently when faced with instances of intimate partner violence and school and community violence than when faced with collective violence. These 3 coping mechanisms were acceptance, restraint coping, and positive reinterpretation and growth. Future studies should examine the use of these adaptive and maladaptive coping strategies in order to help victims form better coping strategies for all categories of interpersonal violence.

58. THE EFFECT OF RACE AND FAMILY SIZE ON BLAME ATTRIBUTION AND SENTENCING DECISIONS

Krysten M. Knecht (Dr. Christian End)

Psychology Department



Race is the most widely researched characteristic influencing blame attribution and severity of sentencing in the criminal justice system, with the preponderance of literature indicating that black offenders are judged more harshly than white offenders. A less researched characteristic that may influence the sentencing of criminal offenders is family structure. The present study investigated the effect of a suspected criminal's race (white or black) and family size (small or large) on attributions of blame and sentencing decisions. Participants ($N=125$) were randomly assigned to one of four conditions and completed measures as if they were jurors assigned to the defendant's case. An analysis of variance indicated a main effect of race of the defendant on attributions of blame $F(1,125)=14.18, p<.001$, responsibility of the crime $F(1,125)=5.49, p<.05$, and recommended severity of the sentence $F(1,125)=4.25, p<.05$. Contrary to the hypothesis, the white defendant was judged more harshly than the black defendant. This discrepancy could be due to an empathetic college population. Future research should replicate in a more general sample to see if this attitude change translates to other populations, as well as compare archival data to recent data to test if racial and familial attitudes have shifted over time.

59. THE INTERPERSONAL AND INTRAPERSONAL CONSEQUENCES OF IDENTIFYING WITH AN UNSUCCESSFUL SPORTS TEAM

Krysten M. Knecht, Kate E. Saunders (Dr. Christian End)

Department of Psychology



Past research indicates that fans of unsuccessful sports teams often reduce their team associations for self-presentational purposes, while fans of successful sports teams often emphasize these associations. In the present study researchers examined whether a sport fan's team association manifested in stigmatizing or enhancing impressions, (eliciting negative intrapersonal and interpersonal experiences), and measured the interpersonal impact of a perceiver's knowledge of one's team's affiliation. Participants were assigned to one of two roles (fan or observer) and paired to create fan-observer dyads. Students assigned to be fans completed a biographical questionnaire that included a manipulated item describing successes or losses of the participant's affiliated team (unsuccessful, successful, control). Students assigned the role of observers reviewed the questionnaires in which their partners' (fans) team affiliation was indicated or excluded. Dyads conversed for six minutes and subsequently reported the first impressions, interpersonal attitudes, and likeability of their partner. Participants also completed personal measures of self-esteem, and positive and negative affect. A 3 (team affiliation: unsuccessful, successful, control) x 2 (observer's knowledge of the affiliation: blind, informed) mixed between-within MANOVA was used to determine if one's team affiliation combined with a perceiver's awareness of that team affiliation affected the previously mentioned variables.

60. THE EFFECTS OF SPEECH DISORDERS AND POWERLESS SPEECH ON EMPLOYABILITY

Kate E. Saunders (Dr. Christian End)

Department of Psychology



Speech is one of the most influential factors in an employment interview. Past research has indicated that properly developed communication skills result in the best impression of a job applicant (Ko, Judd, & Stapel, 2009). The current study examines the effects of a speech

