

**CELEBRATION  
OF STUDENT RESEARCH  
AND CREATIVE ACTIVITY**

**XAVIER UNIVERSITY  
APRIL 20, 2009**

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# POSTER PRESENTATIONS

1.

## FAMILY INTERRUPTED

Lily K. Jensen (Prof. Suzanne Chouteau)

Department of Art



This series of prints explores concepts of family, interconnectedness, and the often subtle, non-verbal communications that occur between family members through portraits done in the silkscreen process. First begun as a lamentation on familial discord and alienation, the body of work has evolved into a series of meditations on each subjects' role in the artist's life, and the roles they play in each other's lives. Use of symbolism, color, and graphic line expresses uncomfortable tensions, guilt, and regret while simultaneously creating connections through shared experience, attachments, and gestures. It is often shared experience and empathetic relationships that become de-emphasized amidst complicated family dynamics.

2.

## HOUSE AS A METAPHOR FOR SELF

Ellen T. Schroeder (Bruce Erikson)

Department of Art



A house can be a metaphor for our inner self, while simultaneously, our experiences, memories, and daydreams can create a universe within that space. In other words, space defines the inhabitant and the inhabitant defines the space. In order to demonstrate how my childhood suburban house is a metaphor for me as well as how the generic space is defined by me, I am building intricately detailed, small-scale models of typical suburban houses using poplar wood. I am then whitewashing their exterior and painting scenes and using photos from my own life on their interior. In addition to my own experiences, my project is influenced by research in three areas: psychology, philosophy, and art. My investigations of Sigmund Freud's essay, *The Uncanny*, are addressed in the dreamlike scenes painted on the interior of the houses. The sole viewing point through the hinged garage door demonstrates the theories I have researched in John Dewey's *Art as Experience*, and Gaston Bachelard's *Poetics of Space*. Problems I have encountered in constructing the houses—like the need for electric lighting and a more luminescent paint—are solved through research of contemporary, conceptual art by British sculptor Rachel Whiteread and the pre-Renaissance egg tempera technique used by artists like Sandro Botticelli. I will also digitally document the construction of the houses and the egg tempera process. In my final display, it will be clear that a house provides a metaphor for different parts of the inhabitant while the inhabitant also defines the space, and viewers will be challenged to consider and experience the spaces they inhabit more consciously.

## 3. A RETROSPECTIVE ANALYSIS OF PRIMARY ROTATOR CUFF TEARS WITHIN THE GENERAL POPULATION UTILIZING A NEW CLASSIFICATION SYSTEM

Andrew T. Dornbrook (Dr. William Anyonge)

Department of Biology



Classification of rotator cuff tears helps to determine surgical and postoperative management. Current rotator cuff tear classification systems utilize either size or tear type but not usually both to describe tears treated. The purpose of this study is to construct a new classification system that combines tear size and tear type based on information derived from 527 consecutive patients that received surgical repair of a rotator cuff tear by a single surgeon at The Louisville Orthopedic Clinic between 2004 -2008. Data was collected for tear size, tear type, age, gender, side injured, chronicity, and time from onset of injury to surgery for primary rotator cuff tears. A cross tabulation of the data and a chi square test was performed to determine relationships between variables. One surgeon arthroscopically analyzed each tear to classify tear size and shape according to the new classification system. Significant correlation ( $p < 0.05$ ) of tear types observed consisted of crescent (58.25%), anterior L (6.83%), posterior L (14.42%), complex (10.06%), u-shaped (9.29%), and split tears (1.13%) and were compared to tear sizes, small (28.84%), medium (28.84%), large (22.20%), and massive (20.11%). In addition there were secondary correlations ( $p < 0.05$ ) between gender and tear size, tear size and chronicity, age and size, and tear size and type.

#### 4. THE RELATIONSHIP BETWEEN JAW AND SKULL MORPHOLOGY AND FEEDING TUBES IN UNGULATES

Kristen Klatte (Dr. William Anyonge)

Department of Biology



Ungulates are hoofed mammals such as horses, cows, and antelopes whose diet consists primarily of vegetation with varying degrees of toughness. The purpose of this study was to explore the relationship between jaw and skull morphology and feeding type in ungulates. A total of 18 jaw and cranial traits that have been shown to reflect the functional significance of jaw musculature were measured from the skull of 16 species of representative ungulates from each order (Perissodactyla and Artiodactyla). Each species was classified as a grazer or a browser based on the dietary preferences. It was hypothesized that grazers, when compared to browsing ungulates within each order, would exhibit jaw and cranial characteristics that reflected adaptations to a tougher diet.

#### 5. THE EVOLUTIONARY EFFECTS OF INCREASING CRANIAL CAPACITY ON THE UPPER FACIAL CHARACTERISTICS OF HOMINID SKULLS

Christopher J. Krivanek (Dr. William Anyonge)

Department of Biology



The common ancestor of modern humans and their closest relatives, chimpanzees, experienced a phylogenetic split some seven million years ago. Over this time, the evolutionary pathway that led to *Homo sapiens* has experienced multiple changes that have forever distinguished them morphologically from *Pan troglodytes*. The most recognizable of these phenotypic characteristics is the development of superior intellectual capacity, as evidenced by the growing complexity in the neural systems giving rise to phenomena such as language and consciousness. This can be attributed to a general trend toward the increase in cranial capacity in the genus *Homo*. The growth in the volume of the skull was most likely accompanied by a variety of parallel morphological changes in cranial anatomy. The purpose of this study was to quantify aspects of craniofacial morphology that reflect these changes. A series of craniofacial measurements were made on several representative species in the Hominid lineage with the aim of ascertaining key transformations in skull morphology that may have been linked to the evolution of larger brain size.

#### 6. ANALYSIS OF LIMB BONE ALLOMETRY IN SMALL CATS

Kasey E. Lachner (Dr. William Anyonge)

Department of Biology



This study examines allometric scaling relationships between limb bone lengths and body mass in small cats (Family Felidae) that inhabit various habitats in the New and Old World. Crural and brachial indices were computed from measurements on principal limb bones in six species of wild cats to determine if a correlation exists between evolutionary increase in body mass and limb bone length. It was hypothesized that differences in hind limb and forelimb scaling patterns in species from both the Old and New World would indicate specializations in use of the forelimb for subduing prey, or adaptations in locomotor patterns that may reflect habitat preferences.

#### 7. LIMB BONE MORPHOLOGY IN FAST RUNNING UNGULATES

Gregory Morgan (Dr. William Anyonge)

Department of Biology



Ungulates are hoofed mammals that have evolved morphological adaptations for cursorial locomotion (the ability to achieve and maintain high speeds for an extended period of time). The skeletal adaptations specially designed for rapid locomotion over terrestrial environments include the elongation of distal limb elements, reduction of distal mass, and the fusion and reduction of bones. Ungulate skeletons consistently display the fact that all distal elements of the limbs are significantly elongated relative to proximal limb elements. There is also pronounced fusion and reduction of bones in the distal limbs, for example the reduction of the ulna which fuses to the radius. The purpose of this study is to quantify these adaptations in limb morphology in selected species of odd-toed and even-toed ungulates. Since fast locomotion is an important factor in predator avoidance, a comparison of limb morphology among ungulates could provide valuable insights into how natural selection has favored the evolution of similar traits in prey species from various ecological settings.

## 8. SKELETAL INDICATORS OF LOCOMOTOR BEHAVIOR IN GREAT APES, LESSER APES AND NEW WORLD MONKEYS

Dale A. Parsons (Dr. William N. Anyonge)

Department of Biology



Brachiation is a form of locomotion by which certain primates swing beneath a superstrate using the pectoral limbs. True brachiation, in which strictly the pectoral limbs are utilized, is limited to the gibbons and siamangs, Family Hylobatidae (also known as the lesser apes). Semibrachiators use footholds or a prehensile tail in addition to their pectoral limbs and include three genera of New World monkeys and two genera of great apes. The purpose of this study was to analyze differences in skeletal morphology between true brachiators, semibrachiators and nonbrachiators. The genera under investigation included *Hylobates*, the gibbons, New World monkeys *Alouatta*, *Ateles* and *Lagothrix*, and the two semibrachiating great apes, *Pan*, the chimpanzees, and *Pongo*, the orangutans. *Gorilla*, a nonbrachiating great ape, was also studied for comparison. Several measurements were made on the femur, tibia, humerus and radius from at least 5 specimens of each species using MacMorph image analysis software. Several limb indices were subsequently calculated and subjected to statistical analyses. The data show that brachiators tend to have greater brachial indices (relatively long radii and ulnae) than semibrachiators and nonbrachiators. This suggests that enhanced forelimb length may be an adaptation for habitual arm-swinging locomotion in brachiating species.

## 9. RELATIONSHIP BETWEEN SKULL FORM AND PREY SELECTION IN SNAKES

Ashley H. Rosen (Dr. William Anyonge)

Biology Department



Living snakes are present on every continent, except for Antarctica, and comprise over 2,900 species. Snakes can range in size from 10cm to up to 7.6m. The differences in body size, habitat, and prey preference have resulted in the evolution of a feeding mechanism in snakes that involves the presence of moveable joints within the cranium, allowing the ingestion of prey that surpasses the size of the heads of most snakes. Previous studies have shown the importance of skull shape, size and cranial mobility in determining prey selection. The purpose of this work is to compare the skull morphology in several species of venomous and non-venomous snakes that differ in feeding behavior. It is hypothesized that species that kill and swallow large prey will exhibit enhanced cranial kinesis. This should be reflected in the articulation patterns of individual cranial and mandibular bones, many of which are joined by ligaments. Data has been gathered on individual skull bones of over 50 snakes and is being currently analyzed.

## 10. A QUANTITATIVE COMPARISON OF LIMB BONE MORPHOLOGY OF SELECTED NEW WORLD AND OLD WORLD MONKEYS

Chad M. Solik (Dr. William Anyonge)

Department of Biology



Maximum articular lengths of principal limb bones of selected Old World (family Cercopithecidae) and New World (family Cebidae) monkeys were measured. Brachial and crural indices were computed from these measurements and subjected to an analysis of variance. Results indicated that New World monkeys in general displayed smaller brachial indices than Old World monkeys. New world monkeys tended to have elongated proximal elements in their forelimbs, which suggested a possible adaptation for arboreal locomotion. The crural indices showed a more random assortment of values with no clear trends among any of the two groups of monkeys. This study highlights the complex relationship between evolution, environmental pressures, and locomotor behaviour. Monkeys are often classified as either terrestrial or arboreal (Old World or New World) even though it is apparent that there is a tremendous variation in locomotor behaviour and habitat preference among species found within each family.

## 11. CORRELATION BETWEEN DENTAL MORPHOLOGY AND FEEDING BEHAVIOR IN UNGULATES

Lisa Vogl (Dr. William Anyonge)

Department of Biology



Ungulates are hoofed mammals that are classified in two Orders; Perissodactyla (odd-toed ungulates such as horses, tapirs, and rhinos), and Artiodactyla (even-toed ungulates such as cows, deer, and antelopes). This study investigates whether dental characteristics such as tooth area on the occlusal (grinding) surface, and crown height can be used to distinguish between browsing and grazing ungulates. Due to dietary adaptations among the two groups, teeth are worn down in distinct patterns that allow the quantification of observable and measurable differences. It was hypothesized that grazers will exhibit pronounced hypsodonty (higher tooth crown height), and more complex ridge patterns on the occlusal surface than browsers and thus provide a basis for assessing the relationship between dental morphology and feeding ecology.

