

# UNDERGRADUATE RESEARCH SYMPOSIUM 2006

## Abstracts

(the department/school shown is that of the faculty mentor's)

### **SIBLINGS OF CHILDREN WITH AUTISM SPECTRUM DISORDER: PERCEPTIONS OF SELF AND FAMILY**

By: Amy Albert

Psychology

Faculty Mentor: Karla Doepke

Prior research done on groups of siblings of children with developmental delays indicated that the siblings are at higher risk for developing symptoms of anxiety and depression when compared to their typical counterparts. One hypothesis that may explain this is that a great deal of parental and family time and attention goes to the child with the disability. While prior research has been done on groups of siblings of children with developmental delays or chronic illness, little is known about the specific experiences of children who have siblings with an autism spectrum disorder. This exploratory research study is designed to investigate characteristics of siblings of children with autism spectrum disorder, specifically looking at stress and anxiety levels of the siblings. Additionally, this research will also investigate children's perceptions of their family functioning and support, as well as the children's adaptive functioning. Through self-assessments and interviews with the children, combined with parent ratings of the child's and family's functioning, we hope to gain more insight in the everyday life of the siblings of children with autism spectrum disorder.

### **VOICES OF ROMANTIC PARTNERS OF TRANSEXUALS: MAKING SENSE OF ONE'S SEXUAL ORIENTATION IDENTITY AFTER THE GENDER IDENTITY OF A ROMANTIC PARTNER CHANGES**

By: Drew Anastasia

Sociology and Anthropology

Faculty Mentor: Thomas Gerschick, Susan Sprecher

There is a growing body of research on sexuality, gender, transgenderism and transsexualism. In the past twenty years, sociologists and feminists have begun to research the lives of "gender variant" individuals. However, there has been little research on the romantic partners of these individuals. Extant feminist and sociological researchers have made a case that identity categories are socially constructed and have the ability to change across time, culture and geographical location. Additionally, sociological researchers have noted that people form their identities in relation to other individuals, institutions, and various social factors. This qualitative case study will look at the lives of partners of transsexuals from the Central Illinois and Chicagoland area in order to explore the process by which the romantic partners of transsexual individuals make sense of their sexual orientation identity once their partner has undergone sex reassignment surgery and/or begins living or identifying as a member of a gender other than their biological sex. By focusing on the experiences of the partners of transsexual individuals, I hope to better understand the complex processes by which people form identities in relation to non-static identities and social networks. Using in-depth, semi-structured interviews, this project seeks to explore the complicated process of identity formation in a society that values static, normative identity categories. This research will work to fill the gap in research regarding this population as well as contribute to the body of work concerning the fluidity and malleability of gender and sexual orientation identities over time and the impact of changing sexual orientation identities on social networks and political organizations.

### **YOUNG CHILDREN'S USE OF RELATIVE DISTANCE TO COMMUNICATE ABOUT LOCATIONS**

By: Lindsey Anderson, Elizabeth Ellison

Psychology

Faculty Mentor: Alycia Hund

Learning to communicate about locations is important in everyday life. For example, children and adults often communicate about the locations of missing objects such as shoes, backpacks, and keys. In English, we use prepositions to describe locations (e.g., my shoes are by the door). How do children learn to communicate about locations? This goal of this experiment was to examine how preschool children and adults use relative distance to make judgments about locations. Using relative distance to judge nearbyness involves judging one distance in relation to other distances. For example, if the closest park to one's house is 5 miles away, one might say that it is near the house in relation to other parks, but if a new park opened only 1 mile from the house, the park that was 5 miles away would no longer be considered nearby. In this experiment, 3- and 4-year-old children and adults were asked to rate how well the word by described the relation between several blocks and a central landmark. In all conditions, the blocks were arranged in two concentric circles around the landmark (i.e., a blue box). In condition one, the blocks were placed three and six inches from the edge of the landmark. In condition two, the blocks were placed six and twelve inches from the landmark. In condition three, the blocks were placed twelve and eighteen inches from the landmark. The experimenter marked the blocks one by one in a random order and asked participants to rate how well the word "by" described the relation between each block and the blue box. Children were asked whether each block was by the blue box, sort of by the blue box, or not by the blue box. Adults were asked to rate how well the word by described the relation between each block and the blue box: the description was very poor, poor, fair, good, or very good. We predicted that adults' ratings of blocks at the same distance (e.g., 6 inches) would vary depending on the relative position of other blocks, suggesting that they used relative distance when rating the by descriptions for each block. In contrast, we expected that children, especially 3-year-olds, would have more difficulty using relative distance, and their ratings would be less systematic overall. Preliminary analyses confirm these predictions, thereby providing important details regarding young children's developing abilities to communicate skillfully about locations.

### **AGING DECREASES B CELL PROLIFERATIVE CAPACITY AND ABILITY TO UNDERGO EARLY ACTIVATION**

By: Hina Ansar, Kylie McGlauchlen

Biological Sciences

Faculty Mentor: Laura Vogel

Aging is accompanied by dysfunction of the humoral immune system, which results in decreased protection from infectious diseases. Although T cell defects with age are well established, aged B cell function is less clear as many studies have not differentiated between poor helper environments and intrinsic B cell defects. Previous results from our laboratory found aged B lymphocytes consistently expanded less than their young counterparts upon antigen exposure in vivo. To further investigate the implications of this reduced expansion, we have examined the ability of aged B cells to respond to anti-CD40 mAb and LPS in vitro. While freshly isolated cells had similar levels of surface markers, aged B cells were unable to upregulate CD23 and CD69 to the extent of their young counterparts. Aged cells did upregulate CD86. In addition, aged B lymphocytes had decreased blast formation and BrdU incorporation, with the effect being more pronounced in older animals. Levels of Bcl-2 were found to be similar in cultured B cells from both young and aged animals. Thus, aged B cells exhibited a reduced response in several early activation events, but since a partial response was always observed, possibilities exist for therapeutic intervention in the elderly.

### **CONCERN OF CULTURE TO BUSINESS IN JAPAN**

By: Mihoko Asada

Management and Quantitative  
Methods

Faculty Mentor: Iris Varner

Though the business world has become more borderless and internationalized than any other areas, I believe the concern of each country's culture is relatively ignored in the business world even today. In the business world, when workers are sent to some other countries, there is always conflict or dilemma as to how to communicate with foreigners. And this struggle has become one of the important problems to solve for achieving company's strategies and expanding their business opportunities. Therefore to discuss and prove the cultural concern to business, I would like to focus on cultural aspect of business in Japan. Since I am Japanese and have been to many other countries before, I believe that I'll be able to offer comprehensive viewpoint about Japanese culture in business. According to Hall (1960), Japanese culture is taken as so called "high-context culture" which is considered opposite cultural characteristic with American culture, "low-context culture." From this understanding, I am able to insist an idea that though Japan has been a second biggest economy following America, it owns a totally different cultural concern from that of America. Therefore this research should be worthwhile to focus on.

Having analyzed the recent Japanese culture in business, I found that there is deniable fact that Japan still possesses group-oriented type of business management. However at a same time, it cannot be forgotten that in the past two years, there has been a very new dynamic fundament to liberalize the Japanese market and I believe this fundament is affecting the Japanese people very positively in that the people are encouraged to question and think of the existing business structure, group-oriented structure. Therefore I would like to conclude the Japanese culture as a strong group-oriented structure but there is a new fundament of liberalization occurring.

Finally, by studying about the cultural concern into business, I found its tremendous concern. However at a same time, I realized the importance to have a critical view on culture should be considered also. In other words, it is necessary to think that culture doesn't necessarily all the time represent its member's identity. Though people have grown up in the same cultural environment, obviously they have still different identity. Therefore I believe it is very worthwhile to mention the importance not to perpetuate the idea of culture as it explains everything about the people's character.

### **FAMILY ASSESSMENT PORTFOLIOS (FAPS): A NEW PIECE OF THE PUZZLE**

By: Patricia Balogh, Sarah Alber

Special Education

Faculty Mentor: James Thompson

Family Assessment Portfolios (FAPS) include information on a child that is different than that which is found in traditional assessment reports. Specifically, these portfolios (created with families) include photographs of a child in a variety of settings, personal descriptions of a child's family and friends including different people's opinions and observations, rich descriptions of activities a child enjoys, and samples of a child's work. Although some information parallels what is found in typical assessment reports (e.g., information about words known and how he/she communicates, functional descriptions of motor abilities and challenges, descriptions of specialized equipment, background information on the child's disability), such information is presented in an accessible, person, "user friendly" format (e.g., the portfolio is written in the child's voice). Anecdotally, parents and educators report that FAPS promote greater understanding of children with disabilities and increase school professionals' commitment to include children in regular kindergarten classrooms. In this session guidelines for developing FAPS will be presented and sample FAPS that have been developed with a culturally, ethnically, and socio-economically diverse array of families will be shared. Moreover, a program of research to systematically investigate the influence of a variety of components of FAPS will be described.

### **A CROSS-CULTURAL COMPARISON OF THE PERCEIVED CAUSES AND TREATMENTS OF AIDS/HIV**

By: Lindsay Barber

Sociology and Anthropology

Faculty Mentor: Lori Fitton

I will argue that AIDS has specific symptoms according to Western medicine however, it is also viewed through a cultural filter. The treatments for AIDS/HIV also go through a cultural filter. I will show that ethnobotany and traditional treatments are playing an important role in the AIDS/HIV battle, especially within ethnic groups that do not have ready access to Western medicines. I also argue that the collaboration of traditional medicine with Western medicine is an important factor in battling the AIDS/HIV pandemic. As AIDS/HIV continues to be a pandemic, and the cost of Western medicines continues to be too costly for many people in non-Western countries to afford, this paper helps offer insight into alternative ways, as well as complimentary ways, of dealing with the disease.