NOVEL HYPOXIA RESPONSE GENES IN PROSTATE CANCER

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Department of Biology



Prostate cancer is the second-leading cause of death in American males. Better understanding of the mechanisms of the disease could lead to development of safer and more effective treatments. In order to survive and spread, a prostate tumor must overcome numerous challenges. One of these challenges is delivering oxygen to all parts of the infected tissue as the tumor continues to grow. One method of dealing with these low oxygen (hypoxic) conditions is to use the cell's own hypoxic response mechanism. The transcription factor ID1, which is involved in activating hypoxia response genes, has been found to be elevated in more aggressive and hard-to-treat prostate tumors. In this study, a comparative microarray found a significant increase in expression of 81 genes when ID1 was overexpressed, with 23 previously implicated in the hypoxic response. A subset of these genes was chosen for further study. 4 cancer cell lines were cultured and grown to 80 percent confluency, and half were put in hypoxic conditions for 24 hours. The RNA of all cells was then harvested and cDNA was synthesized. Real-time PCR was carried out on the cDNA using primers from the subset of genes from the microarray. Over 4 cancer cell lines, the genes *NDRG1*, *PLOD2*, *MYOD1*, and *TMEM45A* were consistently hypoxia-inducible. Of these 4 genes, *MYOD1* and *TMEM45A* are novel hypoxia-inducible genes.

ANALYSIS AND IDENTIFICATION OF S-NITROSYLATED PROTEINS USING ORGANOMERCURY CAPTURE METHODS AND MASS SPECTROSCOPY TECHNIQUES

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S-nitrosylation, the posttranslational modification of protein cysteine residues to form S-nitrosocysteine, is an emerging mechanism by which nitric oxide acts as a signaling molecule. Herein, protein and peptide mass spectrometry-based proteomic methodologies site-specifically identified 99 cysteine containing peptides, which were independently matched to 81 proteins in mouse liver, 77 of which were newly identified targets of S-nitrosylation. This advancement was accomplished by the design and use of innovative organomercury reagents that reacted directly with S-nitrosocysteine, affording 95% reaction efficiency, 90% specificity as assessed by negative controls. This approach provides a platform to identify endogenous S-nitrosoproteomes, advancing the understanding of nitric oxide biology.

ARSENIC PERTURBS CELL CYCLE PROGRESSION IN HEPATOCYTES AFTER PARTIAL HEPATECTOMY

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Department of Biology



Arsenic is known as both a generally toxic as well as carcinogenic agent that, paradoxically, has also been shown to be an effective cancer treatment. Thus, arsenic's possible effects on the cell cycle and, more specifically, the cellular events of apoptosis and proliferation, have already been shown in a multitude of cell types, including the liver. However, often times such studies use unrealistically high concentrations of arsenic. This study was undertaken to test the hypothesis that subhepatotoxic levels of arsenic impair hepatocyte proliferation. To test this, the effects of acute arsenic pre-exposure on mice undergoing partial hepatectomy was determined. Male C57/BL/6J mice were exposed to arsenic at levels of 49 ppm (as sodium arsenite in drinking water) for 7 days prior to partial hepatectomy. Mice were sacrificed 48 hours after surgery. Arsenic and partial hepatectomy together resulted in an increase in liver inflammation compared to partial hepatectomy alone, as indicated by liver enzymes. Quantitation of immunohistochemical staining suggested delayed progression through S phase of the cell cycle as well as the G1/S cell cycle checkpoint. While cyclin D1 mRNA expression did not appear to be elevated by arsenic, p21 was slightly decreased in animals that were exposed to arsenic. The cell cycle inhibitor p27 mRNA expression was dramatically increased in the arsenic-treated group. These results suggest that arsenic may be affecting cell cycle by inhibiting progression of the cell cycle by upregulating p27.

**THE EFFECTS OF POPULATION GENETIC DIVERSITY AND SEED NITROGEN CONTENT
ON SEED MASS IN THE ILLINOIS TALLGRASS PRAIRIE PLANT *GENTIANA*
*PUBERULENTA***