## 12. THE EFFECT OF INVASIVE AMUR HONEYSUCKLE ON NATIVE LEAF LITTER DECOMPOSITION

Gabrielle J. Borak (Dr. Brent Blair)

Department of Biology



Amur honeysuckle, *Lonicera Maackii*, is an invasive shrub native to Eastern Asia. It was introduced to North America as an ornamental during the nineteenth century and was the species of choice for this research due to its current widespread population in Southwestern Ohio. Invasive species are known to outcompete native species for resources and faster decomposition rates of invasives may favor these high productivity species over slower growing native plants due to increased nutrient availability. This study sought to analyze the decomposition rates of Amur honeysuckle and native species to determine the effects of Amur Honeysuckle's presence on forest leaf litter decomposition. Decomposition of native leaf litter was examined in the presence and absence of Amur honeysuckle. This study posited a positive correlation between the presence of *Lonicera maackii* and an increased rate of decomposition in native species. The results of this study did indicate that leaf litter decomposition of honeysuckle is faster than that of native species. The data also suggests that decomposition rates increased for native leaf litter present in plots containing Amur honeysuckle as compared to the forest plots where the decomposition rates remained relatively stable. The results obtained were congruent with the hypothesis of the research.

## 13. THE INVASION OF AMUR HONEYSUCKLE, *LONICERAMACKII*, AND ITS EFFECTS ON THE SOIL DYNAMICS OF SOUTHWESTERN OHIO'S FORESTS

Abby Strietmann, Andrew Uhling, Sameer Rasa (Dr. Brent Blair)

Department of Biology



Amur Honeysuckle is an invasive species that currently inhabits the majority of forests in eastern North America. Amur Honeysuckle threatens native biodiversity possibly by altering native soil dynamics, specifically the rate of nitrogen mineralization which converts organic nitrogen into plant available inorganic nitrate ( $\text{NO}_3$ ). In plants, nitrogen plays an important role in photosynthesis and metabolic processes responsible for growth. An increased mineralization rate would allow Amur Honeysuckle to out-compete native species for resources via rapid growth and seed production. To determine the effects of Amur Honeysuckle on soil dynamics, Mt. Airy forest (Cincinnati, OH) was chosen as the location of study. Soil samples from invaded and un-invaded plots were collected and spectrophotometry was used to detect differences in KCl extractable nitrate in the native and invaded soils. For each sample, nitrate readings were taken soon after sampling from the forest and after an incubation period in order to determine the nitrogen mineralization rates. The acidity of soil is increased by the presence of nitrate, thus, pH readings were also conducted. The results of this study indicate that the mineralization rate is slightly higher in soils invaded by Amur Honeysuckle and the pH of invaded soils is more acidic than native soils.

**14. THE EFFECTS OF L-TYPE AND T-TYPE CALCIUM CHANNEL INHIBITORS ON SMOOTH MUSCLE CONTRACTION OF LEFT ANTERIOR DESCENDING ARTERY OF BOVINE HEARTS**

**Laura Borchers, Christine Chuck, Jordan Clendenen, K. Payton Keller, Meredith McAdams, Nina Mecca, Michelle Poineau, Evan Werk (Dr. Lisa Close-Jacob)**

**Department of Biology**



This experiment studied the contribution of different calcium channels to smooth muscle contractions of bovine left anterior descending (LAD) arteries. We examined whether L-type or T-type channels were more responsible for contractile activity using nifedipine and mibefradil as L-type and T-type calcium channel inhibitors, respectively. Arterial rings were hung on force transducers in Krebs solution. The arteries were treated with either the drug or the drug's vehicle, then contracted with U46619 to observe the effect on overall contraction. The results were gathered using Chart and standardized by determining the force per cross sectional area of each arterial ring. Nifedipine reduced force by  $1.654 \text{ g/mm}^2$ , or 41%, relative to the control values. Treatment with mibefradil resulted in a 24% reduction in stimulated force relative to control ( $0.771 \text{ g/mm}^2$ ). Combining the two inhibitors diminished stimulated force by 25%, a reduction of  $0.702 \text{ g/mm}^2$  relative to the control value. These data suggest that L-type calcium channels play a larger role in smooth muscle contraction in LAD arteries of bovine hearts than T-type channels.

**15. AN IMPROVED PROCESS FOR PURIFICATION OF CARBONIC ANHYDRASE BY AFFINITY CHROMATOGRAPHY**

**Drew Kaiser, Bill Kappel, Rick Mehig (Dr. Dorothy Engle)**

**Department of Biology**



Bovine carbonic anhydrase is a zinc containing enzyme that plays an important role in respiration. Previous studies on the enzyme have been successful in purifying the enzyme from bovine erythrocytes using affinity chromatography. This project sought to improve upon an existing purification process. Greater yield of the enzyme and a safer purification process were desired. Through several changes in the purification process including optimization of the manufacture of the affinity resin, a greater yield of enzyme was produced. In a scale trial of the new purification process, enzyme yield was increased 13% with a 9% increase in overall protein by weight in the final lyophilized product. Additionally, optimization of the affinity resin manufacturing process increased the binding capacity of the resin while reducing hazardous waste. Changes to the purification process also increased the safety for the chemists involved and led to process implementation in purification of carbonic anhydrase from human erythrocytes.

**16. NUMERICAL DISCRIMINATION AND FORAGING BEHAVIOR IN NORTHERN MOCKINGBIRDS**

**John P. Chadwell, Christina Baldwin, Warren D. Leas (Dr. George L. Farnsworth)**

**Department of Biology**



When birds are faced with foraging options, optimal foraging theory predicts that they will choose the option that provides the largest reward with the least effort. We tested the ability of a wild Northern Mockingbird (*Mimus polyglottos*) to optimally choose between two feeders that varied in difficulty of operation and amount of reward provided. The experimental feeders were introduced into the bird's winter territory in an urban college campus. The feeders contained a food reward (*Tenebrio* larvae) that could be obtained when the bird removed a certain number of bamboo sticks from either end of the feeder. In our first trial, the bird was presented with the choice between a feeder with 1 cup and 1 stick, and a feeder with 3 cups and 1 stick. In our second trial, the choice was between a feeder with 1 cup and 1 stick, and a feeder with 1 cup and 6 sticks. In our third trial, one feeder had 1 cup and 1 stick, while the other had 3 cups and 6 sticks. In trials 1 and 2, the bird chose feeders in the manner predicted by optimal foraging theory, preferentially going for more food and fewer sticks, respectively. In the third trial, the bird showed



an equal preference for both feeders, with the bird's preference for more food seemingly acting against its avoidance of more obstacles, producing a result that was statistically "in between" the results of the first two trials. These results indicate that the Northern Mockingbird tested exhibited numerical discrimination in regards to both reward and effort, and that both variables appeared to act simultaneously to influence its choice of foraging options.

#### 17. SEX RATIOS IN NORTHERN MOCKINGBIRD BROODS IN OHIO AND NORTH CAROLINA

Amsul Khanal, Brett E. Schrand, Whitney Wauligman (Dr. Farnsworth & Dr. Engle)

Department of Biology



In birds, the sex ratio of offspring should reflect the reproductive value of and differential investment required to raise male and female chicks. To determine the sex ratios in nests of Northern Mockingbirds (*Mimus polyglottos*) in Ohio and in North Carolina, feathers were collected from nestlings to sample DNA, and the birds were weighed. The sex of birds is determined by sex chromosomes. Males are homogametic (having two Z chromosomes), and females are heterogametic (having one Z and one W chromosome). PCR was used to amplify a region on the sex chromosome that is different on the Z and the W chromosome. Gel electrophoresis was used to determine the sex of each nestling. An overall male-biased sex ratio in the Ohio population was found (75 males and 52 females;  $\chi^2_1 = 4.165$ ,  $p = 0.041$ ). A seasonal trend in sex ratios in the Ohio population with a greater proportion of male chicks fledging before 15 June than in broods fledging after 15 June was observed. In contrast, a female-biased sex ratio was found in the North Carolina population (24 females and 5 males;  $\chi^2_1 = 12.4$ ,  $p < 0.001$ ). Male chicks were heavier than female chicks ( $p < 0.01$ ). Thus male chicks may represent a greater parental investment due to their greater size. Male chicks may benefit more than females from fledging early in the season. In the higher-density population in North Carolina, it may be adaptive to overproduce female chicks because females are more likely to disperse.

#### 18. MAZE LEARNING IN THE COMMON WALL LIZARD, *PODARCIS MURALIS*

Kyle Yeager, Ann Cherukara, Domonique Griffin (Dr. George L. Farnsworth)

Department of Biology



Reptiles have been regarded as having relatively simple behaviors and for this reason few spatial learning studies have been performed on reptiles as compared with other vertebrates. The purpose of the experiment was to observe the behavior and learning ability of the Common Wall lizard, *Podarcis muralis*. A lizard was captured from the wild, stored in a terrarium, fed food and water ad libitum, on a 12 hour light/dark cycle. In order to test its learning ability, the lizard was introduced to a maze that was surrounded on the floor and walls with ice, and the reward for completion of the maze was a heat lamp. A simple and a complex maze were used to assess learning ability. The time to complete the maze and number of errors made by the lizard were recorded. Differences between trials with and without errors were compared. The lizard completed the simple maze on average 39.1 seconds faster without errors than when it made errors. In the complex maze the lizard completed the maze 50% of the trials. Based on the data collected the lizard made no significant improvement in time, number of errors, or completion of the maze and was deemed to have not fully learned the mazes.



Dr. Linda Finke's research group: abstracts below

Grace Hallenbeck, Caitlin Richter, Katie Raffel, Sean Monroe, Robert Jen (lower front) and Karan Motiani

**19. ENHANCEMENT OF THE SURVIVAL OF ESCHERICHIA COLI IN THE PRESENCE OF THE NITROGEN FIXING AZOLLA-ANABAENAM SYMBIOSIS**

Grace E. Hallenbeck, Caitlin A. Richter (Dr. Linda Finke)

Department of Biology

The water fern *Azolla* and its endosymbiont *Anabaena azollae* are being turned to as a possible biofertilizer because of the latter's ability to fix nitrogen. Nitrogen is widely available in the form of nitrogen gas,  $N_2$ , but this is unusable by most living organisms. Cyanobacteria of the genus *Anabaena* are able to convert this unusable nitrogen to  $NH_3$  by way of the enzyme nitrogenase, and to supply this fixed nitrogen to their symbiotic partner *Azolla*. Recent public health scares have illustrated the ability of the pathogenic bacterium *E. coli* O157:H7 to survive in association with leafy vegetables. Is it possible that the nitrogenase activity of the *Azolla-Anabaena* system, widely grown in rice fields, may support extended survival of fixed nitrogen-dependent pathogens like *E. coli*? To examine this possibility, *Azolla* was grown in mineral nutrient media with or without fixed nitrogen. Nitrogenase activity was quantitated by way of the acetylene reduction assay. *E. coli* was inoculated into systems of both types, as well as into appropriate control solutions, and its survival was determined over five days post-inoculation through a plate count procedure using EMB agar.

**20. THE EFFECTS OF AQUAPRO HERBICIDE ON NITROGEN FIXATION ACTIVITY IN AZOLLA-ANABAENA**

Robert Jen, Karan Motiani (Dr. Linda Finke)

Department of Biology

Because the supply of nitrogen in soil needs to be replenished due to its continual loss as a result of leaching, denitrification, and constant uptake by plants, many developing countries use the *Azolla-Anabaena* symbiotic  $N_2$ -fixing system as a fertilizer for aquatic crops such as rice. The *Azolla-Anabaena* system involves a symbiotic relationship between the cyanobacterium *Anabaena* and the water fern *Azolla*. Naturally, the surface of floodwater provides the site for aerobic phototrophic nitrogen fixation by the *Azolla-Anabaena* complex. One potential problem for the complex, however, is the use of herbicides which are applied to aquatic crops as a means of limiting the growth of undesirable plants. Due to uncertainty regarding the herbicidal impact on such an important nitrogen-fixing association, this study investigated the effects of a particular commercial herbicide called AquaPro on *Azolla-Anabaena*. The purpose of the experiment was to determine whether there was a significant decline in nitrogen-fixing activity and, subsequently, a decline in the growth of the complex. The study was accomplished by administering AquaPro to an *Azolla-Anabaena* system and then performing acetylene reduction assays after one week of treatment to detect any changes in nitrogen fixation activity. Growth was measured by calculating the change in surface area coverage by the *Azolla* plants.