### **COMPARISON OF HOUSING SELECTIONS BETWEEN MEN AND WOMEN ON THE COLLEGE CAMPUS**

By: Tara Barnes, Ericca Wasser, Jamie Wilmot, Courtney Loy, Amanda Emerson

Family and Consumer Sciences

Faculty Mentor: Jean Memken

It is common knowledge that significant differences exist between men and women in many areas of life. Numerous studies have confirmed these differences; however few studies have examined gender differences in housing preferences, particularly campus housing preferences. The purpose of this study was to examine gender differences in terms of college housing preferences. For this study, 276 students at Illinois State University were surveyed about their campus housing. Questions related to advantages and disadvantages of current residence, housing features that are most important and ideal college housing were included in the survey. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypothesis. Results showed that men and women are not significantly different in terms of their college housing preferences overall, however, some significant relationships were noted. Women were more like to see proximity to campus as an advantage to their current housing than men. In terms of disadvantages, men reported a lack of cleanliness significantly more often than women and women noted lack of parking as a disadvantage significantly more than men. When asked what were the most important options in college housing, women were significantly more likely to report air conditioning, proximity to campus and efficiency of maintenance as important factors than men.

### **THE EFFECT OF ENVIRONMENTAL SCALE AND DIRECTION TYPE ON WAYFINDING EFFICIENCY**

By: Mary Bartlett, Brian Seanor, Sadie Nazarczuk

Psychology

Faculty Mentor: Alycia Hund

Finding our way from place to place is essential for daily living. Often, people rely on directions offered by others to facilitate wayfinding. For example, travelers might ask the hotel staff for directions to nearby tourist sites. These directions might include a variety of cues, including landmarks, cardinal descriptors (e.g. north, east), and left and right turns. How efficiently can people follow directions containing these types of cues? One goal of this investigation was to examine whether people are faster and more accurate when navigating based on directions that contain cardinal descriptors or left and right turns (e.g., turn north versus turn left). A second goal was to compare navigation processes across two environmental scales: a large environment (e.g., the basement of DeGarmo Hall) and a similar small environment (e.g., a model of the basement of DeGarmo Hall). The model was built using a 44 in. x 77.5 in. piece of white plywood. Hallways were placed using blue tape, and classrooms and offices were outlined in black, and labeled with 1 in. x 2 in. white labels. College student participants were asked to read sets of directions and follow the routes specified in the directions to get from designated starting locations to destinations. All of the routes contained four turns. Half of the directions contained cardinal descriptions (e.g., Turn north at the end of the hall), whereas the others contained left and right turns (e.g., Turn left at the end of the hall). Participants completed 3 trials containing cardinal descriptions and 3 trials containing left and right turns in the basement (e.g., they walked from the starting locations to the destinations) They also completed 3 cardinal trials and 3 left and right trials using the model of the basement (e.g., by moving a small toy person around the model). The order of routes and environments was counterbalanced across participants. The researcher recorded the navigation time and errors during each trial. We predicted that people would be faster and more accurate when following the left/right directions versus the cardinal directions, especially when walking around the basement. In contrast, we expected that navigation efficiency in the model task would not differ as greatly depending on direction type. Preliminary analyses confirm these predictions, suggesting that the type of information provided affects the efficiency with which people use directions to find their way from place to place in large- and small-scale environments.

### **IT'S ALL DOWNHILL FROM HERE**

By: Anthony Battaglia, Nathan Kidwell, Ryan Lodes, Nick Pieroni, Randi Prettyman

Physics

Faculty Mentor: Charles Su

Since the 17th century, the brilliant physicists and mathematicians have been investigating what would be the fastest route between two points in a vertical plane under the influence of gravity and contact forces. This problem has been solved neglecting the friction and air resistance. The curve that took the least amount of time was predicted by Bernoulli using the principle of variation, to be a section of a cycloid. In this presentation we would like to outline, the general problem involving the action of friction and air resistance. We will show a demonstration of three balls rolling down three different types of curves.

### **ARE WOMEN MORE LIKELY TO PERCEIVE STEREOTYPES THAN MEN?**

By: Joanna Beatty

Psychology

Faculty Mentor: Rocio Rivadeneyra

The present study was conducted in order to examine the disparity, if any, in responses regarding the identification of group stereotypes in the media. It was proposed that women would perceive stereotypes more often than men on account of the emphasis on sensitivity with regard to female socialization. To see if a difference was in fact demonstrated, previous research was drawn upon concerning perceived Latino stereotypes by non-Latinos as seen in television clips. Initial research was conducted at Illinois State University in 2003 and consisted of 102 male (n=20) and female (n=82) participants who viewed four television clips with at least one Latino character portrayed stereotypically. Participants then filled out a questionnaire and engaged in a focus group discussion concerning their impressions of the clips. A gender discrepancy was demonstrated with females reporting not only significantly more Latino stereotypes than males but also more total stereotypes as well, which include any stereotype relating to gender, ethnicity, sexual orientation, or otherwise. Females were also less likely than their male counterparts to view these television portrayals as positive. However, no gender difference existed regarding total stereotypes believed. Results have implications for understanding why some may be more prone to reject group stereotypes.

### **THE ARTIFACTUAL MIND: THE FORMATION OF SOCIAL IDENTITIES IN A BILINGUAL SPEECH COMMUNITY**

By: Zachary Beier

Sociology and Anthropology

Faculty Mentor: James Skibo, Maura Toro-Morn

In this paper I focus on the often overlooked role of everyday material culture in the formation of social identities. I consider material culture to be meaningfully constituted as well as socially significant. I use this same perspective when analyzing examples of material culture imprinted with language. I argue that in a bilingual speech community such as Puerto Rico, language assumes a multi-functional role, creating messages specific to various contexts and encouraging particular behaviors. This is particularly true for "linguistic material culture," such as signs, which target and influence behavior of a specific group. For example, linguistic artifacts in Spanish portray personal identity, while forms in English are linked to the commercial or professional realms. A combination of ethnographic fieldwork data and physical evidence (such as the analysis of photographs of bilingual speech material) is presented. I show that Spanish and English occupy different diglossic social functions, which are manifested in linguistic artifacts. As the world becomes more interconnected through globalization, an awareness of how messages created by forms of linguistic material culture are becoming increasingly critical.

### **GERMANS, SETTLEMENTS, BREWING PIONEERS IN AMERICA**

By: Blake Benson

Geography-Geology

Faculty Mentor: Jill Freund Thomas

According to C.E. Dick in his speech given at the University of Minnesota, "Germans have been recognized as adept braumeisters and many breweries in this country bear German names. Few other industries in the United States have a locational pattern that illustrates so well the power of an ethnic factor in influencing locations" (1981). Over the past two centuries the number of breweries in the United States, has steadily increased due to the large number of German immigrants. Where these Germans settled has had a great impact on the location and number of breweries in this region.

Having personal experience working in my family's Bar and Grill on Chicago's Southside has given me a greater insight into the German immigrants' impact on U.S. beer production. Our establishment offers German products brewed in the U.S., such as Anheuser-Busch, Miller Lite, Beck's, Spaten, Pabst, Leinenkugel, and Coors to name a few. The assumption is made that breweries are located in close proximity to German settlements, will be illustrated on this poster, looking to see if this correlation is as strong as the assumption states.

### **SYNCHRONIZATION OF A PLASMA DISCHARGE TO A FREQUENCY MODULATED LASER: FUNDAMENTALS**

By: Justin Berry, Tom Juskevics

Physics

Faculty Mentor: Epaminondas Rosa, Brian Clark

We analyze phase space plots and Fourier transforms to study how plasma reacts to light from a diode laser at different conditions. These plots show how the modulated laser signal changes the characteristics of the plasma. The plasma discharge is maintained in a hollow cathode lamp filled with neon gas. During the discharge, electrons move from the cathode to the anode, colliding with and exciting neon atoms along the way. The output of a diode laser is frequency modulated near an atomic resonant transition is focused into the center of the discharge and modifies the plasma characteristics as it interacts with neon atoms. In this work we present the fundamental physics behind our experimental setup, and check for synchronization between plasma and laser.

### **COMING OF AGE IN THE SYSTEM: CHILDREN OF THE COURT**

By: Jennifer Blanchard

Sociology and Anthropology

Faculty Mentor: Gina Bessa, James Skibo

In the United States we have a system composed of various agencies that not only oversee children once they are placed into court custody, but also administer juvenile justice. I explore the achievements and or failures of these agencies in several ways that include an auto-ethnographic memoir interviews with employees and former residents of such state institutions. The research will focus on state and privately operated homes as well as juvenile correctional facilities. From an anthropological perspective, I will explore how these institutions shape the future of these juveniles who one day are released when they become adults.

### **SEARCHING FOR CLUES: A PREHISTORIC ARCHAEOLOGICAL INVESTIGATION AND ANALYSIS OF HEMATITE**

By: Laura Blank

Sociology and Anthropology

Faculty Mentor: James Skibo, David Malone

In the summer of 2005 I attended an archaeological excavation in the Upper Peninsula of Michigan on Grand Island, where we were investigating a prehistoric Native American settlement. The excavation, along with this paper, is a continuation of the research being done by the Grand Island Archaeological Project. Even though the recently excavated sites are still in the preliminary stages of analysis, I wanted to carry my involvement in the project to the next stage. One of the interesting aspects of last summer's excavation was the hundreds of fragments of the mineral hematite, not native to the island, that were recovered from the living surfaces dating to about A.D. 1000. My paper explores the possible uses of hematite and specifically how the prehistoric inhabitants of Grand Island employed this material. To accomplish this I have combined an ethnographic search of the uses of hematite in North America with laboratory analysis. The lab portion of my paper includes artifact analysis and some experimentation with the hematite, which should shed some light on the use of this mineral by the prehistoric inhabitants of Grand Island.