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Tallgrass prairie, once one of the largest ecosystems in North America, has been subjected to widespread destruction. In Illinois, at least 99% of prairie has been destroyed. This destruction has led to fragmentation of tallgrass prairie, resulting in smaller plant populations that are separated from each other. These populations are susceptible to increased genetic drift and may suffer from lack of gene flow, leading to a decrease in genetic diversity. *Gentiana puberulenta* is a perennial plant native to Illinois tallgrass prairie. Previous studies have shown that there is significant variation in seed size among and within nine populations of *G. puberulenta* in central Illinois. This is in contrast to theory; thus, the current study sought to test if population genetic diversity and seed nitrogen content affect seed mass in *G. puberulenta*. Population genetic diversity was estimated using randomly amplified polymorphic DNA (RAPD) primers and genomic DNA in PCR. A total of 18 RAPD primers have been used. Of the 76 bands scored, 55 were monomorphic for the entire sample. Average seed mass was not significantly correlated with either the Shannon genetic diversity indices or the percent polymorphism. A CHN analyzer was used to determine seed nitrogen content in 5-mg samples of seeds from 30 individuals. Mean seed mass was found to be strongly related to nitrogen content per seed. Our data suggest that environmental factors such as soil quality or the land use surrounding each population are contributing to seed mass variation in *G. puberulenta*.

**FROM SOLIDARITY TO DOMINANCE: PYTHAGOREAN ETHICAL VEGETARIANISM AND
THE EFFECT OF CHRISTIANITY**

Gillian R. Halusker (Dr. Timothy Quinn)

Department of Classics



Many people today believe vegetarianism to be a modern phenomenon. Vegetarianism and the philosophy behind it are far from new or revolutionary; the tradition of ethical vegetarianism in Western thought can actually be traced back to the Ancient Greeks, though proponents of such thinking were relatively nonexistent from Late Antiquity to the 18th century. In this paper, I want to first examine ancient thought regarding ethical vegetarianism and then look at the factors which contributed to its decline, specifically Christianity. Pythagoras and his followers are the first voices in antiquity to teach and promote a significant moral concern for the welfare and rights of animals. I will be looking at both Greek and Roman philosophers such as Pythagoras, Plutarch, and Porphyry; these authors argued for a close relationship between human and animal existence. While most of Pythagoras' followers did not promote his idea of the transmigration of souls, they still agreed that animals displayed intelligence, sentience, and emotion like humans. However, with the rise of neo-Platonism and Christianity, there was a growing belief in the moral distinction between humans and animals, since humans were rational beings created by God. As humans focused more on the immortal life beyond the reality of this one, they began to view animals as lesser beings simply placed on earth for human purposes. I will be examining thinkers such as Aristotle, St. Augustine, and Aquinas, who have been used to support the theory of man's dominance over animals.

THE WRATH OF ATHENA IN THE *ODYSSEY*

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Department of Classics



The wrath of Poseidon takes center stage in the *Odyssey*, but it is really the wrath of Athena that is responsible for the bad homecomings of the Achaeans after the Trojan War. Athena is conspicuously absent in the trials of Odysseus in the beginning of the epic, although she does help Telemachus; considering Athena's role as Odysseus' special protector in the *Iliad* despite Olympian politics, her excuse for not helping Odysseus in the *Odyssey* is initially because she does not want to incur the wrath of Poseidon, but that excuse might not be conclusive; it is important to note Athena's actions immediately following the fall of Troy, because Poseidon's wrath is not incurred until Odysseus blinds Polyphemus. It is therefore my purpose in this research paper to dissect the *Odyssey* for references to the wrath of Athena, its beginning and end, and the effect of her wrath on the entire epic, as it is at least equal to Poseidon's although manifested in a different way.

OVIDIAN MUSIC: RHYTHM AND PULSE IN THE *METAMORPHOSES*

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When we listen to music with a strong beat, it's often difficult not to tap our feet in time to the music. Would you be surprised to learn that the same can be said of Latin poetry? Because the meter in Latin verse was regulated by quantity, each metrical foot takes up a similar temporal space, and as such, those listening to a recitation could tap along at the beginning of each foot. This basic beat wouldn't be the only rhythm present in the poetry, however, as most words in the Latin language have a stress accent, which, when strung together, would create a very different and variable pulse. In his *Metamorphoses*, the poet Ovid crafts his lines with particular attention to these two patterns, either synchronizing them to allow harmony and speed or clashing them in order to heighten the dramatic tension. This study focus specifically on Book VIII.183-235, which tells the famous myth of Daedalus and Icarus, a story filled both with harmony as the father and son soar high above the oceans as well as with tragedy as Icarus' enjoyment of his flight causes him to fly too close to the sun, melting the wax binding his wings and sending him plummeting into the ocean below. In addition to a line-by-line textual analysis, musical examples have been created to illustrate the effect of Ovid's manipulation of these two separate but connected rhythms.