**21. EFFECTS OF SODIUM SULFATE SALINITY ON NITROGEN FIXATION ACTIVITY  
WITHIN THE AZOLLA-ANABAENA SYMBIOSIS**

**Sean M. Monroe (Dr. Linda R. Finke)**

**Department of Biology**

Nitrogen fixation is an important process within the nitrogen cycle in which atmospheric nitrogen is reduced to ammonia by the bacterial enzyme nitrogenase. This process is typical within bacterial-plant symbioses in which the bacterial symbiont fixes nitrogen, which in turn benefits the plant symbiont. The *Azolla-Anabaena* symbiosis is a perfect example of such a relationship, since the *Anabaena* cyanobacterium provides ammonia for the *Azolla* fern, while in turn receiving a suitable habitat under the leaves of the ferns. Since this symbiosis exists in aqueous environments, small changes in the content of the water can have a dramatic effect on the survival and activity of both symbionts. Salinity is one cause of such problems, and was the basis for this study. In this study, the effects of the salt sodium sulfate ( $\text{Na}_2\text{SO}_4$ ) were studied on the *Azolla-Anabaena* symbiosis. The symbionts were exposed to three concentrations of  $\text{Na}_2\text{SO}_4$  between 5 and 15 mM and allowed to grow for several weeks. My hypothesis was that the  $\text{Na}_2\text{SO}_4$  would be detrimental to the survival of the symbionts and would cause a decrease in nitrogen fixation activity. The acetylene reduction assay was performed at hourly intervals to measure nitrogen fixation rates of the experimental groups exposed to  $\text{Na}_2\text{SO}_4$ . Acetylene reduction data were compared among these treatment groups, and with reference to a control group of organisms not exposed to  $\text{Na}_2\text{SO}_4$  salinity.

**22. PARA-NODULE FORMATION IN WINTER WHEAT IN ASSOCIATION WITH ANABAENA**

**Katie Elizabeth Raffel (Dr. Finke)**

**Department of Biology**

Wheat is a basic food source across the world, but its commercial growth demands large amounts of nitrogen fertilizers. This experiment studied the potential for formation of a symbiotic relationship between *Anabaena*, a nitrogen-fixing cyanobacterium, and roots of *Triticum aestivum* (winter wheat.) Wheat plants were grown hydroponically in three separate experimental groups. The first was grown in a nitrogen-free medium. The second employed the same medium with the addition of *Anabaena*, and the third group contained both of the above ingredients as well as 2,4-D. The latter is a synthetic auxin and a known inducer of nodule-like masses called para-nodules on plant roots. Plant growth was monitored by photographic documentation and growth comparisons were based on dry-mass measurements at the end of the growth period. An acetylene reduction assay was performed to quantify nitrogenase enzyme activity. It was hypothesized that para-nodules would develop in the wheat plants treated with 2,4-D and that colonization of these nodules by *Anabaena* would result in increased acetylene reduction levels indicating enhanced nitrogen fixation.

**23. THE EFFECT OF PUBLIC VIEWING ON MIDWEST FLORIDA MANATEE  
SWIMMING BEHAVIOR**

**James L. Barlow, Rebecca J. Bruning, Katherine M. Haap, Jason L. Kelty, Matthew D. Niehaus,  
Avante D. Roberts (Dr. Charles J. Grossman)**

**Department of Biology**

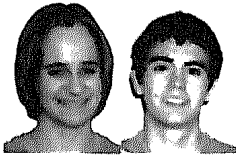


This project focuses on the two captive male Florida manatees located at the Cincinnati Zoo & Botanical Gardens. The Florida manatee, (*Trichechus manatus latirostris*) is concentrated in the area of the Florida coastline, residing in both marine and freshwater habitats. The manatee is a very social mammal, often aggregating in groups. The main focus of the study was to observe the swimming behavior of the captive manatees when visitors were present in the viewing area. The viewing glass of the manatee tank was divided up into blocks creating a tape grid system. The swimming behavior of the manatees were then tracked and recorded by observing the number of blocks traversed. It was predicted that the manatees' swimming behavior would increase significantly when visitors were present in the viewing area of Manatee Springs. Initial observations have shown increased swimming behavior when public viewers were present and statistical analysis is currently being performed to confirm the data is significant.

**24. DECIPHERING THE DIFFERENT VOCAL CHARACTERISTICS BETWEEN MALE AND FEMALE CAPTIVE FLORIDA MANATEES**

Rebecca A. Santho, Jacob B. Wasserman, Dr. Jennifer Robbins (Dr. Charles Grossman)

Department of Biology



It is not known whether Florida manatees (*Trichechus manatus latirostris*) have a characteristic "vocal signature" that would identify them as an individual in the wild. Studies have been done regarding the vocalizations of manatees as a whole, but differences between individual manatee vocalizations have been neglected. The goal of this study was to differentiate individual manatees based on the characteristics of their vocalizations thus, assign a vocal signature to each individual manatee. First, we determined that differences in vocalizations could be detected between male and female captive adult Florida manatees by analyzing the following vocal characteristics; duration, number of harmonics, fundamental frequency, step size, and modulation. A total of 302 previously recorded vocalizations were studied from male manatees at the Cincinnati Zoo and female manatees at the Columbus Zoo. Preliminary results indicate there is a significant difference between male and female vocalizations with regard to duration, fundamental frequency, step size, and modulation pattern. In addition, this study looked to see if we could discern any information from these vocal characteristic variables that might couple to the size of the manatee due to a possible correlation between body weight and fundamental frequency.

**25. LONGITUDINAL STUDY INVESTIGATING POSSIBLE CIRANNUAL SWIMMING BEHAVIORS OF CAPTIVE FLORIDA MANATEES (*Trichechus manatus latirostris*) IN THE MANATEE SPRINGS EXHIBIT AT THE CINCINNATI ZOO**

Allison M. Tewell, Sara J. Roper (Dr. Charles J. Grossman)

Department of Biology

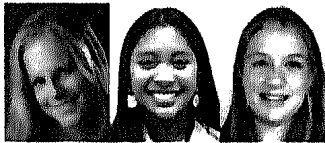


Many animals exhibit circadian or circannual rhythms in their behaviors. To date, it has not been determined if *Trichechus manatus latirostris*, the Florida manatee, also demonstrates such rhythms in behaviors. This study compared monthly swimming behaviors of five manatees housed in Manatee Springs at the Cincinnati Zoo. Longitudinal data to monitor the movements of manatees in the tank was collected using a grid scheme set-up. A cloth grid was attached to the glass viewing window of the tank and the grid was used to record the blocks traversed by the manatees during a 1-minute run. Data collected over the past nine years was compiled to compare the blocks traversed by each manatee each month. This data was further compared using the Kruskal-Wallis Rank test. Analysis found significant differences in three of the five manatees, in the way their month-to-month swimming behaviors changed. This suggests a possible rhythm to the swimming behaviors of Florida manatees over the course of the year. Further study must expand on the data values and determine if the manatees have increased swimming movements in one season of the year versus another.

**26. CHARACTERIZATION OF GENETIC DIVERSITY IN ROCKHOPPER PENGUINS USING PCR**

Jeanette Feider, Carolyn Marcelo, Kristen Richards (Dr. Waltke Paulding)

Department of Biology



Recent genetic analyses have suggested that rockhopper penguins can be further divided into two species, northern rockhopper (*Eudyptes moseleyi*) and southern rockhopper (*Eudyptes chrysocome*) (Jouventin 2006). Rockhopper penguins are natives of South America with populations in Chile, Argentina, and the Falkland Islands. Twenty feather samples were collected in 2007 from Isla Terhalten, Chile, and genomic DNA was extracted from each of the samples. Three microsatellite loci were cross-amplified using primers developed from the Humboldt penguin (*spheniscus humboldti*) via the polymerase chain reaction (PCR). PCR products will be sequenced in order to analyze samples for genetic variability. This study is important because both the northern and southern rockhopper species have been placed on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List, with the southern rockhopper as a vulnerable species and the northern rockhopper as an endangered species (IUCN 2008). Analysis is incomplete, but due to small sample size

and collection of samples in an isolated area, the Rockhopper samples will likely exhibit low genetic variability.

**27. RED-NECKED GREBE PCR PRIMERS CAN BE USED TO AMPLIFY GREATER FLAMING DNA**

**Stephanie Ibemere (Dr. Waltke Paulding)**  
**Department of Biology**



Microsatellites are a polymorphic DNA loci comprised of repeating units of 1-6 base pairs. The number of repeating subunits is highly variable between individuals within a population of organisms. Thus, microsatellite DNA can be amplified using PCR and used as genetic markers to differentiate individual organisms in population genetics studies. Typically, specific PCR primers are synthesized for microsatellite DNA in each individual species. Universal primers, which cross-react with multiple species, are preferred, as they have wider application. No PCR primers exist for microsatellites in the Greater Flamingo. We are currently performing cross-species microsatellite PCR amplification of Greater Flamingo DNA using Red-Necked Grebe primers, as evolutionary evidence suggests that the two species are closely related enough for the Grebe primers to amplify Flamingo microsatellite DNA. Conclusive results are currently not available, but it is expected that this cross-species amplification will be successful once all conditions have been optimized, providing a rapid method to paternity test Greater Flamingo chicks.

**28. DETERMINING POPULATION BOTTLENECK IN *PODARCIS MURACIS* USING MICROSATELLITE LOCI AND THE M-RATIO**

**Catherine J. Marcelo (Dr. Waltke Paulding)**  
**Department of Biology**



In this study, we are testing the M-ratio model in the population of *Podarcis muralis* in Cincinnati to see if it accurately predicts the bottleneck effect. This species is known to have undergone the bottleneck effect because a small sample was introduced to Cincinnati from Italy in the 1950s. When a bottleneck occurs, the M-ratio is expected to be smaller than that of the original population. We are testing the reliability of the M-ratio by amplifying and sequencing three microsatellite loci. We have amplified and are currently sequencing the loci and will use the data to calculate the M-ratio for our population. We expect the results to support the presence of a bottleneck effect in the Cincinnati population of *Podarcis muralis* and thus validate the reliability of the M-ratio in determining the bottleneck effect.

**29. INTERCELLULAR SPREAD RATES OF *LISTERIA MONOCYTOGENES* BETWEEN HUMAN MACROPHAGES AND EPITHELIAL CELLS**

**Patrick R. Vargo, Paula J. Thielen (Dr. Jennifer Robbins)**  
**Department of Biology**



The facultative intracellular bacterium, *Listeria monocytogenes*, has the ability to cause gastroenteritis in healthy individuals, meningitis in immunocompromised individuals, and spontaneous abortions in pregnant women. The intracellular lifecycle of this pathogen has been well documented, but its mechanisms for crossing host barriers and spreading throughout the body remain ambiguous. To investigate the feasibility of *L. monocytogenes* parasitizing macrophages and using them as a vehicle to spread infection, this study measures the intercellular spread rates of the bacterium between macrophages and epithelial cells. Macrophages are infected with a RFP (Red Fluorescent Protein) *L. monocytogenes* strain and cocultured with epithelial cells in a gentamicin solution to facilitate only intercellular spread. Infectious foci and CFUs in the recipient epithelial cells are used to quantify the intercellular spread rate. This procedure is repeated using the following combinations of cocultured cells: infected epithelial cells and uninfected epithelial cells; infected epithelial cells and uninfected monocytes; and infected monocytes and uninfected monocytes. The intracellular spread rates for these combinations are then compared. The results from this study will further elucidate the roles of intercellular spread and infected macrophages in the transmission of *L. monocytogenes* throughout host tissues.