### **PROJECTILE STUDIES ON A MODIFIED AIR CANNON**

By: Trisha Blood, Michael Turner, Harvey Reynolds

Physics

Faculty Mentor: David Marx, Daniel Holland

Modifications to a previously acquired air cannon are currently being performed so as to allow for freedom of motion both rotationally and along the azimuthal angle. The cannon will be arranged with the tank upright above the barrel, therefore lowering the center of gravity. Hand cranks will be incorporated into the set-up so as to allow for barrel elevation and free rotation. Furthermore, the current iron barrel will be replaced by one fashioned from PVC piping. If time permits, the effects of rifling the barrel will be explored using an enlarged handcrafted bullet. A computer program predicting the desired angle of elevation and muzzle velocity has been designed and will further incorporate data concerning the muzzle velocity. This velocity will be measured using a system of photogates and superballs as projectiles.

### **THE ROLES OF IMPLICIT AND EXPLICIT MEASURES IN PREDICTING SEXUALLY HARASSING BEHAVIOR**

By: Jennifer Bloodgood, Janet Haro, Julia McKee, Lauren Prihoda

Psychology

Faculty Mentor: John Pryor

The purpose of this research was to explore the connections of implicit and explicit measures of male sexual harassment proclivities to sexual harassing behavior. Male participants were asked to conduct an interview with a woman who was applying for a research position in the psychology department. Men were randomly assigned to interview female confederates who appeared either highly qualified or unqualified for the position. The behaviors we assessed in this interview were subtle nonverbal behaviors (e.g., how close the male sat to the female, his body posture and facial expressions, whether he physically touched her, etc.) and overt evaluative behavior (i.e., whether he rated her as qualified for the job). Outside of the interview setting, as part of an unrelated second study, we assessed both implicit and explicit measures of male sexual harassment proclivities. For the implicit measure, we used a modified Stroop procedure to assess the degree to which the men associated sexual ideas with ideas about social power. For the explicit measure, we asked the participants to complete the Likelihood to Sexually Harass scale (LSH; Pryor, 1998). The LSH asks men to rate the likelihood that they would use social power to sexually exploit women. Our prediction is that the implicit measure will be more strongly correlated than the explicit measure with subtle, automatic, nonverbal behaviors related to sexuality. Men who have stronger associations between ideas about sex and power will be more likely to act in a spontaneous sexual way when they find themselves in a position of authority over an attractive woman. On the other hand, we predict that the explicit measure of sexual harassment proclivity, the LSH, will be more strongly connected than the implicit measure to overt evaluations of the job applicant's suitability for the position. Explicit measures, like self-reports of sexual harassment proclivities and overt behaviors both involve control processes. In other words, they both involve conscious decisions to behave in certain ways. We hypothesize that men who score high on the LSH will be less concerned about whether the woman is qualified or not in his evaluations of her. High LSH men consciously evaluate women as sex objects first with less concern about professional factors. Data collection is ongoing and will be completed by the time of the symposium.

### **INTERCULTURAL TRANSFORMATION VIA THOLOS**

By: Chris Bogue, Daniel Crawford

Communication

Faculty Mentor: Megan Hogue

This presentation studies a new technology that is projected to be put into effect within the next two years. Tholos Systems has developed intercultural communication hubs that will be placed in public areas of several European cities. The technology creates a unique medium for communication across borders. This presentation explores the effectiveness of the "Tholos" as an intercultural and interpersonal tool. To effectively measure its effectiveness the "Tholos" will be compared to a communication model presented in 2004. The model describes how new subcultures are formed when interpersonal, intercultural communication takes place. By applying this model to the new technology of "Tholos" we can have a clear picture regarding its validity as a globalizing tool. The final goal of the presentation is to discuss some implications regarding the globalizing effects of the "Tholos."

### **THE INFLUENCE OF VIRTUAL 3-D CORNERS ON THE 2-D MULLER-LYER ILLUSIONS**

By: Jennifer Bonomo

Psychology

Faculty Mentor: Gordon Redding

The Muller-Lyer illusion was hypothesized to arise from size distortion of the 2-D drawings by the virtual size of 3-D corners that would produce the drawings according to the rules of linear perspective. The arrow-junction drawing corresponds to a right-angle corner in front of the picture plane, which is smaller than the drawing size, while the fork-junction drawing corresponds to a right-angle corner behind the picture plane, which is larger than the drawing. The orientation for constant virtual corners relative to drawing station point was manipulated to produce different sized drawings with different vertex junctions. Virtual corner size was compared to T-junction control stimuli for the corresponding drawings to determine the relative contribution of virtual and picture plane size to participant judgments of size as measured by size reproduction responses. Response to fork-junction drawings of a virtual concave corner was fit by a function assigning 30 percent influence to virtual size and 70 percent to picture plane size. Response to arrow-junction drawings of a virtual convex corner was fit by a function assigning 20 percent influence to virtual size and 80 percent to picture plane size. The common finding of a larger illusion for fork-junction stimuli may be explained by the larger influence of virtual size. Fit to prediction was better for arrow junctions (convex corners) than for fork junctions (concave corners), perhaps because of a general tendency to underestimate larger sizes.

### **A RECYCLING STUDY EXAMINING THE BEHAVIORS AND ATTITUDES OF THE ILLINOIS STATE UNIVERSITY COMMUNITY**

By: Christiny Bouback, Jessica Wells, Anne Simpson, Lindsay Shockley

Marketing

Faculty Mentor: Timothy Longfellow

The purpose of this study was to determine the current attitudes of the Illinois State University faculty, staff, administration, and students (both on and off campus) toward recycling during the fall semester of 2005. This purpose was for the intention of helping the Green Team to better understand the current Illinois State University community's behavior so they can implement a better program in the future. A research design was employed to develop a web-based questionnaire to analyze the attitudes and behaviors of the population through the testing of various constructs. The survey asked the community member about their recycling behavior, intentions, and motivation. The population maintained two strata, which included the Illinois State University's faculty, staff, and administration in the first pool and the on and off campus students in the second. The research indicated that the faculty, staff, and administration group had an overall higher recency of recycling, motivation to recycling, and intention to recycle than the students did. Areas for further consideration consist of increasing the student's involvement towards recycling through motivation, behavior, intention, and recency.

### **MIXED METAL CLUSTER COMPLEXES**

By: Heather Bowen

Chemistry

Faculty Mentor: Lisa Szczepura

The first mixed metal core clusters were developed and fully characterized by Long and coworkers. 1 These clusters of  $(\text{Bu}_4\text{N})_3[\text{Re}_5\text{OsSe}_8\text{Cl}_6]$  and  $(\text{Bu}_4\text{N})_2[\text{Re}_4\text{Os}_2\text{Se}_8\text{Cl}_6]$  now have had further studies completed on them. In our lab the focus is on Re and Mo mixed metal clusters. Recently, the introduction of mixed metal systems has stimulated more interest into how the Re/Mo mixed metal will function. Fedorov and coworkers<sup>2</sup> reported an impure preparations of the octahedral heterometal rhenium-molybdenum cyano cluster complex  $[\text{Re}_5\text{MoSe}_8(\text{CN})_6]^{5-}$ . In order to obtain a pure compound a new approach to the synthesis of  $[\text{Re}_5\text{MoSe}_8(\text{CN})_6]^{5-}$  was developed, and the purification was completed. The goal of my research project is to repeat the synthesis and to make the pure compound of  $(\text{PPh}_3\text{Me})_4[\text{Re}_5\text{MoSe}_8(\text{CN})_6]$ . This has been accomplished for this compound. Further studies will include the reactivity studies of  $(\text{PPh}_3\text{Me})_4[\text{Re}_5\text{MoSe}_8(\text{CN})_6]$ , more specifically; ligand substitution of the CN- ligand for a  $\text{PEt}_3$  ligand. Substitution of different ligands may site specific reactivity in this mixed metal cluster core.

Reference:

Tulsky, E. G.; Long, J. R. *Inorg. Chem.* 2001, 40, 6990

Fedorov, V. E.; Naumov, N. G. *Polyhedron.* 2004, 23, 599

## **GOVERNMENT AND PRIVACY ISSUES**

By: Ellis Bowers, Jacquie Roberts

Criminal Justice Sciences

Faculty Mentor: Donna Vandiver

With the United States government's renewal of the Patriot Act and the administration's recent controversial issues regarding wiretapping of Americans, an enormous amount of distrust is being generated from the public. In 2005, research was conducted at Illinois State University concerning privacy issues and opinions on terrorism and security. Thirty-one questions were asked to a convenience sample of 105 Illinois State University students who were asked questions such as, "Do you think the government monitors your activity too much," "Do you fear terrorism," and "Should the government have the right to track your activities on the internet?" The purpose of the research was to explore students' attitudes and fears concerning privacy. The survey was conducted using face-to-face confidential interviews that were conducted by ISU criminal justice majors as part of a Research Methods class project. The answer options were closed-ended, including yes/no, yes/no/maybe, and Likert responses. Forty-nine percent of the respondents were male and 51 percent were female. Additionally, 16 percent were freshmen/sophomore and 79 percent were juniors/seniors. The remaining six percent were graduate students. Eighty-six percent were Caucasian; six percent were African-American and nine percent Hispanic or an "other" race. Thirty-one percent who participated in the survey were criminal justice majors and 70 percent were not. According to the research 46 percent of the participants feared terrorism; 36 percent thought the government monitored their activities too much; and 32 percent believed the government has no right to track their activities on the Internet. According to the research, we can conclude that Illinois State University students seem somewhat satisfied with the job the government has done so far to protect their individual privacy rights while protecting them from acts of terrorism. In today's society, security is a high priority for the present administration, yet government officials cannot infringe upon the rights of American citizens for the purpose of apprehending suspected terrorists.