THE ODYSSEY AS AN EDUCATOR

Mark Joseph Mangione (Dr. Shannon Byrne)

Department of Classics



I have decided to present on the concept of *xenia* (guest-host relationship) and its function throughout the *Odyssey*. Odysseus' journey home teaches him important life lessons, and he learns these lessons through both proper and improper displays of *xenia*. The *Odyssey* is believed to have been used as a means of education for the ancient Greeks in other areas, and the lessons that Odysseus learns during his long voyage home would have conveyed, among other things, lessons pertaining to *xenia*. By observing the lessons that Odysseus learns from *xenia*, I will reconstruct some of the lessons that ancient readers of the *Odyssey* themselves learned.

THE HEROIC ATHLETE: A CLASSICAL AND MODERN PHENOMENON

Nicholas S. Mayrand (Dr. Thomas Strunk)

Department of Classics



Have you ever stopped to question the position that professional athletes hold in modern society? The wealth and fame that they enjoy border on the ridiculous. The language that is used to describe these athletes often endows them with an almost superhuman aura. Does this elevated status reflect a modern way of thinking, or were previous cultures similarly enamoured of their athletes? The answer is yes, and the example I will discuss is ancient Greece and the Panhellenic Games. Greek athletes competed in a variety of athletic events for personal honor at the games themselves and enjoyed glory and recognition when they returned to their home states. This paper examines the methods by which young Greek men became successful athletes, many of whom were then transformed into iconic cult heroes. The works of ancient authors such as Pausanias, Pindar, and Bacchylides provide unique insight into the lives of ancient athletes and how they were revered. Greek athletes only officially received an olive wreath for winning an Olympic event, but the rewards that their native cities heaped upon them rival the financial benefits that modern athletes are given. Their fame spread through the erection of impressive statues and the dedication of lyric poems that linked the victorious human athletes to legendary mythic characters. However, the notoriety and wealth of these men also earned some criticism from contemporaries, especially from intellectuals. I will show that the similarity in the treatment of ancient and modern athletes provides a historical basis for the understanding of the curious trend of the "heroization" of athletes.

COURTROOM DEFENSE ORATORY: A TIMELESS TOOL

David Michael Oldham (Dr. Shannon Byrne)

Department of Classics



My thesis helps bridge the gap between antiquity and modern day by showing that significant similarities exist between their world and ours. I will show that Rome's defense oratory is extremely similar to modern defense oratory. The comparison I will use in this paper is between Cicero's closing defense of Marcus Caelius Rufus in the *Pro Caelio* and Johnnie Cochran's closing defense of O.J. Simpson. Johnnie Cochran's closing defense was one of the main factors in the jury's acquittal of Mr. Simpson; it attacked issues other than the case, such as race and character, much like Cicero's closing defense, with its emphasis on the shady character of a woman and the boyish pranks of Caelius' youth. In both cases more than just evidence moved the jury to acquit. Clever oratory instilled doubt in the jury, and changed the focus of the case from a question of innocence into something completely different. Both lawyers shifted focus away from the guilt of the defendant and impugned the witnesses of the prosecution, and as a result the jury saw the defendant in a different light. Oratory prowess won cases 2000 years ago much as it still does today.

A SPANKING FOR ADULTS: PEJORATIVE SEXUALITY IN MARTIAL'S EPIGRAMS

Clayton A. Schroer (Dr. Shannon Byrne)

Department of Classics



Sexuality, when combined with violence, is a stigma in the modern world. In modern times, the focus of aggressive sexuality is always on the unwilling recipient. In ancient Rome, sexuality is dominated by the adult male. There is no such stigma against aggressive sexuality. Aggressive sexuality is actually very prevalent in Roman literature. Martial is aware of aggressive sexuality and uses it in his sexual humor. In this paper, I seek to show that rather than pioneering a place in literature for aggressive sexuality, Martial is drawing on a colorful tradition of aggressive and pejorative sexuality in Roman literature.