30. **THE EFFECT ON CONE CELL DEVELOPMENT IN MUTANT FLIES WITH A DOMINANT NEGATIVE FORM OF NOTCH DUE TO THE INTERACTION OF NOTCH AND EGF SIGNALLING**

Lauren M. Kopicky (Tiffany Cook, PhD)

Division of Developmental Biology, Cincinnati Children's Hospital and Medical Center



The development of the *Drosophila* eye is based on a complex network of signalling pathways whose interactions are still being discovered. In this experiment, we examined the interaction between two signalling pathways, called *Epidermal Growth Factor (EGF)* and Notch signalling, during eye cell development. In the *Drosophila* eye, five cells form an R7 competence group, and while one cell becomes the R7 photoreceptor, the other four assume non-neuronal cell fate and become cone cells. Because R7 development must precede cone cells formation, we compared cone cell number in wild type vs. mutant flies with a dominant negative form of Notch. The GAL4-UAS system was used to generate experimental flies which overexpressed the transcription factor *pros* in order to enhance the visibility of the R7 and cone cells. *Pros* is expressed in the R7 equivalence group and is stronger in the R7 cell than the cone cells. Fly eyes were sectioned and stained with antibodies against the transcription factors *cut*, *pros*, and *Elav*. Unfortunately, the red colored eyes inhibited stain visibility, so the experiments were repeated with a second set of flies in which the white gene was silenced by RNA interference; this resulted in Notch negative, *pros* over- expressing flies with white eyes. The experiment was repeated and results showed a lack of *cut* staining in the cone cells. Further experiments need to be conducted to obtain more conclusive results.

31. **THE ROLE OF THROMBIN IN MEDIATING ARTERIAL THROMBOSIS**

J. Eric Questel<sup>1</sup>, Greg Adams<sup>2</sup>, Gretchen LaRusch<sup>2</sup> and Alvin H. Schmaier<sup>2</sup>, <sup>1</sup>SPUR Fellow, Department of Biology, Xavier University <sup>2</sup>Division of Hematology and Oncology, Department of Medicine, Case Western Reserve University, Cleveland, OH 44106



Thrombosis, the coagulation of blood in the vascular system, can lead to the occlusion of arteries and veins resulting in medical complications. Annually, arterial and venous thromboses lead to the deaths of over 1,000,000 people. The majority occur from myocardial infarctions, strokes and embolisms. Information on this mechanism may lead to prevention and/or new therapies for patients at risk for arterial and venous thrombosis. Thrombin, the main clotting enzyme, cleaves fibrinogen to create the basic framework of thrombus. In this study, we examined if all arterial thrombosis risk is mediated by thrombin. In this investigation, tissue factor induced prothrombin times (PT) and activated partial thromboplastin times (aPTT) were performed using a kinetic fluorometric plate reader to make thrombin generation curves. Lag times and rate peaks were measured for thrombin production between mouse knockout and heterozygous genotypes and their wild type controls. Bradykinin B2 receptor knockout (B2RKO) mice are protected from thrombosis (longer times to arterial occlusion) phenotypically, but the results from the thrombin generation time (TGT) assays show lag times and peak rates not consistent with a defect in thrombin generation. Angiotensinogen heterozygous (Agt+/-) mice are also protected from thrombosis (longer times arterial occlusion), but the results showed an insignificant difference between the PT and aPTT lag times and peak heights between the mouse genotypes. Bradykinin B2 receptor/kininogen knock out (B2R/KinKO) mice are prothrombotic (shorter times arterial occlusion). The PT results show insignificant differences between the mouse genotypes while the aPTT results show increased lag times and decreased rate peaks in thrombin generation, data contrary to the hypothesis examined. The results from the three mouse studies suggest arterial thrombosis in these animals is independent of thrombin generation.

32. **PROBING HALIDE EXCHANGE ON  $[AlX_4]^-$  ANIONS VIA Al-27 NMR: APPLICATION OF THE PAIRWISE-ADDITIVE MODEL**

Bridget M. Dixon (Dr. Craig M. Davis)

Department of Chemistry



A laboratory exercise using Al-27 NMR spectrometry to study halide exchange has been developed for upper-level inorganic classes. Tetrahedral tetrahaloaluminate complexes  $[AlX_4]^-$  and the binary systems  $[AlX_4Y_{4-n}]^-$  (X, Y = Cl, Br, or I) are formed; the latter reveal a statistical distribution of the halides. Then, the pairwise-additive concept developed by Vladimiroff and Malinowski (1) is used to predict the chemical shifts of the ternary anions  $[AlCl_mBr_nI_{4-m-n}]^-$ . The pairwise-additive model recognizes each substituent on the central atom affects the

chemical shift of each of its neighbors. For example, the  $[\text{AlI}_4]^-$  anion has six I-I interactions. Its  $^{27}\text{Al}$  NMR chemical shift is -27.0 ppm; hence, each I-I pairwise parameter is -4.5 ppm. The  $[\text{AlI}_3\text{Cl}]^-$  anion has three I-I and three I-Cl interactions. Its  $^{27}\text{Al}$  NMR chemical shift is 21.7 ppm; given each I-I pairwise parameter is -4.5 ppm, each I-Cl pairwise parameter must be 11.6 ppm. (Other parameters: Br-Cl = 15.7 ppm and I-Br = 6.8 ppm). Thus, the chemical shift of the anion  $[\text{AlI}_2\text{BrCl}]^-$  can be predicted. It has one I-I, one Br-Cl, two I-Cl, and two I-Br interactions. The calculated  $^{27}\text{Al}$  NMR chemical shift is  $(-4.5) + (15.7) + (2 \times 11.6) + (2 \times 6.8) = 48.0$  ppm, while the observed chemical shift is 47.7 ppm.

### 33. HALIDE EXCHANGE OF TETRAHEDRAL AND OCTAHEDRAL COMPLEXES AS OBSERVED BY Al-27 AND Sn-119 NMR SPECTROMETRY

Christopher J. Rizik, Raees Ismail (Dr. Craig M. Davis)

Department of Chemistry



A laboratory exercise using multi-nuclear NMR spectrometry to study halide exchange has been developed for upper-level inorganic classes. First, tetrahedral tetrahaloaluminate anions are studied with  $^{27}\text{Al}$  NMR spectrometry. Spectra of the homoleptic complexes  $[\text{AlX}_4]^-$  and the binary systems  $[\text{AlX}_4\text{Y}_{4-n}]^-$  (X, Y = Cl, Br, or I) are acquired. Then, the pairwise-additive concept developed by Vladimiroff and Malinowski (below) is used to predict the chemical shifts of the ternary anions  $[\text{AlCl}_m\text{Br}_n\text{I}_{4-m-n}]^-$ . Second, the octahedral complexes  $[\text{SnX}_6\text{Y}_{6-n}]^{2-}$  (X, Y = F, Cl) are studied with  $^{119}\text{Sn}$  NMR spectrometry. The complexes  $[\text{MX}_2\text{Y}_4]^{n-}$ ,  $[\text{MX}_3\text{Y}_3]^{n-}$  can each exist as two geometric isomers. Molecular modeling is used to predict which geometric isomer is more stable, and NMR spectrometry (again with the aid of the pairwise-additive concept) confirms its existence in solution. The pairwise-additive model recognizes that each substituent on the central atom affects the chemical shift of each of its neighbors. For example, the  $[\text{AlI}_4]^-$  anion has six I-I interactions. Its  $^{27}\text{Al}$  NMR chemical shift is -27.0 ppm; hence, each I-I pairwise parameter is -4.5 ppm. The  $[\text{AlI}_3\text{Cl}]^-$  anion has three I-I and three I-Cl interactions. Its  $^{27}\text{Al}$  NMR chemical shift is 21.7 ppm; given each I-I pairwise parameter is -4.5 ppm, each I-Cl pairwise parameter must be 11.6 ppm. Obtaining the parameters for all possible X-X interactions allows one to predict the chemical shift of any  $[\text{AlX}_4\text{Y}_{4-n}]^-$  X, Y = Cl, Br, or I) or  $[\text{AlCl}_m\text{Br}_n\text{I}_{4-m-n}]^-$  anion.

### 34. OXYGEN-ACTIVATING NICKEL(II) COMPLEXES WITH BULKY OXIMATE LIGANDS

Alyssa L. Young (Dr. Craig M. Davis)

Department of Chemistry



Traditional oxidizing agents, such as hexavalent chromium, are costly and environmental hazards. A preferred oxidizing agent would be molecular oxygen, but the challenge is to develop catalysts which can activate molecular oxygen. Our group, in collaboration with Dr. Michael Baldwin of the University of Cincinnati, has synthesized nickel(II) complexes that catalyze the oxidation of organic substrates by molecular oxygen. The Baldwin Group has observed that a Ni(II)-TRISOX complex can activate oxygen. Unfortunately, after ten turnovers the catalyst stops functioning. To limit possible side reactions our group has replaced the TRISOX ligand with the bulkier TRIPHOX and TRITOX ligands. The nickel(II) complexes of these two ligands have been characterized by UV-vis and FT-IR spectroscopy and by X-ray crystallography. Both nickel complexes have demonstrated their ability to catalyze the oxidation of methanol, as observed qualitatively by FT-IR spectroscopy. Quantitatively, their ability to oxidize several substrates (benzyl alcohol, and benzylamine, as well as methanol) will be determined by gas chromatography.

### 35. FURTHER STUDIES OF AN ANALYTICAL METHOD FOR THE DETERMINATION OF ORGANOARSENIC COMPOUNDS IN THE WORKPLACE USING GC/MS

Amadou B. Diop (Dr. Barbara M. Hopkins)

Department of Chemistry



Roxarsone is an organoarsenic compound used in the agricultural domain as a growth promoter for poultry. Since workers in feed-producing factories can be exposed to this compound, an air-sampling method using Gas Chromatography/Mass Spectrometry (GC/MS) was developed. Previous work showed that this method satisfied the criteria of the National Institute of Occupational Safety and Health (NIOSH) for an air sampling method that included a storage study at the permissible exposure limit (PEL) as well as values

lower and greater than the PEL. A problem that was observed with the GC/MS method was that at low concentrations (from 0.2 to 0.1 x the PEL), the Roxarsone peak was hardly detectable. Attempting to lower the limit of detection of Roxarsone, the individual steps of the method were varied. One step involves the conversion of the non-volatile Roxarsone into a form suitable for GC analysis, followed by extraction of this volatile compound into toluene which is injected into the GC. Changes in this extraction procedure improved the range over which Roxarsone is detected.

### 36. EFFECTS OF IONIZATION AND REDUCTION UPON THE FOLDING TRANSITIONS IN BOVINE PANCREATIC RIBONUCLEASE

Kristie M. Jetter (Dr. Daniel J. McLoughlin)

Department of Chemistry



The pH induced unfolding transitions of bovine pancreatic RNase A were measured under various concentrations of reducing agents by monitoring the change in excited tyrosine fluorescence. Lyophilized protein was dissolved to a concentration of approximately 0.1 mg/ml and the spectra were recorded in a 1 cm quartz cuvette on a fluorescence-spectrophotometer. Titration pH values were recorded along with fluorescence changes upon the addition of small amounts of sodium hydroxide solutions to the cuvette. Data collections were repeated under various concentrations of reducing agent in order to determine the effect of the cysteine-cysteine cross links within the protein. The results of the folding and unfolding changes under these various reducing conditions and pH profiles will be discussed.

### 37. A COMPARATIVE METHODOLOGY OF PACKED COLUMN VERSUS CAPILLARY COLUMN GAS CHROMATOGRAPHY THROUGH THE ANALYSIS OF THE FATTY ACID COMPOSITION OF PORCINE DEPOT FAT

O'Dasha T. Johnson (Dr. Daniel McLoughlin)

Department of Chemistry



Gas chromatography is the most utilized scientific method for the separation and identification of compounds. The instruments utilize a fixed phase of material within a column for the separation. A mobile phase is then allowed to move against this fixed phase and separation occurs under varying temperature conditions. The columns used to hold the fixed phase generally come in two types. The first type has the fixed phase absorbed upon inert material that is then "packed" into the column. The second type utilizes a thin bore column and the fixed phase is directly absorbed to the inside walls of the "capillary". These two types of columns will be examined as to their ability to separate the esters of porcine fat. Fatty acid methyl esters of porcine fat will be prepared and a comparative separation will be performed upon packed column and capillary column instruments.