## **EFFECT OF INTENTIONAL AND INCIDENTAL LEARNING ON IMPLICIT MEMORY TASKS**

By: Jeremy Braithwaite

Psychology

Faculty Mentor: Dawn McBride

Memory is a very intriguing and complex function of the human brain. One aspect of this function that several researchers have found very dynamic is the creation of false memories. False memories seem to be created in one of two ways: Either a person claims to have experienced some event that never happened, or they remember an event, but their recollection differs from the actual experience. This study was designed to explore how the formation of false memories is influenced by whether the individual engages in active learning of study lists. In previous studies, using the Deese-Roediger-McDermott (DRM) paradigm, researchers have been unable to elicit false recall of critical lures on implicit memory tasks. A 2 (learning: intentional vs. incidental) X 2 (level of processing: semantic vs. graphemic) X 2 (Test condition: explicit vs. implicit) mixed factorial design using the DRM paradigm was developed to further explore the causes of the lack of false memory effect. Participants will be presented 15 lists each containing words semantically related to a non-presented critical lure. The recall session that follows will be a word-stem completion task, in which participants in the explicit condition are told to recall words they distinctly remember seeing, while participants in the implicit condition are told to write down the first word they could think of after reading each stem. The presentation of study instructions is also manipulated—participants in the intentional learning condition are informed of a recall test, while those in the incidental learning are not. Previous research indicates that participants in the explicit test condition will have higher rates of false recall than participants in the implicit test condition across both learning conditions. We expect the intentional learning condition to yield higher rates of false recall than incidental learning.

## **PHOTOPHYSICAL BEHAVIOR OF SELECTED NOVEL CARBAPORPHYRINS IN ETHANOL**

By: Jakoah Brgoch

Chemistry

Faculty Mentor: David Cedeno

We have investigated the photophysical properties of four selected novel carbaporphyrins in ethanol using photoacoustic calorimetry and emission spectroscopy. These methods are used to measure and quantify the amount of intersystem crossing, and singlet-oxygen. If the amount of singlet-oxygen generated is large enough, these compounds could be used as photodynamic therapy drugs. The research is aimed primarily at how the molecular structure of the carbaporphyrins affects the fluorescence yields and triplet state of the molecule, and ultimately, the generation of singlet oxygen. In order to measure these yields various spectroscopic techniques were utilized. Molecules were excited using a nitrogen-dye laser leading to the triplet state. Photoacoustic calorimetry is used to measure the amount of energy involved in this process. The fluorescence yield was measured and quantized using a commercial spectrometer and the cut and weigh method. Finally, the formation of singlet oxygen was detected with the use of an argon ion laser, and a germanium detector at the exit of a monochromator. With a better understanding of the physical aspects involved, the results can now be optimized and other carbaporphyrins designed rationally to produce the maximum amount of singlet-oxygen possible.

### **GEOCACHE, A NEW GAME FOR THE 21ST CENTURY, AND CAN YOU PLAY?**

By: Douglas Brown

Geography-Geology

Faculty Mentor: Jill Freund Thomas

The United States military's need for locating things resulted in the creation of a NAVSTAR Global Positioning System (GPS). NAVSTAR today is a system of 24 satellites circling the globe. Any four satellites can be used to pin point someone's exact location on the globe. Being the creative people that humans are, this technology was embraced by the private sector. The private sector created hand held GPS units that almost anyone can use, which receive signals from the four satellites. People began to use the GPS units to further enhance their recreational experience, like geocaching.

So what is "geocaching" and where did it come from? How does the military figure into the creation of this new game? The first 'geocache' occurred May 3, 2000 by Dave Ulmer. Mr. Ulmer embraced a new idea he concealed a bucket of trinkets in the woods outside of Portland, Oregon then used his handheld GPS unit to record the exact location. Mr. Ulmer then went online and recorded the exact location of the hidden cache using Latitude and Longitude coordinates. In that moment he started a new game which has spread like wildfire across the globe.

I believe the data will show that the presence of U.S. troop's station in foreign countries will correlate to large number of geocache sites in each of those countries. This information will also answer, what is geocache, why did Mr. Ulmer decided to hide his bucket, how does one play, and actually number of sites in each country. I am sure that the inventors of NAVSTAR never saw the full impact of their designs. It is within this embrace that our inner child's desire to play has turned a product of war into a worldwide pastime.

### **FORGET HIM AND THE CAMP AESTHETIC**

By: Cassidy Browning, Annaliisa Ahlman, Alex Potanos, David Wilhelm

Theatre

Faculty Mentor: Elizabeth Reitz-Mullenix

I chose the topic of queer theory because I have studied theatre history and theory during my undergraduate career, and have found that gender and sexuality are the areas that I wish to focus on during my graduate work. The embodiment of my studies in theatre theory, and specifically, queer theory, is the show I am directing through the School of Theatre's Freestage program entitled Forget Him. It was written by Harvey Fierstein, a gay theatre artist and activist. Through this production, I hope to demonstrate the use of camp, a uniquely queer aesthetic, as well as utilize feminist techniques in directing. I am focusing on collaboration and discussion to generate ideas and meaning for the production. I was inspired by this play when I read it for a course at ISU. We also discussed camp at length, as it is an integral component to the script. Camp is not a superficial style; it comments while maintaining the image of frivolity. The culmination of the work will be the performances of Forget Him during the Freestage Festival this spring on April 22 and 23.

During my presentation, I will review the script and its context before moving into the subject of camp and how it relates to the piece. I will also review other queer as well as feminist techniques that I employed to produce the play. To demonstrate the camp aesthetic, I will have the cast for Forget Him perform an excerpt of the script during my presentation.

### **THE EVOLUTION OF JAPANESE ANIMATION: A CULTURAL MEDIA MOVEMENT**

By: Jordan Bryant

Communication

Faculty Mentor: Megan Houge

On September 17, 2005, the Lycos 50, known for their famous internet search engine "lycos.com," concluded their ten year analysis of popular culture. They found that the top five internet searches since 1995 included Pamela Anderson, Britney Spears and the WWE. But, amongst the ranks of silicone and spandex were two very interesting narratives which have captured the attention of millions. These works of art have our country and the world fascinated in a fantasy frenzy. They were two Japanese television shows titled "Pokemon" and "Dragon Ball Z." Where our initial reaction to this discovery might be laughable, a moments focus would show us that this phenomenon goes beyond television shows, collectors cards, video games and comic books. Japanese animation, also known as anime, demonstrates a cultural media movement worthy of our attention. As communicators, it is pertinent that we explore a genre which continues to shape and influence mass media while simultaneously is spreading significant religious messages.

### **ON GAMMA-LABELINGS OF 2-REGULAR ALMOST BIPARTITE GRAPHS**

By: Ryan Bunge

Mathematics

Faculty Mentor: Saad El-Zanati

In 1965, Alex Rosa introduced several types of graph labelings as means of attacking the problem of finding cyclic graph decompositions of complete graphs. Rosa showed that if a graph  $G$  with  $n$  edges admitted certain kinds of labelings ( $\rho$ -,  $\sigma$ -, or  $\beta$ -), then  $G$  cyclically decomposes the complete graph on  $2n+1$  vertices. Moreover, if  $G$  is bipartite and if it admits a restrictive labeling, called an  $\alpha$ -labeling, then  $G$  cyclically decomposes the complete graph on  $2nx+1$  vertices for every positive integer  $x$  (thus  $G$  divides an infinite family of complete graphs, rather than just one). A new labeling that yields the same decomposition outcome as  $\alpha$ -labelings was recently introduced for graphs that are not necessarily bipartite. Blinco, El-Zanati, and Vanden Eynden showed that if an almost-bipartite graph  $G$  with  $n$  edges admitted what they call a  $\gamma$ -labeling, then  $G$  cyclically decomposes the complete graph on  $2nx+1$  vertices for every positive integer  $x$ . A non-bipartite  $G$  graph is almost-bipartite if it contains an edge whose removal makes  $G$  bipartite. I show that every 2-regular almost-bipartite graph  $G$  has a  $\gamma$ -labeling, except when  $G$  is  $C_3$  or  $C_3 \cup C_4$ .

## **EVOLUTION IN AMERICA: OPPOSITION AND SOCIETAL REACTIONS**

By: Michael Burke

Sociology and Anthropology

Faculty Mentor: James Skibo, Martin Nickels

Evolution, first proposed by Darwin in 1859, is well accepted in science but still hotly contested among the American public. In my paper I will explore, from an anthropological perspective, the history of this debate in the United States and where it is today. One current debate is whether or not to include evolution in public school curriculums even though it is widely accepted in modern American science. My main focus will be on the differences in reactions by both the scientific and non-scientific communities to the creation-science movement as opposed to that of the Intelligent Design advocates. I will use as data specific events, published documents, and individuals who have taken a specific position on the debate.

## **AFFORDANCE PERCEPTION**

By: Karen Burtschi

Psychology

Faculty Mentor: Jeffrey Wagman, Steve McCaw

In order to successfully guide their behavior, people must be aware of those behaviors that are possible and those behaviors that are not. The current study investigated whether people are aware of what heights would be safe to jump from. Participants looked at platforms of various heights and reported (a) whether they would be willing to jump from that height and land on one foot and (b) whether they would be willing to jump from that height and land on two feet. The results show that in general, perceivers were more conservative in reporting that they would be willing to jump from a height and land on two feet than in reporting that they would be willing to jump from a height and land on one foot, especially at heights greater than 80 centimeters.