RIVALS FOR GLORY

Sean Tulley (Dr. Shannon Byrne-Cueva)

Department of Classics



The institution of patronage was integral to ancient Rome; it permeated the lives of all Romans, rich and poor. Through the writings of ancient authors, poets in particular, it is possible to discern the nuances and intricacies of this system. Martial wrote a great deal concerning patronage as it was practiced in Flavian Rome. Flavian patronage was characterized by an intertwining of social classes through a system of reciprocity. Particularly interesting is the place of the poet within this institution; how he viewed it, how it inspired his work, and how he viewed other poets vying for the same patrons as he. Martial was contemporaries with another Flavian poet, Statius, and it seems there was some rivalry between two. I intend, by examining the works of both and exploring the nuances of literary patronage, to determine the extent and the object of competition between the two poets.

THE CINAEDUS IN CONTEXT

Evan T. Ward (Dr. Shannon Byrne)

Department of Classics



Though Latin has an extensive vocabulary for sex and gender terms, these words rarely correspond with modern concepts. For this reason they are often the most difficult to translate. I shall examine the occurrences of one such word, *cinaedus*, in prominent Roman authors such as Plautus, Catullus, and Martial, and from these occurrences I shall illustrate what the word meant to the Romans as they conceived of gender and sexuality. Though often translated as *homosexual*, I will show that *cinaedus* cannot be translated as such because the notion of sexual identity based upon the gender of one's sexual partner was not a Roman concept. The *cinaedus* is typically represented as a male who deviates from the Roman protocols of masculinity in terms of both gender expression and, to a lesser extent, sexual behavior.

HAPPILY EVER AFTER? A LOOK AT ROMAN MARRIAGE CUSTOMS, IDEALS, AND LAWS

Emily A. Williston (Dr. Shannon Byrne)

Department of Classics



Much like today, ancient Romans had an idealized image of marriage as affectionate companionship. Yet they lived in a strictly patriarchal society that legally excluded women from participation in politics and limited their activities in the public sphere. How could their ideal marriage operate in this society? To understand Roman marriage, one must first understand the Roman structure of *patria potestas*, the power of the father of the family, the *paterfamilias*. A woman lived under her father's power her entire life, until he either passed power to her husband or died, at which time she would come under the guardianship of an appointed male relative. During the late Republic, fathers more often retained control of their daughters by not passing *manus* on to their husbands. This gave women greater freedom, since they lived with their husbands yet remained under the supervision of their fathers. As women gained more independence, marriages became more unstable. Therefore, when Augustus took power, he instituted several laws to curb women's freedom, restore stability to family life, and increase birth rate. Like most Romans, he believed that in an ideal marriage, while man and wife were partners, the man was in control. He hoped that by returning to marriage customs from Rome's past, he would strengthen the institution; his goal failed miserably. I will briefly explain the *paterfamilias* system and discuss how marriage with *manus* and without *manus* occurred. I will describe the ideal Roman marriage, and how Augustan marriage laws sought and failed to subdue the newfound independence of women and reinforce the patriarchal family structure.

ASSET RISK EVALUATION GUIDE FOR STUDENTS

Long Phan (Dr. Brian Balyeat & Dr. Julie Cagle)

Department of Finance



With the recent financial crisis, the importance of financial decision-making has been highlighted. Pervasive in finance is the use of asset pricing models like the CAPM to value assets and compare asset performance. In the CAPM, the risk relevant to investors is systematic risk as measured by beta. Betas are often estimated using regression analysis. However, infrequent trading can cause regression residuals to have negative autocorrelation and the estimates to be inefficient. This research will examine to what extent autocorrelation is present in the error terms. Further, a method to correct inefficient estimates using the Cochrane-Orcutt procedure in Excel is suggested. This method is practical for investors because raw data is available without charge on the Internet and the spreadsheet software is widely accessible. In addition, given that many investors will use published estimates of beta rather than estimate their own, we examine three popular sources of beta estimates: Yahoo! Finance, MSNBC, and Value Line. Several questions will be addressed. What are the limitations of the three major sources of beta? Why do the three methodologies produce different estimates? Do these methodologies produce inefficient estimates? How can these inefficiencies be corrected?