### 38. SYNTHESIS OF FLUORINE LABELED ETHENO-ADENOSINE ANALOGUES AS TOOLS FOR CHARACTERIZING PROTEIN STRUCTURE AND FOLDING

Marites T. Woon, William Taylor Brooks (Dr. Daniel J. McLoughlin)

Department of Chemistry



Many modern spectroscopic techniques may be utilized to examine the process of protein binding, dynamics and folding. Past investigators have shown etheno-adenosine compounds to be useful spectrofluorometric tools to examine the equilibrium binding and kinetics of several enzyme systems. Progress will be presented involving the synthesis of fluorine labeled etheno-adenosine compounds. In addition to fluorometric studies, these compounds may also serve as useful tools for the NMR examination of protein structure. These compounds may also prove useful in future investigations of the kinetics and thermodynamics of protein folding.



39.

## ASYMMETRIC CONJUGATE ADDITION: SYNTHESIS OF (+)-PILOSINE

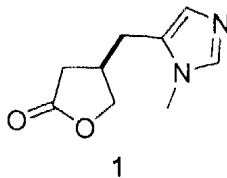
Michael J. Beauchamp, Reid M. Faylor (Dr. Richard J. Mullins)

Department of Chemistry



presented.

(-)-Pilosine and (+)-pilocarpine are naturally occurring alkaloids produced by a member of the *Pilocarpus jaborandi* family of plant leaves found in the Amazons. Our groups interest in the application of asymmetric conjugate addition for small molecule synthesis reveal these as suitable targets for this strategy. Our efforts toward the development of a general and versatile strategy for synthesis of pilosine and related molecules will be



(+) - pilosine

40.

## ASYMMETRIC CONJUGATE ADDITION: SYNTHESIS OF (+)-KALKITOXIN

Everett W. Merling, Nina R. Collins (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 embarked on a quest to better understand the manner by which it prevents the growth of tumor cells. To accomplish this goal, our efforts have focused on the total synthesis of kalkitoxin, utilizing the conjugate addition of an allylic stannane 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.

41.

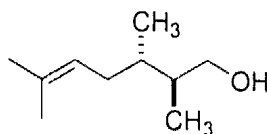
## ASSYMETRIC CONJUGATE ADDITION: SYNTHESIS OF LASIOL

Emily E. Wilding, John J. Gregg (Dr. Richard J. Mullins)

Department of Chemistry



Lasiol is a major component of the mandibular gland secretion by males of the *Lasius meridionalis* ant. First isolated in 1990, lasiol serves as the primary sex attractant secreted by the male ant. Our interest in the synthesis of lasiol stems from the stereochemistry of the two chiral methyl groups and the synthetic challenges posed by this common structural motif. Our synthesis efforts, exploiting an asymmetric 1,4-conjugate addition of an allylic stannane to produce the 1,2-anti-dimethyl arrangement with high diastereocontrol, have recently resulted in the synthesis of the parent molecule. Our progress in this area will be presented.



42. **KRISTALLNACHT: WHAT DID THE WORLD REALLY KNOW?  
AN ANALYSIS OF NEWSPAPER REPORTS WORLDWIDE ON "THE NIGHT OF BROKEN  
GLASS"**

Ashleigh M. Sanders (Dr. Irene Compton and Dr. David Mengel)

Department of German, Department of History



How newspapers from across the globe reported on the events of Kristallnacht are examined in this work. Kristallnacht was a significant event of the Holocaust in which thousands of Jewish synagogues and businesses were destroyed, marking the beginning of major Nazi persecution of Jews. A history of Kristallnacht is provided, including details from eye witness accounts. Newspaper reports from the *Cincinnati Enquirer*, the *New York Times*, and the *London Times* are examined, as well as the German-American newspaper the *Zinzinnati Freie Presse* and the German newspapers *die Eßlinger Zeitung* and *Der Stürmer*. Only the time period from November 8-November 14, 1938, is examined. The analysis includes what events were reported on and in what detail, whether the reports were factual or opinion-based, the length of the reports, and where the reports were located in their respective newspapers. It was found that the majority of the events were reported by all newspapers, and often made front-page news with pictures included, although at times with some error in reasoning. It was explained as a punishment for all German Jews for the murder of Ernst von Rath. Several of the reports expressed horror at the events and included a call to action to aid Europe's Jews, demonstrating that the world did indeed understand the extent of the events occurring in Nazi Germany and therefore had a responsibility to intervene and prevent further persecution.

43. **HISTORICAL MISREPRESENTATION: THE AFRO BRAZILIAN REALITY**

Matthew S. Mellon (Dr. Julia O'Hara)

Department of History



The field of Afro Brazilian Studies contains vast research and has followed a capricious and oftentimes incongruous historiography. Afro Brazilian studies attained international attention in the 1930s with sociologist and cultural anthropologist Gilberto Freyre's paradigmatic study translated into English as *The Masters and the Slaves* which presented Brazil as a "racial democracy." This notion did not stand up to intellectual scrutiny social policies, and became passé by the 1960s. Emerging in the 1960s was a school of thought that argued class was the most important factor in determining prejudice. Even though the latter paradigm is becoming more difficult to justify, it is still subscribed to in some of today's academic circles. The problem with this school of thought is that it does not take empirical data seriously in terms of the racial disparity in Brazil. The teasing apart of race and class denies the interconnectedness of the two, and denies that race is a determinant of class. the historiography of Afro Brazilian studies largely overlooks the fact that racism is an adaptive reality that has survived from the era of slavery to the current industrial capitalism. This presentation will explore how the black experience and its understanding (or lack thereof) academically has shaped the conception of "blackness" in Brazil, with a comparative backdrop of Black history in the United States.

44. **THE MODERATING IMPACT OF CSE AND SOCIAL SUPPORT ON  
THE FAMILY ROLES AND EMPLOYEE OUTCOMES**

Amanda J. Edwards, T.A. Wagner, R.B. McKinley (Dr. Scott L. Boyar)

Department of Management



We examine two important components of family responsibility, breadwinner and caregiver. Breadwinner is the extent one is responsible for providing financial assistance to the family. Caregiver is the extent one is responsible for providing physical/emotional care for family members. Specifically, we assess the impact of breadwinner and caregiver on three important outcome variables including absenteeism, employee performance, and life satisfaction; we also explore the intervening impact of core self-evaluations (CSE) four types of social support among these relationships. The results demonstrate the impact of breadwinner and caregiver on important outcomes as well as limited support of the moderating impact of CSE and social support. The research and practical implications, as well as limitations of this study are discussed.

45. **APPLYING NON-NEGATIVE MATRIX FACTORIZATION TO FEATURE  
EXTRACTION AND RECOGNITION IN DIGITAL IMAGES**

**Terrance D. Callan (Dr. Gary Lewandowski)**

**Department of Mathematics and Computer Science**



Non-negative matrix factorization (nnmf) is a technique whereby two factors,  $W$  and  $H$ , are generated for an initial matrix  $V$  that contains no negative values such that  $V \approx WH$  and  $W$  and  $H$  are also guaranteed to contain no negative elements. When working with digital images it is common to treat each image as a matrix or vector of pixel values. Since negative pixel values make little sense, nnmf is a particularly appropriate technique to apply to digital images. When using nnmf to extract features from images, a set of images is treated as a set of vectors and concatenated into a single matrix  $V$  and then factored into  $W$  and  $H$  such that the columns of  $W$  correspond to the features in the initial set of images and  $H$  indicates the occurrence of those features in the initial images. Having thus obtained a set of features, one can factor further images using the feature matrix to identify which of those features are present in the image in question.

46. **CREATING A REAL-TIME TRACKING SYSTEM USING WIIMOTES  
AND INFRARED LED LIGHTS**

**Krista M. Miller (Dr. Gary Lewandowski)**

**Department of Mathematics and Computer Science**



Not only is the Nintendo Wii a fun and entertaining gaming system, but the remotes, referred to as "Wiimotes," used to enjoy it have many other uses. The Wiimote contains a 1024 x 768 infrared camera and built-in Bluetooth so it can connect directly to a computer. In conjunction with the creators of the Institute of Navigation's First Annual Mini-Urban Challenge, this research develops a system that can track a Lego robot on a 20' X 20' "mini-urban" course and display the path of that robot on a screen in real-time using only two Wiimotes, a wireless camera, a laptop, and an infrared LED light attached to the robot. Prior to this research, tracking systems were much more complicated and expensive needing sensors and state-of-the art computers. This research develops a very affordable and user-friendly system that allows spectators to watch the path of a robot from a bird's eye view as it completes the course. As the robot is being tracked, the system displays a blue line for where the robot has been.

47. **MODELING AND OPTIMIZING HIV TREATMENT**

**Nicholas A. Clark (Dr. Hem Raj Joshi)**

**Department of Mathematics and Computer Science**



Highly active antiretroviral therapy (HAART) is currently the standard treatment for the Human Immunodeficiency Virus (HIV). We modify an existing system of differential equations describing the interaction of the HIV virus with the human immune system. In this model, we incorporate variables representing typical HAART treatment with three drugs: Two Nucleoside Reverse Transcriptase Inhibitors (NRTIs) and one Protease Inhibitor (PI). We form an optimality system which includes the adverse side-effects of these drugs and solve this system numerically (using the Runge-Kutta order four algorithm) in order to determine the treatment that will maximize the quantity of CD4+ T-cells in a patient (strengthening the immune system) while minimizing hazardous side effects of the drug treatment on a patient's health.

48. **NEW WORLD ORDER: CONTEMPORANEOUS FAMOUS FEMALE PHYSICISTS**

**Evelyn A. Dohme (Professor Suzanne Chouteau)**

**Department of Art**



In preparation for publishing an illustrated physics book about famous female physicists of the 20<sup>th</sup> century and the 21<sup>st</sup> century for children, I first needed to understand more intimately both the media type I would be working in and the women who would fill the pages of my book. This process was not a linear journey by any stretch of the imagination; I found myself time-and-time-again facing unexpected problems, especially concerning how to illustrate abstract and lofty physics material. Torn between a desire to maintain realism for the women, but stuck with physics which could not be represented physically, surrealism became my happy modality of communication. Most importantly, my journey began with me trying to get into their heads and understand their theories without

truly understanding their circumstances and situations. In the end, my thesis illustrates their lives—a revelation of my own journey as a woman, a physicist, and as an artist.

49.

### EMISSION OF HIGH ENERGY GAMMA FROM A FIELD OF VARYING OPTICAL DENSITY

Evelyn A. Dohme (Dr. Marco Fatuzzo)

Department of Physics



Through statistical mechanics, this article examines Inverse Compton Scattering, as a photon is up-scattered by a relativistic particle (both mono-energetic and with a ranged energy via power-law). Monte Carlo mechanics and Brownian motion allow for examination of photons through a field of variable optical density. A highly relativistic gamma walking through a spherical field of particles will eventually collide with one of the particles. From this, if the gamma is highly energetic enough, a scattering occurs, which must be examined in the scatter particle's rest frame. If the gamma does not have sufficient energy, no scattering occurs. These two possibilities are available to every collision, and the whole process stops when the gamma has left the radius of the scatter field.

50.

### HYPERVELOCITY STARS

Tyler B. Pollock (Dr. Marco Fatuzzo)

Department of Physics



In this presentation, I will discuss how a binary star system acts when impinging on a black hole. The focal points of discussion will be on Newton and Kepler's laws of motion and gravitation, especially with a two-body system. From there, I will present how I was able to code in Mathematica the formulas needed to make a graphical representation of the orbiting bodies. Then, I will demonstrate how a two-sun-one-black hole system becomes chaotic and breaks apart. I will also discuss my results based on different parameters, such as different positions, masses of suns, initial velocities, and eccentricity of the orbit.