## **COMPUTATIONAL STUDIES OF THE INTERACTION OF SULFUR TRIOXIDE AND SULFUR DIOXIDE WITH HYDROGEN HALIDES**

By: Matthew Cafarelli

Chemistry

Faculty Mentor: Jean Standard

A computational study was performed on the interaction of sulfur trioxide and sulfur dioxide with hydrogen halides. The levels of theory employed were HF, B3LYP, and MP2 with a LANL2DZ basis set. Geometry optimizations, vibrational frequency calculations, and Natural Bond Orbital analyses were carried out on the SO<sub>3</sub>-HX and SO<sub>2</sub>-HX complexes, X= F, Cl, Br, and I. In most of the complexes, the formation of S-X bonds was observed; however, in some cases hydrogen bonding was obtained. Trends in bond lengths, bond angles, and binding energies were analyzed.

In both the SO<sub>3</sub>-HX and the SO<sub>2</sub>-HX complexes, the S-X bond lengths increased from HF to HI, as the S-X-H bond angles decreased from HF to HI. The calculated binding energies of SO<sub>3</sub>-HX were in the range of -0.7 to -6.7 kcal/mol with the SO<sub>3</sub>-HF complex having the largest binding energy. The binding energies of SO<sub>2</sub>-HX were in the range of -0.6 to -7.3 kcal/mol with SO<sub>2</sub>-HF the complex having the largest binding energy.

## **PHONEMIC AWARENESS INSTRUCTION IN FIRST GRADE: DOES IT WORK?**

By: Colleen Campbell

Speech Pathology and Audiology

Faculty Mentor: Heidi Harbers, Tena McNamara

This study investigated the effects of phonemic awareness intervention on the spelling and word recognition skills of low-achieving first grade readers using different service delivery models. Portions of the Phonological Awareness and Literacy Screening 1-3 (PALS 1-3) were administered three times to all children (N = 47) in two first grade classrooms in a public school in Peoria, IL. The first administration occurred in September. Both classrooms received their regular curriculum until January (the time of the second administration). At that time, one classroom was randomly selected to receive whole classroom intervention two times per week. In addition, children (n = 12) who obtained low scores in January or demonstrated minimal gains from September were selected to receive additional intervention in small groups outside of their classroom. Portions of the PALS 1-3 were re-administered at the end of the school year. MANOVA results indicated no statistically significant difference in spelling or word recognition scores between the control and intervention classrooms. For the targeted students, however, a combination of whole class and small group instruction proved more beneficial than small group alone or whole class instruction alone.

## **EXPERIMENTS OF LIGHT SCATTERING IN MILK\***

By: Sawyer Campbell

Physics

Faculty Mentor: Charles Su

We have explored experimentally the propagation of a light pulse in a heterogeneous medium, such as milk. Using a (LabView) computer controlled translation stage we are able to collect scattered light from the input diode laser beam over 6 orders of magnitudes in intensity. We will also describe our first experiments to determine the scattering and absorption coefficients as well as the anisotropy of milk for various concentrations by measuring the scattered or absorbed light intensity as a function of the source-detector spacing. This apparatus will be used in the near future to study other proposed light scattering experiments and possible bio-optical imaging algorithms. [1,2]

\* Supported by grants of the NSF, Research Corporation.

[1] M.S. Bell, A.F. Lewis, R.E. Wagner, Q. Su and R. Grobe, Laser Phys. 13, pp. 207-212 (2003).

[2] S. Menon, Q. Su and R. Grobe, Phys. Rev. Lett. (in press).

## **THE RHETORICAL REJECTION OF WHITENESS: ROGER EBERT'S ANALYSIS OF WHITENESS IN FILM**

By: Patrick Carberry

Communication

Faculty Mentor: Megan Houge

In early 2005, Lion's Gate Entertainment released the film diary of a mad black woman, written by and starring Tyler Perry, and entertainer not well known among whites by immensely popular among the African-American community. While the film was a box office smash, grossing more than \$25 million in its opening weekend, it was a critical flop. One critic in particular, Chicago Sun-Times reviewer Roger Ebert, wrote an extremely negative one star review of the film, calling its zany, hodgepodge, variety-show-like plot a train wreck. Within hours, Ebert was inundated with thousands of emails from African-Americans across the United States, all saying variations of the same thing, white critics just don't get it. On March 2, after receiving more emails than about any other review he's ever written, Ebert published on his website and on the pages of the Sun Times an essay, entitled Who Is that Mad Black Woman? in which he publicly considers the validity of his critics' claims, ponders his own Eurocentric understanding of the film and questions whether or not a white film critic could ever objectively review a black-themed film. Critical race scholars argue that, due to the historical dominance of whites, whiteness has become the cultural norm. Scholar Richard Dyer argues in his pinnacle 1997 book white that whiteness has been allowed to maintain its normativity by remaining hidden, unquestioned. Ebert, by publicly questioning his white authority, is engaging in a form of discourse nearly nonexistent in the public forum. Ebert's rhetoric clearly warrants further analysis and begs the question, "Does Ebert reject his whiteness enough to establish legitimate black cultural space?" To answer this question, we will employ the methodology of Ronald Jackson in his article, White Space, White Privilege: Mapping Discursive Inquiry into the Self as found in the \_\_\_ 1999 Journal of Communication. Because Ebert is responding to criticisms that his whiteness blinded his objectivity, an article that defines and interrogates whiteness could be used as a test, if Ebert is truly not perpetuating his whiteness (as he would have us believe) than his rhetoric would not feature the strategies described by Jackson. With this in mind we could, first, explore Jackson's methodology, second, contrast it to Ebert's rhetoric, before, finally, drawing some critical conclusions about Ebert's essay and the nature of critical theory.

To study the invisible and omnipresent nature of whiteness, Jackson made use of an interesting research group: white students attending predominantly African-American universities. By stepping out of the mainstream these students, perhaps for the first time, are forced to confront what it means to be white. By studying these students communicative behavior, Jackson uncovered three ways in which whites represent themselves: whiteness as uninterrogatable space, whiteness as a metaphor for the universal insider, and whiteness as occupying both guilty and fair space.

## **EXPLORING EVOLUTIONARY MECHANISMS IN INSECTS USING ARTIFICIAL NEURAL NETWORKS**

By: Kareem Carr

Mathematics

Faculty Mentor: Olcay Akman

Using caddisflies as a model, we explore sexual differences as a driving force in the evolution of this order of insects. Using the body sizes and shapes of caddisflies, our work not only shows that sexual difference has played a key role in the emergence of species of caddisflies but also that artificial intelligence techniques in general and Kohonen artificial neural networks in particular are a powerful tool in exploring patterns in populations of animals.

## **CHANGING VIEWS OF IDENTITY IN THE FACE OF GLOBALIZATION AMONG HISPANIC/LATINO COMMUNITIES IN DIASPORA**

By: Catherine Carter

Sociology and Anthropology

Faculty Mentor: James Skibo, Nobuko Adachi

According to a 2004 survey by the US Census, Hispanics and Latinos constitute 12.5% of the entire US population, making them the largest minority group in the United States. But unlike other categories that identify one's background (e.g., black, Asian, American Indian) Hispanic is the only term that does not refer to a racial category. First developed in the 1960's as a marketing and advertising tool by which to lump together all Spanish-speaking individuals, this trend has culminated in the wake of a global economic and technological revolution. I examine the legitimacy of this category today and the extent to which it appropriately reflects a group identity, posing the question: How determinative is the role of global capitalism in the creation and maintenance of a collective

## **WATER WOES: THE POTENTIAL DANGERS OF WATER PRIVATIZATION**

By: Lauren Chessare

Communication

Faculty Mentor: Megan Hoge

In October 2004, when California resident Rebecca Trujillo opened her monthly water bill, she was expecting to see her flat rate of \$21. However, she was shocked to see that her bill had somehow managed to reach over \$200. Unable to pay the outrageous increase, and worrying that a pipe may be leaking she called her customer service number where she, according to a July 1, 2005 article in Colorlines Magazine, "Learned that the voice on the other end of the line now belonged to an employee of Germany's RWE-Thames Water, the third largest private water company in the world."

Thames Water is just one of many corporations tapping into what Fall 2004 edition of the Journal of Law and Social Challenges describes as, "The looming distribution and availability crisis of water," and further calls attention to Fortune magazines' simply stated prediction that, "Water is the oil of the 21st Century." As the world's population continues to rise, water is becoming viewed more as a commodity than as a fundamental need and right, and private companies across the globe are quick to act. America is no exception to this growing dilemma, and according to the State Environmental Resource Center's Website, last accessed November 21, 2005, "While municipal water in the US has been traditionally viewed as a public resource, private management is on the upswing in a market that is now estimated at 2.5 billion dollars per year." Because of independent companies' increasing involvement with one of our most crucial resources it is essential that we examine the causes of the trend toward water privatization, the effects of these changes, before finally enacting solution to this ever increasing threat to one of human being's most crucial resources

## **POLITICS, NATIONALISM, AND ARCHAEOLOGY**

By: Piyanadda Chitsuk

Sociology and Anthropology

Faculty Mentor: Elizabeth Scott, James Skibo

Many countries have used archaeology as a tool to prove their long existence in their respective regions and to explore their ethnic identity. As distant and dissimilar from one another as it may sound, archaeology and politics are strongly interlocked. Some archaeologists are starting to ask questions about the use of archaeology for ethnic identity reconstruction and for political gain. Many archaeologists are concerned about the validity of the work of archaeologists who work under the pressure of their governments. Some fear that using archaeology in the reconstruction of national and ethnic identity is dangerous and may cause negative outcomes. The focus of my paper will be on how nations have used archaeology to strengthen their political status, develop their ethnic identity and claim supremacy over others. I explore how politics and archaeology are strongly tied to one another and the types of impacts, positive or negative, this has on the discipline.