NORTHERN AND SOUTHERN JEWISH RABBIS AND THEIR OUTWARD COMMITMENT TO RACIAL EQUALITY DURING THE CIVIL RIGHTS ERA

Angelica K. Bullock (Dr. Christine Anderson)

Department of History



The paper will present differences and similarities between Northern and Southern rabbis during the 1950s and 60s. It will reveal the experiences and opportunities of Jews in the North and South, the causes of these experiences, and the effect location played in the rabbis' outlook. Northern rabbis more vocal compared to their Southern counterparts. Northern Jews contributed more to the movement than any other white ethnic group in the United States. They believed that fighting for civil rights in the South would lessen inequality. Northern Jewish organizations announced their support for and involvement in the movement. Southerners believed that vocal, public support for civil rights would harm the Jewish community. Southern Jews were not in favor of segregation but were fearful for the safety of their community. During this period most Southern Jews and Jewish organizations denounced their Northern counterparts and asked them to lessen their presence in the civil rights cause. Because of the different responses to activism during the civil rights era, tensions developed between Southern and Northern Jews and Jewish communities. The paper will look at letters from different rabbis, and their views of public activism during this era.

DELEGITIMIZING ENVIRONMENTAL ADVOCACY: THE RHETORIC OF SOUTH PARK

Will R. Geerer, Julie Stewart (Dr. Tom Clark)

Department of Management



South Park, one of cable television's most controversial and enduring hits, creates and reinforces negative stereotypes of environmental advocates and advocacy. This paper analyzes three episodes which lampoon radical environmentalists and their ideological opponents. It demonstrates how *South Park*'s scriptwriters employ populist and related storylines that tap into broadly shared American values as they weave together anti-hypocrisy, anti-elitism, and anti-authority themes within a narrative structure of cartoon characters. Given that television influences ways viewers perceive the natural world, it is important to see how the interplay of form and content invite audiences to share *South Park*'s reductionist parody of radical environmentalism and environmental advocacy. Given *South Park*'s popularity, it helps us understand how negative stereotypes of environmental advocacy can be constructed in ways that may inhibit popular support for sustainability initiatives.

THE BACONIAN REVISION OF FINAL CAUSALITY IN SCIENCE

Anne M. Schmid (Dr. Timothy Quinn)

Department of Philosophy



Francis Bacon's dismissal of Aristotelian final causality epitomizes the break between the methods and goals of ancient science and those of modernity. Bacon's treatment of this issue reveals that perhaps the most fundamental discrepancy between ancient and modern science lies in contrasting worldviews regarding the intelligibility of reality. This paper examines Bacon's and Aristotle's arguments regarding the existence of final causality and its applicability to science, aiming to show that a shift in experiences and values, not a technological breakthrough, motivated the expulsion of this idea from the modern method.

GOD AS A UNIFYING PRINCIPLE IN AMERICAN THOUGHT: THE DECLARATION OF INDEPENDENCE AND SELF-RELIANCE

Valerie Williams (Dr. Michelle Brady)