### 51. SELF-SIMILAR COLLAPSE SOLUTIONS THROUGH CRITICAL LINES WITH NONZERO INITIAL VELOCITIES FOR STAR FORMATION IN MOLECULAR CLOUDS

John C. Strubbe (Dr. Marco Fatuzzo)

Department of Physics



In the paper, *Generalized Solutions with Nonzero Initial Velocities for Star Formation in molecular Clouds*, Fatuzzo, Adams and Myers calculated self-similar spherical collapse solutions for a self-gravitating gas with a dynamic equation of state starting with an overdense state of hydrostatic equilibrium. The authors chose not to consider solutions that went through critical points in the research. Our study resolves solutions to the critical points ignored by Fatuzzo, et al, by using techniques presented in Lou and Cao's (2007), *Self-similar Dynamics of a Relativistic Hot Gas*. Essentially, we recreated Fatuzzo, Adams and Myers analytical and numerical

models to find the critical curves such that  $\frac{\alpha}{D} = \frac{v}{D} = \frac{0}{0}$ . Then solutions on both sides of selected critical points were calculated and the results were interpolated to allow a smooth transition across the critical conditions.

52.

### CONSTRUCTION OF COMPUTED TOMOGRAPHY USING ALGEBRAIC RECONSTRUCTION THEOREM

Eric Anderson (Dr. Steven Herbert)

Department of Physics



Computed Tomography (CT) involves sending X-Rays through a material and measuring the attenuation coefficients to obtain a cross sectional picture of the scanned object. We reproduced at CT scan by sending a collimated beam of X-Rays through an object along an x-y plane. The object was scanned by "moving" the beam along the y axis, measuring the attenuation coefficients, and storing them in a matrix. The object was rotated to a new angle, the process was repeated and a new matrix was created. The Algebraic Reconstruction Theorem (ART) rotates all matrices onto one final matrix and the coefficients are normalized and gray-

scaled using MatLab. A picture of the cross sectional area of the object was obtained illustrating an understanding and reconstruction of a CT Machine using the Algebraic Reconstruction Theorem.

**53. WHAT MAKES A GOOD LISTENING EXPERIENCE: FREQUENCY RESPONSE AND HOW IT RELATES TO SOUND QUALITY IN HEADPHONES**

**Michael W. Bauer (Dr. Steven Herbert)**

**Department of Physics**



Headphones are the least expensive, least disturbing way to listen to high quality music reproduction from your musical sound source. In an attempt to identify what makes a good, personal listening experience, this work examines the relationship between frequency response and sound quality in headphones. A function generator is used to input a wide range of frequencies from the equal tempered scale into several different sets of headphones. In a sound isolating chamber, the frequencies are measured using a PASCO sound sensor. The plotted data is compared to the ideal flat frequency response curve. The results show that the frequency response in headphones is not flat, and that different headphones do reproduce a different range of frequencies.

**54. NORMAL METAL TUNNEL JUNCTIONS**

**Matthew Shergy (Dr. Steven Herbert)**

**Department of Physics**



We fabricated normal metal tunnel junctions using photolithography and thin film deposition techniques. We will discuss the fabrication process in depth as well as the quantum theory of tunnelling. We will also present data measuring the response of the tunnel junction as a measurement of temperature and compare it to theoretical results.

**55. IMAGING METHODS USING COMPUTERIZED TOMOGRAPHY**

**Jimmy Stringer (Dr. Steven Herbert)**

**Department of Physics**



Internal medicine is limited by the technology that allows for non-intrusive internal views of the human body. Computerized Tomography (CT) is one important technique that allows for non-intrusive internal viewing of the body. This research project focuses on the theoretical foundation and technical requirements of CT scanning. At its foundation, CT scanning detects the varying densities of objects by measuring the attenuation of x-ray beams as they pass through. The real benefits of this technique come from reconstructing the internal structure of the object using the radon transformation method to discretize the space and the filtered back projection to reconstruct the space. We will discuss the mathematical foundation of this reconstructive process and present data on a real object which we used to obtain a primitive CT scan.

**56. LASER ASSISTED ELECTROLYSIS**

**Shawn Cissell (Mr. Jeff Stapleton)**

**Department of Physics**



Laser assisted electrolysis involves the use of electricity and a UV laser to split water into its constituent parts of oxygen and hydrogen. The laser is used to split the covalent bond of the  $H_2O$  molecule using photons of a specified wavelength. This research focuses on the capturing of hydrogen for the purpose of later use in a fuel cell. We use a wire mesh as electrodes, and an inverted cylinder as a collection device. This work will delve into the origin of using a laser to assist in electrolysis as well as the many challenges that we have encountered along the way.

**57. THE EMOTIONAL RESPONSE OF COLLEGE STUDENT TO INFANT VOCALIZATIONS**

**Sarah E. Bucher, (Dr. Cynthia Dulaney)**

**Department of Psychology**



The purpose of this study was to examine the emotional responses of college students to infant vocalizations. Xavier University students complete an emotion survey after listening to an audio clip of either an infant laughing or an infant crying. The emotion survey was used to measure whether the participant experienced positive or negative emotions (reflected in high or

low emotion scores, respectively) in response to the audio clip. Results show that participants who listened to the crying clip experienced lower emotion scores ( $M = 35.56$ ,  $SD = 7.20$ ) than participants who listened to the infant laughing audio clip ( $M = 71.50$ ,  $SD = 14.13$ ),  $t(35) = 10.26$ ,  $p < .01$ . The results support the hypothesis that the infant laughter clip would elicit more positive emotions than the infant crying clip. These findings are important because they support the idea that all humans have an innate tendency to respond in the same way to infants' vocalizations.

**58. INFLUENCE OF TRAINING LEVEL ON FOOD PERCEPTION AND BODY SATISFACTION IN DIVISION I COLLEGIATE SWIMMERS**

**Elizabeth A. Fichtel (Dr. Cynthia Dulaney)**

**Department of Psychology**



Food and body satisfaction in collegiate swimmers related to changes in training level throughout the competitive season was examined. Fifty-four Division I swimmers (26 male and 28 female) completed a series of three questionnaires regarding perceptions of food and body satisfaction. The questionnaires were completed twice during the competitive season; first during high intensity training and again during post-season, low intensity, training. Contrary to the hypothesis, there were no differences in body satisfaction between high intensity training ( $M = .67$ ;  $SD = .92$ ) and low intensity training ( $M = .88$ ;  $SD = .95$ ),  $t(23) = 1.23$ ,  $p = .23$ . There were also no differences in food perception, as measured by the EAT, at high intensity training ( $M = 5.87$ ;  $SD = 7.74$ ) or low intensity training ( $M = 4.75$ ;  $SD = 5.14$ ),  $t(23) = 1.50$ ,  $p = .15$ . Similarly, no differences in food perception were found by the FPQ at high intensity training ( $M = 66.75$ ;  $SD = 26.26$ ) or at low intensity training ( $M = 68.29$ ;  $SD = 24.94$ ),  $t(23) = .59$ ,  $p = .56$ . In conclusion, no evidence was found to support the influence of training level on food perception and body satisfaction in Division I Collegiate Swimmers.

**59. ATTITUDES AND PERCEPTIONS OF DOMESTIC VIOLENCE AGAINST WOMEN IN DIFFERENT SOCIOECONOMIC CLASSES**

**Maria Cristina Juliano (Dr. Cynthia Dulaney)**

**Department of Psychology**



This study examines the attitudes and perceptions of domestic violence and victims in light of differing SES variables. Forty-nine participants each read a description of a heterosexual married couple in which the couple is an employed high socioeconomic couple or an employed low socioeconomic couple. Both descriptions included the consuming of an undetermined quantity of alcoholic beverages by both parties followed by a domestic dispute. Then an identical police report describing the domestic violence disturbance between the couple described was given to both groups. Next participants were given the Domestic Violence Blame Scale. Contrary to the hypothesis, there was no significant difference in blame attributed to the victim of violence in the low socioeconomic family ( $M = 2.00$ ,  $SD = .72$ ) versus the victim of violence in the high socioeconomic family ( $M = 2.07$ ,  $SD = .85$ ),  $t(47) = .28$ ,  $p = .78$ . These results challenge the hypothesis that more blame would be attributed to victims of low SES due to negative stereotypes related to household stability and drug and alcohol abuse. Implications of the study will be of value towards future research on domestic violence and societal reactions to such behavior.

**60. THE RACIAL BIAS OF HISPANIC CHILDREN IN THE UNITED STATES**

**Shaye S. Worthman (Dr. Cynthia Dulaney)**

**Department of Psychology**



Although researchers have confirmed Black and White American children's racial biases in their preferences for light skin tones and negative evaluations of dark skin tones (Gopaul-McNicol, 1988), this study examined Hispanic children's racial attitudes. It was hypothesized that Hispanic children would positively evaluate White children and negatively evaluate Black children. Thirty-five Hispanic children in third to sixth grade were presented six pictures of White, Black, and Hispanic boys and girls, and responded to nine racial preference questions by choosing one of the pictures. Hypotheses were partially confirmed. Although no clear preference for White children emerged, chi-square analyses revealed that participants negatively evaluated Black children on several dependent measures. Participants indicated that Black children "looked bad" significantly more than White children,  $\chi^2(1) = 4.48$ ,  $p < .05$ , and Hispanic children,  $\chi^2(1) = 4.48$ ,  $p < .05$ .

and "looked ugly" significantly more than White children,  $\chi^2(1) = 4.48, p < .05$ , and Hispanic children,  $\chi^2(1) = 4.48, p < .05$ . Participants also chose Black children as "looking pretty" significantly less than White children,  $\chi^2(1) = 7.12, p < .01$ , and Hispanic children,  $\chi^2(1) = 10.71, p < .01$ . Finally, participants chose Black children as "being a nice color" significantly less than White children,  $\chi^2(1) = 7.14, p < .01$ , and Hispanic children,  $\chi^2(1) = 15.70, p < .001$ . These findings suggest that an out-group bias exists among Hispanic children toward Black children. Future research should examine racial preferences of Hispanic children in Latin America to offer insight as to where and how this bias develops.

#### 61. NEWBORN GENDER STEREOTYPING: DOES PINK VERSUS BLUE REALLY MATTER?

Kasie M. Bowling (Dr. Christian End)

Department of Psychology

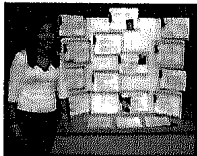


The present study examined the effects of clothing color on the perceived characteristics of an infant as well as the infant's future opportunities. Past literature indicates that parents describe and treat their newborns differently from birth based on the child's gender. The gender bias held by the parents may transfer to others responding to gender cues, such as an infant's clothing. Ninety-three participants viewed one of three photos of an infant; one in which the infant was wearing a blue Onesie (a one-piece bodysuit), one in pink, and a control in white. The participants then completed the Infant Characteristics Scale: a list of 18 bi-polar adjectives and the Infant Future Behaviors Survey (IFBS) which required participants to indicate their feelings about the target infant participating in various activities (e.g., playing football) and pursuing various careers (e.g., nurse or doctor). Significant differences were found on a few characteristics based on clothing color; however, a greater number of the IFBS items were rated significantly different. These results support past literature examining perceptions of gendered characteristics in newborns and suggest that gender cues may affect the treatment of and future opportunities presented to the child.

#### 62. YOUNG ADULTS' ATTITUDES TOWARD CEREBRAL PALSY

Melanie M. Castillo (Dr. Christian End)

Department of Psychology



Attitudes toward people with cerebral palsy are not always positive, often due to people's lack of knowledge about the disease. Research has indicated that certain interventions can evoke more positive attitudes. This study hypothesized that participants who viewed an educational video about cerebral palsy would report more positive attitudes than those not exposed to the video. It is also hypothesized that males would have more negative attitudes towards people with cerebral palsy than females.