## **CLASSICAL MODEL TO UNDERSTAND THE PAIR CREATION PROCESS\***

By: Nic Chott

Physics

Faculty Mentor: Charles Su

Using a simplified model systems we examine the production of an electron-positron pair in a spatially localized force-field [1-4]. Using numerical solutions to computational quantum field theory we compute the kinetic energy spectra of the created particles. A comparison with classical mechanical calculations based on simple trajectories suggests that despite the fully relativistic and quantum mechanical nature of the matter creation process, some aspects can be understood very well in terms of classical mechanics. This approach also permits us to distinguish between the energies that the particles are born with and those energies they gain by accelerating out of the force field.

\* Supported by grants of the NSF, Research Corporation, Illinois State URG and Honors Program.

[1]P. Krekora, Q. Su and R. Grobe, Phys. Rev. Lett. 92, 040406 (2004).

[2]P. Krekora, Q. Su and R. Grobe, Phys. Rev. Lett. 93, 043004 (2004).

[3]P. Krekora, K. Cooley, Q. Su and R. Grobe, Phys. Rev. Lett. (submitted).

[4]P. Krekora, K. Cooley, Q. Su and R. Grobe, Las. Phys. (in press).

## **CULTURAL APPROPRIATION AND IDENTITY IN THE CONTEMPORARY ART OF NATIVE AMERICANS**

By: Nathan Clark

Sociology and Anthropology

Faculty Mentor: Elizabeth Scott

In this paper I will argue that what may be termed “modern” or “postmodern” art by Native Americans uses the appropriation of Euro-American culture to maintain the former’s identity. Native art has been pressured to assimilate into the dominant culture through concepts like ‘primitive’ and ‘traditional.’ In the early part of the Twentieth Century, an historical portrayal of traditional identity and racist assumptions of the primitivity of indigenous peoples colored the reception of Indian work, and affected the possibilities of production for the artists themselves. It has been claimed that the appearance of the Santa Fe Indian School in the 1930’s, and the Institute of American Indian Arts (IAIA) in 1962, and subsequent “legitimizing” exhibits have presented a body of work that represents a successful representation of ‘Indianness’ coined in the terms of a modernist artistic vocabulary. Yet this body of work, too, has been mediated to Western society through misrepresentations of Indians. Since the 1960’s, a new generation of Native Artists, many in a postmodern vein, have implemented strategies that generally appropriate Euro-American styles, mediums, and forms in a way that challenges assimilation. I will show how this appropriation is made, and its significance in current Anthropological theory on art. I will also touch on the sort of identity Natives present of themselves. I support these claims through analysis of the general history of Native art as it relates to modern art and anthropology. This history will be presented as a backdrop to the work of a number of contemporary Native American artists - Kay WalkingStick, Edgar Heap of Birds, Bob Haozous, Emmi Whitehorse, Jimmie Durham, and Juane Quick-To-See Smith to name a few. As globalization calls into question past forms of structural difference between culture, the art of the ‘other’ has taken up a critical and politicized posture. This paper offers a study on the logic that governs cultural interaction and assimilation in the contemporary art of Native Americans.

## **PROBLEMS IN US COUNTER INSURGENCY RHETORIC**

By: Anna Cosner

Communication

Faculty Mentor: Megan Houge

In April of 2003, three weeks after US forces invaded Iraq, the government of Saddam Hussein fell and President Bush declared victory for freedom and democracy. However, the ensuing Iraqi insurgency has created a violent political voice that seems to be immutable. With increasing threats from insurgencies such as those in Iraq and Afghanistan it is shocking that military analysts Tom Donnelly and Vance Serchuk explain in their November 3, 2003 paper, U.S. Counterinsurgency in Iraq: Lessons from the Philippine War “US counterinsurgency operations continue to be viewed through an ideological prism unchanged since 1960’s.” This unchanging view of insurgencies leads to further problems in the planning and implementation of counter-insurgency policy. Thus, with the United States’ current involvement in the Iraqi insurgency and potential involvement with others around the globe, it is imperative that the United States military dramatically reform their existing counter-insurgency doctrine.

### **ATTRIBUTIONS OF EVIL: AN ALTERNATIVE EXPLANATION**

By: Shaun Craven

Psychology

Faculty Mentor: Glenn Reeder

Previous attributional research on the Milgram paradigm contends that observers make strong dispositional inferences about teachers who obeyed an authority's order to deliver painful shocks to a learner (Bierbauer, 1979; Safer, 1980). However, our preliminary research on the Milgram paradigm showed that participants make multiple motive inferences that influence dispositional attributions. The current work examines the effect of situational variables on attribution. We theorize that as information is withdrawn, and participants see only a target person's (TP) behavior of delivering shocks, more negative motives and traits will be attributed to the TP. Participants read a transcribed description of the Milgram (1963) experiments in which situational variables are systematically removed. Preliminary results indicate that participants attempt to avoid attributing negative attributes to the TP even when most situational information is minimal. Final results are forthcoming.

### **USING CHAOS THEORY TO CONTROL WEATHER**

By: Daniel Crawford

Communication

Faculty Mentor: Megan Houge, Michael Graupman

Following the momentous 2005 hurricane season, a renewed interest in weather modification has developed. Specifically, the modification of hurricanes has created specific interest in both public and private sectors. Dr. Ross Hoffman of Atmospheric and Environmental Research Inc. has theorized that by applying chaos theory to hurricane formation we would be able to exercise some control over hurricanes. Dr. Hoffman's theory is explained in order to provide a framework for specific weather modification technologies and techniques. Several proposed weather modification technologies are introduced and thoroughly discussed. Far reaching implications exist for weather modification. Implications dealing with chaos theory, the government and the overall environment are discussed to gain a comprehensive picture of weather modification. The unique application of chaos theory will provide a framework that will overarch the presentation.

### **THE INTERACTIVE EFFECTS OF CONSCIENTIOUSNESS AND AGREEABLENESS ON JOB PERFORMANCE AND WITHDRAWAL BEHAVIORS**

By: Andrew Daly, Judy Peters

Psychology

Faculty Mentor: John Binning

It has been shown that Conscientiousness by Agreeableness (CxA) interactions can predict overall job performance (Witt, Burke, Barrick, & Mount, 2002). Witt et al. analyzed the levels of Conscientiousness and Agreeableness from seven different samples and found that jobs that required a great deal of interpersonal interaction illustrated this CxA interaction. It has also been shown that facet level analysis of CxA predicts withdrawal behaviors. Only two facets of Conscientiousness and Agreeableness were found to interact and predict a range of withdrawal and counterproductive work behaviors. While job performance and withdrawal have been predicted on separate occasions, they have never been analyzed within a single sample. The present study wishes to bridge the gap of research and analyze whether or not facet level CxA interaction predicts job performance and withdrawal in the same sample. It is hypothesized that a facet-level analysis of Conscientiousness and Agreeableness will reveal an interaction between particular facets that predicts overall job performance and withdrawal within the same sample. The present study utilized data gathered from 17 childcare centers. This data consisted of personality inventory, supervisor ratings of job performance, and self reports of withdrawal behaviors. Analysis of the data has shown consistency within the interaction of the CxA on overall job performance and withdrawal.

### **A DOG'S BEST FRIEND: THE RELATIONSHIP BETWEEN PEOPLE AND THEIR PETS**

By: Sara Danhour

Sociology and Anthropology

Faculty Mentor: James Skibo, Michael Wiant

Dogs have been a part of human life for thousands of years. Many people feel a very close bond with their pet dog, which might actually stem from our past relationship with them. In this thesis, I explore, from an anthropological perspective, the ever changing relationship between humans and dogs. Why do we feel this relationship with our pets? One can see the changing relationship between humans and our dogs by looking at the medias depiction of dogs, the showing of specific dog breeds and the differing roles of dogs around the world. To explore the relationship between dogs and people, I collected survey data from pet owners that ask, among other things, if they have performed human-like death rituals with their deceased pets. The survey will also collect data on the shifting roles of dogs in society. I compare these results, collected from American pet owners, to attitudes toward pets in non industrial societies. This research will shed light on the changing relationship between humans and dogs in the U.S. and abroad.

### **FROM COMBAT TO CAMPUS: AN ETHNOGRAPHIC LOOK AT CULTURE SHOCK AMONG MILITARY VETERANS RETURNING TO CIVILIAN LIFE**

By: Joseph Dapper

Sociology and Anthropology

Faculty Mentor: James Skibo, Gina Bessa

Culture shock, the feelings of confusion and anxiety experienced when an individual or a group suddenly finds itself in an unfamiliar cultural environment, is one of the many hardships military veterans face when returning home from service. Illinois State University currently has 605 students with military affiliation. It is widely known that veterans of military service often experience culture shock when returning from service. I want to look at the specific variation of culture shock endured by those veterans who return from service to attend college. To explore this issue, I conducted on-campus interviews to better understand culture shock that is unique to the campus setting.