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The concept of a collective people joining together in community to make their own government as it appears in *The Declaration of Independence* appears to differ greatly from Ralph Waldo Emerson's emphasis on the individual's commitment to one's own uniqueness. I maintain that both works advocate the notion of the self-made man in light of a power greater than oneself. It is not enough to acknowledge that man may make himself; rather, one must ask oneself what the nature of the self-made man truly is and in what way man is able to make himself. A consideration of both works together may yield a more complete picture of who the American self-made man actually is and demonstrate how man is capable of being made on his own terms. Why does God play a pivotal role in both *The Declaration* and *Self-Reliance* if men are able to make themselves? In what way does the self-made man make himself? Although Jefferson champions representative government as the channel through which men make their own government, and Emerson argues that self-determination is the ability to hold true to one's unique abilities, there is a common call for men to be self-made and consistent references to God throughout both works. A careful consideration of the *Declaration of Independence* and *Self-Reliance* reveals that both works qualify the notion of self-determination by an appeal to something higher than human opinion; consequently, I maintain that it is through human's self-made actions that God can be seen, that this higher power becomes manifest.

ELITE OPINION AND THE SUPREME COURT

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As members of the nation's highest court, Supreme Court justices are held to the utmost standard of impartiality. There has been considerable debate, both in the media and amongst scholars, if Supreme Court justices are truly removed from outside influence such as public opinion. Considerable research exists examining the relationship between the Court and public opinion; however, Supreme Court justices represent the elite of society in their educational and

socioeconomic background. As such, elite opinion is much more representative of justices and their peers. This study examines a potential correlation between elite opinion and the decisions of the Supreme Court. A measurement of elite opinion is ascertained from unsigned editorials in the *New York Times*, widely recognized as an elite newspaper. A convenience sample of cases has been selected, specifically First Amendment Supreme Court cases from 1994-2005. During this period, the roster of the Court remained unchanged, allowing study of the views of individual justices over a sufficient time period. First Amendment cases were chosen due to the large amount of media and elite attention they generally attract. Ultimately, analysis reveals that Supreme Court decisions align with elite opinion in 76% of the cases examined. On an individual justice level, Justice John Paul Stevens is the closest match to elite opinion at 86% and Justice Antonin Scalia is the worst match, at only 38% correlation. These results call into doubt the true impartiality of the Court and lead to further avenues of study.

THE FINANCIAL BAILOUT: AN EXAMINATION OF THE HOUSE VOTES ON THE EMERGENCY ECONOMIC STABILIZATION ACT OF 2008

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The Emergency Economic Stabilization Act of 2008 allocated \$700 billion of federal money to troubled financial institutions. Representatives' support for the bailout legislation is based on campaign donations from the financial services industry during the 2008 election cycle, the industry's economic impact on a district, and membership on the House Financial Services Committee. Additionally, this paper considers the effect of political party, ideology, and district competitiveness. While the industry supported the bailout, the House rejected the first proposal before passing H.R. 1424 with bipartisan support. Data for this study comes from the Congressional Record, published reports, and campaign finance reports. This paper challenges the assumption that Congressional votes are based on party affiliation or ideology, arguing that monetary donations received from special interests influence representatives' votes on important legislation. The passage of the Emergency Economic Stabilization Act illustrates the influence of the financial services industry over the House.

THE ORIGINS OF THE GRIMM BROTHER'S FAIRY TALES AND THE TRUTH BEHIND THEIR REVISIONS

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Jacob and Wilhelm Grimm are most remembered for the over 200 fairy tales which they transcribed in the 19th century, and published in Children's Stories and Household Tales in 1812. Between this first edition and the final edition that the brothers published of this collection in 1857, revisions were made which created a unified voice for the tales and which incorporated more eloquent prose. Despite the limitless influence that these tales have had throughout the world, John Ellis, a scholar of the Grimm brothers, believes that the Grimms should be shunned and not praised. In Ellis' opinion the depth of these revisions has tainted the true folk influence of the collection which the brothers attempted to preserve, and Ellis makes the claim that the tales originally contained very little folk influence. However, evidence does exist which verifies the amount of uneducated German peasants which contributed to this collection. Jacob and Wilhelm Grimm earned the respect which they have been given by their readers and critics, because, although they decided to revise portions of the texts in their collection which contained original folk expression, the demand to create a volume for entertainment and the dismal sales of their collection eventually allowed the brothers to disseminate important elements of German identity and character, and to create a new literary genre. The collection has become an enduring part of the international cultural heritage for Germany, and the tales in the collection instill in its readers essential elements of the German national character.