The Scale of Attitudes Towards Persons with Cerebral Palsy, was used to assess the 169 college students' attitudes towards persons with cerebral palsy. The responses were summed to create a total score ( $\alpha = .80$ ), which was analyzed by a two-way ANOVA. The statistical analysis indicated that there was no significant difference between those who viewed the video ( $M = 57.62, SD = 9.39$ ) and those who did not ( $M = 59.80, SD = 8.03$ ), but that there was a significant difference between males ( $M = 61.51, SD = 8.00$ ) and females ( $M = 56.70, SD = 8.86$ ),  $p < .001$ . These results indicate males harbored less favorable attitudes toward people with cerebral palsy than women did. Although the intervention did not affect attitudes, gender differences exist. This provides some direction for future attempts to reduce the stigma of cerebral palsy. The gender differences suggest that future interventions might be best served by targeting males.

#### 63. THE IMPACT OF SERVICE RELATED VOLUNTEERING ON SELF ESTEEM AND OPTIMISM

Molly C. O'Connell (Dr. Christian End)

Department of Psychology



The present study investigated the impact of service related volunteering on optimism and self esteem. Thirty college students from a small Midwestern University, participating in a university sponsored service event, completed the Life Orientation Test and Rosenberg Measure of Self Esteem at two time intervals, once before the service event and once immediately following. An additional 52 college students completed the same measures at the post test, during the second time period, without having participated in the service event.

Inconsistent with the hypothesis, the results indicated no significant differences in optimism levels, either between the volunteer and non volunteer groups or from Time 1 to Time 2 within the volunteer group. In

addition, regarding self esteem, there were no significant differences reported between the volunteer and non volunteer groups post service event. However, consistent with the hypothesis, results determined that participants involved in the service activity reported higher levels of self esteem in the post test than in the pre-test, indicating that volunteering does have a positive impact on an individual's self esteem. These results might suggest that individuals with lower levels of self esteem are more inclined to volunteer than individuals with higher levels of self esteem.

**64. THE EFFECT OF PRIOR CRIMINAL RECORD AND QUALIFICATIONS ON EMPLOYMENT SELECTION**

**Elissa Peters (Dr. Christian End)**

**Department of Psychology**



Criminal record has the potential to stigmatize individuals and keep them from being hired for jobs, even if they are equally qualified to other applicants. College aged participants reviewed a classified ad and a resume to determine the employability of an applicant. The resume could have been for an applicant who was a qualified ex-offender, an unqualified ex-offender, a qualified non-offender, or an unqualified non-offender. On a hiring questionnaire, participants decided whether they would hire the applicant and how confident they were in their decisions.

Participants then reported their level of concern about the employment factors. Results demonstrated that the presence of a criminal record had a marginally significant effect on hiring decisions; however applicants were more likely to be hired if they were qualified, regardless of criminal record. These results did not support the hypothesis of employment discrimination toward ex-offenders.

**65. FEMALE COLLEGE ATHLETES AND THE EFFECT OF UNIFORMS ON BODY IMAGE**

**Amy C. Sanders (Dr. Christian End)**

**Department of Psychology**



This study investigates the effects uniforms have on female athletes' body image. The current study hypothesized that tight fitting, revealing uniforms will affect female college athletes to have a higher dissatisfaction with their body shape and overall self image than female college athletes with loose fitting, less revealing uniforms. Seventy two undergraduate student female athletes were randomly assigned into three different groups (tight fitting condition, loose

fitting condition, and control condition); participants were given questionnaires and a scale to assess whether female athletes become more dissatisfied with their body image when visualizing themselves in a tight fitting uniform than in a loose fitting uniform. The results indicated there was no significant difference in body satisfaction between the three conditions.

**66. THE EFFECT OF SINGLE SESSION STANDARD PROTOCOL EMDR ON THE TRAUMATIZING SYMPTOMS AND EXPERIENCES OF POLICE OFFICERS**

**Rachel M. Solomon (Dr. Christian End)**

**Department of Psychology**



To address the question of the effectiveness of a single session of Standard-Protocol EMDR in relieving the distressing symptoms of police officers due to a traumatic incident, participants completed an Impact of Events Scale – Revised (IES-R) at the beginning of a seminar. During the seminar, participants underwent a single session of Standard Protocol EMDR, and two months later, the participants with the highest scores on the IES-R prior to

therapy completed the scale a second time. Consistent with the hypothesis, results of t-tests revealed a significant difference between the levels of symptoms pre to post EMDR. The IES-R, however, was not reliable, suggesting that further research should aim to utilize a measure of traumatic symptoms that is reliable.



**67. IMPRESSIONS OF A FAN ACCORDING TO THE GENDER AND THE NATURE OF THE AGGRESSIVE ACT**

Keila Roman, Katie Wetterau, Elizabeth Fichtel, Gerald McDonnell, Krysten Knecht (Dr. Christian End)

Department of Psychology



Studies that examine perceptions of sports fan aggression are rare in the literature. The purpose of this study was to examine how college students perceive verbal and physical aggression in the context of a sporting event, and how those perceptions might differ based on the gender of the perpetrator. One hundred and twenty participants were randomly assigned to read one of four vignettes portraying either a male or female fan perpetrating a verbal or a physical act of aggression against an opposing fan. Participants then completed the Impressions Scale which consists of eight questions assessing the likelihood the participant would befriend the perpetrator, the extent to which the perpetrator should be reprimanded, as well as judgements of acceptability, justifiability, etc. After eliminating the data of participants who failed a manipulation check ( $n = 26$ ), 2 (Aggressive Act)  $\times$  2 (Gender of the Perpetrator) ANOVAs indicated no effects on most of the variables measured, although a main effect was found for the act when measuring the likelihood of being friends with the fan. An interaction was found when assessing how justifiable the act was thought to be. Results suggest that regardless of the act or the gender of the people harbor negative attitudes towards fan aggression.

**68. DIE HARD FANS: SPORT FAN IDENTIFICATION IN OBITUARIES**

Keila Roman, Shaye Worthman, Gerald McDonnell, Jeff Meinert, Sarah Morris, Gregg Mauntel (Dr. Christian End)

Department of Psychology



The purpose of this study is to determine whether sport involvement, particularly as a fan, is mentioned in obituary content. It was hypothesized that individuals' sport fan identities would be mentioned in obituaries with frequency. It was also hypothesized that sport fan identification would be mentioned more often on male obituaries than on female obituaries. Even though males and females equally identify as sports fans, males are perceived as more highly identified sport fans than females. Obituaries were randomly selected from three different newspapers and coded for sports involvement content. If the obituary contained sport-related content, it was coded to indicate whether it referred to the deceased individual's sport involvement as a fan, participant, or both. Results revealed that 22.2% of the obituaries mentioned sport involvement. A higher percent of obituaries mentioned males sport participation compared to those of females. Fan identity was mentioned 10% of the time, and there was no difference in gender. Our research suggests that sport involvement, both as a participant and a fan, can be such an influential aspect of one's life, that one's involvement is frequently incorporated into the individual's obituary.

**69. STIGMA AGAINST THOSE WITH MENTAL ILLNESSES**

Kyle P. Wendling (Dr. Christian End)

Department of Psychology



Research has shown that people often do not value a person with a mental illness as highly as another person, even when they learn of no other difference besides the mental illness label. The current study tests whether the stigma occurs in the workplace. The participants (21 male and 48 female) read a vignette that described a post office employee's recent job performance. The vignettes all described behaviour symptomatic of schizophrenia, but only the

experimental group ( $N = 32$ ) received one with the schizophrenia label, while the control group ( $N = 37$ ) did not. Assuming the mindset of an employer, the participants completed a 21-item performance evaluation on the person from the vignette. The scores on the individual items were summed to create a total performance evaluation score, higher scores indicating a more positive evaluation ( $\alpha = .86$ ). An independent-samples  $t$ -test was run to assess the hypothesis that the experimental group would provide a significantly lower performance score than the control group. No significant difference was found between the control group ( $M = 62.91$ ,  $SD = 7.38$ ) and the experimental group ( $M = 62.73$ ,  $SD = 9.80$ ). This result may have occurred due to a low validity of the performance evaluation; the questions may not have been suitable to expose differences in the responses due to prejudice. The study may also have been transparent enough to the participants to arouse a self-presentation effect. On a positive note, the participants may simply not have held prejudice towards people with mental illnesses.

#### **70. THE PERCEIVED HARSHNESS OF PUNISHMENTS ON CRIMINAL OFFENDERS WITH OR WITHOUT SCHIZOPHRENIA**

**Hannah D. Wilson (Dr. Christian End)**

**Department of Psychology**



The aims of this study were to identify if having a label of schizophrenia will increase the harshness of an offender's punishment given by participants and to assess the participant's attitudes toward the offender suffering from schizophrenia. The participants read a scenario regarding a defendant, either with schizophrenia or without, who committed the same act of assault on a neighbor who allowed his guests to park in front of the offender's driveway. A collection of self-report measures were utilized to determine the participants' perceptions of the appropriate severity of punishment, by providing a fine, community service hours, and a jail sentence. The perceived dangerousness and intent of the offender was also measured. It was hypothesized that participants would recommend that offenders with schizophrenia who committed an aggressive crime receive a harsher punishment than offenders without schizophrenia. This was expected because most people fear and prefer a greater social distance towards those with mental illness. It was also hypothesized that participants would rate the offender with schizophrenia as having less intent to commit the crime than the offender without schizophrenia. These findings would support the assertion that people hold negative attitudes towards those with mental illness. We found no significant difference in the severity of punishment given to the offender.

#### **71. THE MOTIVES FOR DRUNK DIALS**

**Amanda C. Evans (Dr. Thomas R. Wagner)**

**Department of Communication Arts**



Cell phone communication provides accessibility and ease of communicating to others, whether they are friends, girlfriends/boyfriends, parents, or sometimes the ex's for "drunk dialing". In our research along with the previous research of others, we defined drunk dialing. Also, we discovered the interpersonal communication motives of Xavier University students making drunk dials. Those six communication motives are inclusion, control, affection, pleasure, escape, and relaxation.

#### **72. MOTIVES BEHIND FACEBOOK**

**Lindsay Cornell, Becky Hoerr (Dr. Thomas R. Wagner)**

**Department of Communication Arts**



This study explored students' motivations for using Facebook from a uses and gratifications perspective. The strongest motives were pass time, habit, entertainment, and information gathering while the weakest were arousal and companionship. A moderate positive correlation was found between affinity for and time spent on Facebook. Little support was found for gender differences for motives supported from previous research. The college context and universal appeal of the technology help explain these findings.

## ORAL PRESENTATIONS

Please consult posted signs for room assignments and times

### ALTERED METASTATIC PATTERN OF RAT MAMMARY CANCER INDUCED BY COX-2 INHIBITION-PILOT STUDY

Amber R. Beery (Dr. Dorothy Engle)

Department of Biology



Prevention of cancer progression and metastasis is a critical area of research. Resveratrol may prevent angiogenesis, which cancer cells use to establish new foci of cancer. A pilot study was conducted to demonstrate the efficacy of the inhibitor in an existing breast cancer model. Sixteen female rats were divided into 3 groups: one received a low dose of Resveratrol, one received a high dose and one served as a control. All animals were injected with  $10^4$  MATB rat mammary cancer cells transfected with Green Fluorescent Protein. GFP permits the identification of individual migratory and metastatic cells under a fluorescent microscope. Optimum pH for fluorescence was also determined. Tumors were removed when 1-1.5cm. The study was terminated at 60 days. The left lung was examined for metastatic cells. Maximum fluorescence of GFP cells was physiologic pH. Tumors developed in 100% of high-dose animals, which had the most lung metastases. 40% of the low-dose animals developed tumors and had the fewest metastases. The control group had 80% tumor growth. These data suggest that a low dose of Resveratrol may be more effective at decreasing tumor growth and metastasis but a high dose may promote tumor growth and metastasis. Results from the pilot study confirm the validity of further studies.