### **THE FOXP2 GENE AND NEANDERTHAL EXTINCTION**

By: Mike Darlington

Sociology and Anthropology

Faculty Mentor: Martin Nickels, James Stanlaw

In this paper I will argue that the extinction of Homo neanderthalensis was due to one simple fact. Neanderthals did not develop the FOXP2, or Forkhead Box P2 gene, which is necessary for modern language use and comprehension. I will support this with data from Svante Paabo and others work with the FOXP2 gene. The timing of the appearance of this gene coincides with the earliest known fossils of modern Homo sapiens. I will argue that modern language allowed early modern Homo sapiens to develop into a more successful species than the Neandertal because of an enhanced ability to communicate with each other. I will also argue that fossil evidence indicates Neanderthals likely had less developed brains in those areas related to speech. I will also discuss Lieberman's studies of skulls of contemporary and fossil hominoids, suggesting that the vocal tracts of modern humans are shaped differently than that of Neanderthals and how this difference relates to linguistic abilities.

### **USING THE 3-OMEGA TECHNIQUE TO MEASURE THE THERMAL CONDUCTIVITY OF A SOLID MATERIAL**

By: Matthew Davis

Physics

Faculty Mentor: David Marx

Measuring the thermal conductivity of a small solid sample (a sample with a thickness measured in microns) is difficult if possible using standard techniques. We have found in the research a method called the 3-omega technique that will allow an accurate measurement for the thermal conductivity that avoids much of the error associated with standard calorimetric methods.

Having an efficient and reliable method for measuring the parameters of a very small solid sample will allow us to develop materials needed to increase the efficiency of thermoelectric materials used to generate electricity in devices such as refrigerators. The future applications of this research will be related to devices that generate energy more efficiently than anything in existence today, which in the world of ever increasing gasoline prices is quickly becoming a necessity.

### **TOTAL SYNTHESIS OF RACEMIC TOLTERODINE**

By: Melissa Dean

Chemistry

Faculty Mentor: Shawn Hitchcock

The research described in this poster involves the synthesis of the racemic form of tolterodine. Tolterodine is more commonly known as Detrol LA and has been popularized in many different media (television, magazines, etc.). Tolterodine is a pharmaceutical agent that is used by persons who suffer from urinary incontinence which is defined as the inability to control the flow of urine and the involuntary action of urination. The commercial drug is sold as a single enantiomer drug suggesting that the other enantiomer may have negative or negligible effect in treating persons with urinary incontinence. Tolterodine has been synthesized in enantiomerically pure form by the use of chiral auxiliaries such as oxazolidinones. We sought to explore the potential for the use of structurally novel oxadiazinones in the synthesis of the enantiomerically pure drug. In order to provide a complete analysis of the effectiveness of our enantiomeric synthesis we decided to pursue the synthesis of a racemic mixture of tolterodine to serve as standard to compare the enantiomerically enriched material to. This work initially involved a conjugate addition pathway that involved a reaction between methyl trans-cinnamate and an arylmagnesium bromide. This initial chemistry was unsuccessful and a new pathway was pursued. This new pathway involved the reaction of 3-chloropropiophenone with an arylmagnesium bromide. This process was successful and afforded a key intermediate in the synthesis of tolterodine. This research presentation will describe the details of the research that has been conducted to this date.

### **LINKAGE BETWEEN BODY-TYPE AND SELF-ESTEEM WITH BUYING HABITS AND CLOTHING CHOICES**

By: Kara DeDecker, Jessica Caldwell, Tonoah Merritt, Tyasha Robinson, Ashley Reed

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this study was to examine the relationship between body image and shopping habits. It was hypothesized that students who were influenced by different people (parents, friends, celebrities, etc.) in terms of appropriate body image would feel differently about shopping and would engage in different shopping habits. Moreover, it was hypothesized that feelings about being overweight or underweight would be significantly related to desire to purchase different clothing items like swimwear, pants, shirts, skirts and coats. For this study, 276 students at Illinois State University were surveyed about their campus body image, what and who influences their body image, shopping habits, and what was their favorite and least favorite item of apparel to purchase. Data were analyzed using SPSS. Chi-Square and Analysis of Variance were used to test the hypotheses. Results showed students who felt their parents influenced their opinion on body image were significantly more likely to believe that the clothing they select reflects their feelings about their body than those who are not influenced by parents. Also, those students reporting that celebrities influence their body image are significantly more likely to report enjoying the shopping experience than those that are not influenced by celebrities. There was no significant difference among students who self-reported their weight classification (going from very underweight to very overweight) and overall shopping habits. However, students that reported being very underweight or somewhat underweight were the least likely to enjoy purchasing swimwear, pants and coats. Likewise, students that felt they were somewhat overweight or very overweight were significantly more likely to say they did not enjoy buying swimwear, pants and coats than those reporting normal weight. The results of this research has implications for the apparel merchandising industry, particularly in area of apparel promotion.

### **REPATRIATION IN EGYPT: REGAINING A COUNTRY'S PAST**

By: Samantha DeLong

Sociology and Anthropology

Faculty Mentor: James Skibo, Michael Wiant

Repatriation of ancient artifacts to their country of origin has been a controversial issue for some time, and it continues to be a point of contention between, primarily, museums and nations that were once former colonies and territories of European powers. In this paper I will be exploring the repatriation of artifacts and collections to the people and museums of Egypt. Some of these artifacts were discovered and wrongly confiscated by early explorers, while at the same time others were taken legally and for legitimate reasons for the time. Nonetheless, many people believe these objects should be returned to their native place of origin for the empowerment of their cultural heritage and national image (pride). The main question I investigate is why these objects of contention are not returned to their native land instead of being displayed in museums across the world. I explore this issue from the perspective of both the museum and the nations wishing to repatriate the items of contention.

### **ENVIRONMENTAL FACTORS EARLY IN LIFE AND HOW THEY AFFECT ENVIRONMENTAL FACTOR CHOICES LATER IN LIFE**

By: Danielle Dempsey, Janet Barding, Stephanie Broeske

Family and Consumer Sciences

Faculty Mentor: Jean Memken

We believe that the environment you grow up in during the first 16 years of your life affects your housing choices/ location as an adult. We tested this by randomly surveying people. Questions were asked as to what type of area one grew up in (rural, urban, etc.), what style housing they spent most of their time in, and in what style the home was decorated. To get a better idea of what background questions were asked about family structure and income.

The purpose of this study was to examine current housing situation and its influence on future housing preferences. It was hypothesized that experiences with housing during childhood and adolescence, total family income, and current family structure significantly influence future housing preferences. For this study, 276 students at Illinois State University were surveyed about their current housing and future housing aspirations. Questions operationalized such variables as housing location (rural, urban, or suburban), interior design preferences, family structure and income. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypotheses. Results of the data analysis supported the hypothesis. Current housing location, housing type and interior design style are significant determinants of future housing preferences. Although many of the respondents aspired to have a contemporary style in their future home, greater percentages of respondents chose their current interior design style as their future style preference than any other design style listed on the survey. Income and family structure were not significantly related to future housing preferences.

### **THE RELATIONSHIP BETWEEN JOB LEVELS AND CONFLICT WITHIN AN ACADEMIC SETTING**

By: Dana Derrico

Psychology

Faculty Mentor: Cong Liu

Research has shown that conflict within the workplace can lead to negative outcomes in both employee personal matters and satisfaction with the job. The purpose of this study was to concentrate on the outcomes of conflict within an academic organization and the amount of conflict between the different levels in that particular organization. In this experiment, 294 participants (116 males, 178 females) of different positions in a Midwestern University were given a questionnaire about employee conflict. The results showed that conflict with supervisors was related to job outcomes, such as job satisfaction, whereas conflict with employees was related to personal outcomes, such as depression. It was also found that there was both direct and indirect conflict between employees and both their supervisors and coworkers, and regardless of age, there was no support for age having an affect on supervisor conflict. This study supports previous studies and opens up questions for future research.

### **POSTURE AND PERCEPTION OF AFFORDANCES**

By: Jessica DeWitt, Eric Malek

Psychology

Faculty Mentor: Jeffrey Wagman

To perceive an affordance is to perceive an opportunity to perform a behavior, whether it be to sit on, walk over or avoid something. Previous research indicates that human beings are capable of perceiving affordances. This particular experiment examines the limitations of one's ability to perceive affordances, particularly the extent to which changing one's eye height and posture inhibits one's ability to correctly perceive affordances. Two separate experiments were run. They were similar in the respect that both required participants to judge whether they could walk normally, without bending their body or neck, and successfully under an apparatus of varying heights. The first experiment required participants to judge from two different positions, sitting, which altered the participant's posture, and standing. The second required participants to judge from a standing position and a standing-raised condition which did not alter the participant's posture. Both the sitting and raised conditions altered the participant's eye height by about 45 cm. Considering the amount of height manipulation that took place, the participant's judgment of whether they could successfully walk under the apparatus were surprisingly accurate. By examining results of this particular experiment one can conclude that human beings have an exceptional ability to determine whether a behavior is possible even when their posture and eye height are manipulated

## **UNIVERSITY STUDENTS' PERCEIVED CONSTRAINTS TO PARTICIPATION AS SPECTATORS AT UNIVERSITY ATHLETIC EVENTS**

By: Loriann DiMaria, Holly Hallstrom, Jennifer Lunz, Kris Wildenradt

Kinesiology and Recreation

Faculty Mentor: Amy Hurd

Most university athletic departments understand the value of student participation as spectators at events. Although there are a few universities that may not have difficulty attracting large student populations to sporting events such as football and men's basketball, this is not commonplace. Virtually all universities can see the need to grow student spectators to sporting events. One step in increasing attendance at all athletic events is to determine why students do not attend. The purpose of this study was to discover reasons why students at a Midwest university do not attend their school's intercollegiate athletic football games. Surveys were administered to 200 students on campus and analyzed using SPSS. This study explored the intrapersonal, interpersonal, and structural constraints students face in attending football games using the Hierarchical Model of Leisure Constraints (Crawford, Jackson, & Godbey, 1991). Intrapersonal constraints are those "individual psychological states and attributes which interact with leisure preferences rather than intervening between preferences and participation" (Crawford, Jackson, & Godbey, 1991, p. 311). These constraints exist when individuals do not develop leisure preferences for an activity because of such things as abilities, personality needs, prior socialization to an activity, and attitudes of friends and family to an activity. Interpersonal constraints are those constraints that arise out of social interaction with friends, family, and others. These constraints may impact both an individual's leisure preferences and leisure participation and includes such things as lack of interest in or knowledge of games. Lastly, structural constraints are things that intervene between leisure preference and participation. They include such things as lack of time, money, or child care. The results showed that lack of time because of work, preference to do other things, and lack of time because of participation in other leisure activities were rated as the most influential reasons as to why people do not attend football games. When examining constraints based on gender and residence, it was determined that women felt lack of interest, their friends' interest, and knowledge of football were more influential to their nonparticipation than they were to men's nonparticipation. In regards to residence, on-campus residents found interest, cost, and knowledge of football to be more influential in why they do not attend games than those students who live off-campus. Given these results, marketing can better focus their promotions to target students by increasing their knowledge of when games are and about the game itself.