GREGOR MENDEL: FATHER OF INSIGHT, DOUBT AND CONTROVERSY

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Gregor Mendel was a 19th century Augustinian monk whose groundbreaking hybridization experiments in pea plants and the laws of genetic inheritance, which he thereby characterized, have earned him the title "Father of Genetics". Though the record of his life and research is certainly fascinating in its own right, close examination his work and how it has been received

in the time since it was first published raises three important and intriguing questions: 1) How was it that this monk was capable to gain such insight? 2) Why did his contemporaries doubt and dismiss his work? 3) Why were his abilities and integrity as a scientist so hotly debated well into the 20th century? While the exact answers to such questions cannot possibly be neatly summed up or definitely determined, careful consideration of Mendel's upbringing, published work and the corresponding evolution of scientific thought sheds significant light on the issues at hand.

THE LIMITATIONS IN SUCCESS WITH REGARDS TO THE RESPONSE OF THE SENEGALESE GOVERNMENT TOWARDS THE HIV/AIDS EPIDEMIC

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Within West African Senegal, one can see a controlled and low prevalence of HIV/AIDS. The government prides itself on its quick reaction to the first case in the 1980s; efforts taken to halt the spread of HIV/AIDS included governmental programs for sex education in schools, reaching out to religious communities to also promote sex education and condom usage, regular disease-screening for legal sex workers, etc. It seems as though the government has essentially eradicated the problem with its steady number of cases throughout the years. However, what the government fails to see, or even chooses to ignore, is the existence of certain high-risk groups that are clearly not receiving the same services and opportunities as others, due to various societal stigmas. Illegal sex workers, homosexuals, women in many cases and others are some people who are at high risk of catching and spreading HIV/AIDS. Thus, the success of the Senegalese government in eradicating this disease is completely limited. In order to actually *reduce* prevalence, efforts must be made to include and support all citizens.

L'EFFET D'UNE CULTURE ET UNE LANGUE SOLIDE: LES QUEBECOIS ET LA PROBABILITY DE SOUVERAINETE THE EFFECTS OF CULTURE AND A STRONG LANGUAGE: THE QUEBECOIS AND THE PROBABILITY OF SOVEREIGNTY

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The Canadian province of Quebec has been an unique diamond in the rough for centuries due to its distinct Francophone culture as opposed to the Anglophone rest of Canada. As a result of this, Quebecois separatists have been pushing for sovereignty and breaking away from the nation of Canada instead of potentially losing their distinct French-based identity and strong alliance and support of the French language. By examining the path of the Parti Quebecois, a political party aimed for more Quebec legitimacy and independence, perhaps the quest of sovereignty is not completely unattainable. Unlike the case of the Basques in south western Europe, Quebec seems to possess all the necessary requirements needed to successfully declare sovereignty including a solidified culture and an even stronger desire to uphold their usage of the French language. But will it be successful?

ST. PAUL: A JEWISH STOIC ON SEX

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The purpose of this paper is to examine the extent to which Paul's views on sexuality and marriage come from an exposure to Stoic philosophy and Paul's Jewish heritage. Drawing on the laws in Leviticus and Deuteronomy, Paul's teachings about sexuality are an interpretation of the Jewish sexual purity laws in light of Stoic philosophy and his perspective of God through Jesus. Paul's use of the word *πορνεῖα* and other terms rooted in philosophy and the Greek Old Testament (LXX) in I Thessalonians 4, I Corinthians 5-7, and Romans 1 show his views on sexuality and contain references to both Jewish purity laws and Stoicism. Paul's influences include the views of sexuality from the Jewish laws which dominated temple laws up until the destruction of the temple in 70 CE and the Stoic ideas prevalent in the works of Seneca and Epictetus. Paul addresses issues of immorality and exhorts his audience to live lives of purity and holiness in the Spirit that was given to them by God through Jesus.