### SOUND SOURCE LOCALIZATION IN *CHELONIA MYDAS*

Rachel Norris, (Dr. Charles Grossman)

Department of Biology



The present study was undertaken to determine if the green sea turtle, *Chelonia mydas*, has the ability to localize a sound source. The turtle had previously been trained to swim into a feeding station in an unusually shaped tank using a dog clicker. Due to changes in the aquarium's sea turtle exhibit, the turtle was moved into a circular tank off exhibit. In this new tank, there was no set feeding station. The tank was divided into quadrants and twice a day, the clicker was placed either in front of, behind, to the right, or to the left of the turtle. The time and type of the turtle's behaviors were examined and the correlation between the two determined. Each behavior was categorized as either positive (behaviors which led to locating the clicker), negative (behaviors which did not lead to finding the clicker), or neutral (stereotypical pacing which could not be determined if it led to locating the clicker or not). At the end of the 6 week study, the turtle exhibited more positive than negative behaviors and majority of trials ended in 60 seconds or less;  $\frac{1}{3}$  of all trials ended in 20 seconds or less. Positive behavior had a strong negative correlation to increasing time, and negative behavior had a strong positive correlation to increasing time. This study gives evidence that sea turtles do have directional hearing. This work could be used for sea turtle conservation, more specifically to prevent the occurrence of injuries and fatalities caused by boat strikes.

### ANCIENT GREEK ROCK STARS

Daniel J. Dery (Dr. Morten Kristiansen)

Department of Classics, Department of Music



The focus of this project is the fifth century B.C. in Athens, that most important of times and places at which the experiment of democracy was first tested; we find that music underwent similar trials, adaptations, and scrutiny. Changes in the musical world, as in the political, elicited sometimes harsh reactions from upper-class citizens who preferred the way things once were. As a result of increasing numbers of public performances at festivals, competitions, and such, music transformed from an amateur, elite pursuit into a sort of skilled trade directed by its own new professionals, among whose ranks were non-elites climbing the rungs of society. Professional musicians—for instance, poet-composers such as Pindar—had performed for centuries, but

they tended to come from the elite class and pandered to wealthy patrons. In the fifth century, widespread public performances meant public competitions that could lead the victor—regardless of social status—to a rather comfortable life. Yet this meant, instead of appealing to elite tastes and values through music, catering to the desires and expectations of the many. This project explores the changing nature of professional musicians in classical Athens, and seeks to elucidate the manners in which they rubbed conservatives, such as Plato, in the wrong way.

### PRÉCIS

**Nora Heink (Dr. Edmund Cueva)**

**Department of Classics**



In both of his well-known “twin comedies,” *The Comedy of Errors* and *Twelfth Night*, Shakespeare adapts the New Comedic plot elements and stock characters of Plautus' *Amphitruo* and *Menaechmi*. Although both works reflect the conventions of Roman New Comedy, particularly in their utilization of recognizable stock characters, Shakespeare individualizes these figures and distinguishes them from their traditional roles through components of plot alteration, aspects of metatheatricity, and elements of tragicomedy. By examining the way in which Shakespeare's characters circulate around the central, New Comedic focus of courtship and marriage—an institution of great social importance and a major source of anxiety in the Renaissance—I argue that Shakespeare, inspired by Renaissance humanism and its heightened awareness of individuality, enhances his sources' classical stock characters in order to legitimize comedy as a literary form capable of reflecting human complexity.

### A JOURNEY THROUGH THE EVOLUTION OF STADIA: HOW THE COLOSSEUM MOVED INTO AMERICA

**Anthony Mangione (Jenny Shives)**

**Department of Classics**



In 776 BCE, the world witnessed the ancient Greeks give birth to what would become one of the greatest and most anticipated sporting events of all time, the Olympics. As the Olympics evolved, so did a stadium, and from here, sport as a spectacle became an important tradition for humanity. Sport in antiquity took even greater strides with the construction of the Coliseum. These structures, as well as others from the classical age, serve as models for our stadia today. The materials and architectural techniques employed for the construction of stadia from Greek and Roman antiquity highly influenced those that are used in the construction of modern stadia. Through the examination of stadia as well as authors who analyze the architecture of these structures from both antiquity as well as today, this paper will compare and contrast the materials and techniques used by architects of today as well as in antiquity when constructing stadia. This paper hopes to show not only that the materials we use today are stronger and the techniques are better, but also that modern stadia are forever indebted to the models of the first stadia.

### WHICH CAME FIRST, THE MEANING OR THE WORD? AN ANALYSIS OF THE IMPLICATIONS OF THE REPRESENTATIONAL HYPOTHESIS ON THE HISTORICALLY MEDIATED DEVELOPMENT OF LANGUAGE

**Christopher Farina (Dr. Edmund Cueva and Dr. Timothy Quinn)**

**HAB-Classics Department**



The representational hypothesis was first used only to describe the cognitive steps taken by early man in order to form a language. For a word to be created, a mental representation of an external phenomenon must first be imagined. Paired with a sound that expresses the mental representation, the mind forms a word. In the socio-cultural context, the development of ancient and modern languages sheds new light on the theory. By examining the historical contexts in which novel Latin words were produced, one is able to see a strong correlation between the conditions in which a word was created and the word's original meaning. This analysis supports the naming effect of language on pre-existing environmental phenomena. Such a nominative nature of the evolution of language lends further credence to the representational hypothesis.

## HOL(E)Y BODIES: ORIFICES AND THE VIRGIN/WHORE DICHOTOMY IN JOYCE'S ULYSSES

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For being widely regarded as one of the best novelists of the 20th century, James Joyce spills a lot of ink in his novel Ulysses about feces, snot, piss, excrement, and any other type of bodily fluid leaking from various bodily orifices. But his writing is not filth, for every word in the book fulfils a higher purpose. Not only is Joyce's novel subversive for its treatment of formerly taboo subjects, such as defecation, urination, and sex; but Joyce's portrayal of the body's orifices and their actions explodes the Virgin/Whore Dichotomy, the notion that female sexuality is either promiscuous or chaste. Far from the riots inspired by Synge's mention of women's underwear, Joyce portrays a world where orifices are didactic symbols of both corruption and innocence. His characters are somewhat androgynous: virgins and whores, chaste and promiscuous, faithful and faithless. Joyce's varied and somewhat paradoxical treatment of orifices allows his characters to escape the prevailing binaries to become fully-fleshed out individuals who can occupy the entire spectrum of human sexuality, regardless of their gender or sexual history. This paper explores this treatment of bodily orifices and sexuality, arguing that Joyce's specific focus on these parts of the body redefines the relationship of literature and human sexuality, resulting in a radical and forward-thinking affirmation of life, gender, and sexuality.

## WIEDERAUFBAU

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Tourists flock to German cities to enjoy their historic architecture, old-world atmosphere, and convivial pedestrian zones. Yet the well-kept buildings and bustling streets of Germany's cities belie a truly turbulent history. Half of the structures in cities with populations of 100,000 or more were reduced to rubble during World War II. What had been the face of the recently industrialized, pre-WWII German city, and how did the Allied airborne bombing campaign transform it? Both sides targeted civilian populations and cultural heritage sites with the intention of destroying morale and disrupting labour forces. This largely ineffective policy was carried out until the bitter end. The morning after each raid, the reconstruction process began again, but as the war dragged out, the destruction outpaced efforts to recover. During the Allied Occupation, systematic reconstruction began with the massive task of removing the rubble. Then came the question of whether the Germans ought to restore their cherished landmarks, embrace modern alternatives, or reconstruct using a blend of both. Although some expected the process to last generations, most cities had transitioned from reconstruction to *construction* by the mid 1960s. Many individuals and evolving ideals shaped the reconstruction process, transforming Germany's ruined cities into the vital hubs they are today.

## THE RACIAL BIAS OF MEXICAN CHILDREN

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Although research concerning children's racial attitudes has been conducted in the United States (Clark & Clark, 1947, 1950; Gopaul-McNicol, 1988), this study explored Mexican children's racial attitudes. Based on the history of racism that exists in Mexico (Chasteen, 2006), researchers hypothesized that Mexican children would positively evaluate White children and negatively evaluate Black children. Thirty-six Mexican students in third through fifth grade were presented six pictures of White, Black, and Mexican boys and girls. Participants then responded to nine racial preference questions by choosing one of the six children. Hypotheses were partially confirmed. Although there was no clear preference between the White and Hispanic targets, chi-square analyses revealed that participants demonstrated prejudice directed at Black children on several dependent measures. Participants indicated that Black children "looked bad" more frequently (50%) than Mexican children (14%),  $\chi^2 (1) = 7.35, p < .01$ , and "looked ugly" more frequently (81%) than White children (8%),  $\chi^2 (1) = 21.13, p < .001$ , and Mexican children (11%),  $\chi^2 (1) = 18.94, p < .001$ . Participants also selected the Black children as "looking pretty" less frequently (3%) than White children (50%),  $\chi^2 (1) = 15.21, p < .001$ , and Mexican children (47%),  $\chi^2 (1) = 14.22, p < .001$ , and as "being a nice color" less frequently (11%) than White children (43%),  $\chi^2 (1) = 6.37, p < .05$ , and Mexican children (56%),  $\chi^2 (1) =$

7.20,  $p < .01$ . These findings suggest that an out-group bias toward Black children exists among Mexican children.

## PHILOSOPHY AND SUICIDE: THE OBSCURE THOUGHT

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In his essay *The Myth of Sisyphus*, Albert Camus asserts that the question of whether or not life is worth living takes first priority in philosophy. However, throughout the Western tradition, suicide has often been treated only marginally and with much ambivalence by philosophers. In my paper, I argue that by treating suicide in a manner that focuses primarily on rational, objective considerations, Western philosophers have given us an incomplete, and thus easily distortable, understanding of the phenomenon of suicide. Showing first how Plato's writings on suicide—and consequently interpretations of them—instigated a polemic that focuses almost solely on the act of suicide as it relates to society or theology, I analyze Kant's *Groundwork of the Metaphysics of Morals* and posit that his assertion that suicide is a moral contradiction gives an insufficient account of the act. I then argue that Albert Camus begins to give a more empathetic and thus more complete account of suicide in his essay *The Myth of Sisyphus*, although he likewise fails to give an account of human beings that is complex enough to accommodate fully the myriad factors that affect one's decision to commit suicide.

## PRUDENCE AND “VIRTÚ” WITHIN MACHIAVELLI'S *THE PRINCE* AND *DISCOURSES ON LIVY*

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“Virtú” and “prudence” are notions central to Machiavelli's argument in both *The Prince* and *Discourses on Livy*. Although much scholarship on Machiavelli's works focuses upon the importance of virtù for acquiring and maintaining power, the impact that prudence has in relationship to virtù deserves equal consideration. In this paper, I explain the meaning these notions had for Machiavelli in order to determine the degree to which Machiavellian virtù depends upon a novel interpretation of classical prudence. Among the questions I will address are the following: Is virtù more necessary than prudence? Do good leaders possess prudence; whereas, great leaders possess virtù? Why is it that weak rulers, such as Numa, can rule with only prudence, but not with brute force alone as Agathocles and Remiro d'Orco appear to have done? Examples in both *The Prince* and particularly those within the *Discourses on Livy* suggest that prudence plays at least a vital role in Machiavelli's overall account of politics and potentially provides the foundation for Machiavellian virtù. A careful consideration of Machiavelli's *The Prince* and *Discourses on Livy* demonstrates that prudence is both more fundamental and more necessary to a leader than virtù. Moreover, *Discourses on Livy*'s prudence-driven republic solves the problems with the virtù-driven monarchy in *The Prince*. In this way, Machiavelli suggests a preference for prudence over virtù for generating stability.