## **PROTECTING AMERICAN SMALL BUSINESSES**

By: Joseph Dooley

Communication

Faculty Mentor: Megan Houge, Michael Graupmann, Brandon Wood, Kristyn Meyer

While the investments of corporate behemoths like Barnes and Nobles, AT&T Wireless, and Verizon may create a sense of envy to struggling small businesses working without a financial safety net, they are certainly not new phenomena. Not only do small businesses face the competitive atmosphere that is dictated by large corporations; they also struggle for the same financial support granted by the government. The catch? Many small businesses are witnessing the money allocated to help their companies to stay afloat being given instead to the same large-scale corporations that cause them to collapse. According to the August 6, 2005 edition of U.S. Newswire, the Small Business Administration, otherwise known as the SBA of the U.S. Federal Government, has been purposely and without warrant awarded billions of dollars of small business contracts (such as grants and loans) to large corporations like Hewlett-Packard and Titan Industries. Meanwhile, all across the United States, the federal government is cutting funds to actual small businesses, thus stifling the economic diversity of our communities. At a time when our current government favors big businesses, it is imperative that we uncover the misdirection of small business funding, by first examining the government's problem in funding small businesses. Next, we will highlight the causes of this economic inequity, before finally proposing solutions to help protect American small businesses.

## **AN IMPOSSIBLE PEACE**

By: Jamie Downing

Communication

Faculty Mentor: Megan Houge

Funded in large part by the Japanese Embassy and co-operated by Palestinians and Israelis, All for Peace Radio offers an unconventional approach to promoting peace throughout the Middle East. Although the station offers a wide variety of music focus remains on daily broadcasts in Hebrew, which examine life under the Palestinian Authority, while their Arabic counterparts give an Israeli point of view. In an interview on NPR's All Things Considered on September 25, 2004, Israeli co-director Shimon Malka explains the he hopes the station will offer alternatives to the mainstream media's endorsements of violence. In her 2002 paper Black Radio Politically Defined, Phyllis Johnson explains that radio provides a unique medium--offering many of the benefits of face to face communication while building a shared identity. This tactic, usually reserved for the submissive ideology, is used to blend the voices of both the dominant, Israeli voice, with that of the submissive, Palestinian voice. Because this action violates normal power expectations of communication between two groups, Kenneth Rufo argues in his 2003 paper Rhetoric and Power: Rethinking and Relinking, that it forces a redefinition of rhetorical status and merits further investigation. Thus, we must ask today's research question: How do attempts to blend dominant and submissive voices change the way we view the power structures within a discourse? To explore this question, we can turn to Michel Foucault's examination of strategies used to resist and disrupt dominant power structures. Because much of Foucault's work focuses on disruption of existing power structures, it provides a unique and holistic context for our analysis. In order to gain a better understanding of the communicative techniques used within All for Peace Radio, we must examine Foucault's ideas on resistance, apply these concepts to the station, and finally, draw three critical conclusions from this analysis.

## **GENDER CORRELATIONS BETWEEN EMOTION WORDS, AFFECT FUNCTIONING, DEPTH AND SMOOTHNESS OF THERAPY SESSIONS**

By: Katrina Drummond

Psychology

Faculty Mentor: Jeffrey Kahn

Past research has shown that females tend to use more emotion words than men in speech (Cervantes & Callanan, 1998.) For this current study the hypothesis is that women will use more emotion words than men in therapy sessions. The number of emotion words will also be positively correlated to the emotion functioning of the client. Emotion word use is also expected to be positively correlated to depth of each session, because when people use more emotion words, their speech tends to sound very personal and show depth of emotion. The correlation between emotion word use and the smoothness of the session will depend on whether the client uses predominantly positive or negative emotion words. If the client uses a lot of positive emotion words the session is hypothesized to go smoother, because when someone uses positive emotion words they tend to sound very relaxed and pleasant which would be seen as a smooth session. On the other side of this, negative emotion words would correspond to a rougher or tenser session. This study consists of 11 college age students, 3 males and 8 females, who were videotaped during three therapy sessions. The emotional functioning of the clients after each session was measured by a 100-point scale of observed emotional content (Hoglund et al., 2000). The depth and smoothness were measured by the Session Evaluation Questionnaire (Stiles, 2002). The number of emotion words used was found by using the Linguistic Inquiry and Word Count system, also known as the LIWC (Pennybaker, Francis, Booth, 2001). The LIWC is a computerized method of counting words in different categories. The category I will be focusing on is psychological processes, specifically affective or emotional processes. The sessions were each transcribed and then analyzed by the LIWC program. If the hypotheses are supported, the results of this study will indicate that there is a correlation between the number of emotion words used and the emotional functioning of the client. These will also be correlated with the depth and smoothness of each session and correlations will be examined separately by the gender of the client. These results may show that women tend to have more effective sessions than men and/or that men should use more emotion words to get more out of a session.

## **EFFECTS OF VERMICOMPOST STERILIZATION ON GROWTH OF *Tagetes patula* 'QUEEN SOPHIA'**

By: Andrea Eaton

Agriculture

Faculty Mentor: Gary Bachman

Vermicompost is a biologically active substance created when earthworms process and stabilize organic waste materials. Vermicompost can contribute positive physical and chemical characteristics and have been shown to enhance plant growth when added to potting substrate. However, many potting substrates are sterilized to eliminate any phytotoxic microorganisms that may be present. The objective of this experiment was to evaluate and compare the effects of sterilization on the plant growth promotion properties of vermicompost. Vermicompost, produced from the beef cattle manure obtained at the ISU Farm, was sterilized by heating in a controlled environment to a temperature of 160°C, heating above 160°C produces toxic substances from the potting substrate. The potting substrate ProMix GSX was used for all treatments and was amended as described: control (no vermicompost amendment), 20% vermicompost by volume, and 20% sterilized vermicompost by volume. *Tagetes patula* 'Queen Sophia' seeds were planted in each treatment substrate. Seeds were planted into 32-cell plug trays and each plug tray represented a single repetition. Each treatment was replicated 4 times. Seedling growth was evaluated after 32 days. Data collected included fresh and dry tissue weights, fresh leaf area measurements, and overall visual quality score. The sterilized vermicompost treatment produced reduced fresh and dry shoot weights that were 50% less than the vermicompost or control treatments. Of particular note were the root measurements of the vermicompost treatment. The fresh root weights were 63% and 51% greater and the dry root weights were 48% and 51% greater than the sterilized vermicompost and control treatments, respectively. The vermicompost treatments produced leaf areas were 29% and 49% greater than the sterilized vermicompost or control group, respectively. Also enhanced were germination rates of the seedlings grown in the vermicompost mixture. In addition, the unsterilized vermicompost mixture produced plants of sturdier dispositions and healthier overall appearance. The results of this experiment indicate that growth enhancements of plants grown in vermicompost amended potting substrate are due to microorganisms present in vermicompost.

## **PHOTOVOLTAIC FERROELECTRIC CERAMICS**

By: Ryan Ellison

Physics

Faculty Mentor: David Marx

The research that I am conducting deals with ferroelectric ceramics, which are also known as photovoltaic ceramic materials. The purpose of this research is to discover the abilities of ferroelectric ceramics as well as any possible applications it may have in the real world. Ferroelectric ceramics work by combining elements to make a compound that can be heat treated, polled, and then by having electromagnetic radiation applied to the ceramic, thus creating a measurable current across the photovoltaic ceramic. The compounds that are being used in this experiment are Lead Zirconate and Lead Lanthanum Titanate. Previous ceramics, found through research, that have been made with Lanthanum have shown a lot of promise. The furnace that is being used to sinter the ceramic is now capable of reaching the appropriate temperature of 1100° C. The ceramics will then have a conductive metal evaporated onto the outside layer and will then need to be polled by using a power supply that is capable to producing 50,000 volts. The electric field will be applied to the ceramic while being heated passed the Curie temperature. This will allow the entire ceramic to be polled in the same direction. After the ferroelectric ceramic is polled, tests will begin to determine if a current can be produced when a source of electromagnetic radiation (light) is applied directly to the ceramic. This new technology has a huge potential in that ferroelectric ceramics could soon be used as batteries. The photovoltaic ceramics would be used like batteries in the same fashion that solar panels work, only much more efficient. The process of enhancing the current produced across the ceramic will be a challenge, nonetheless, this potentially new source of energy could aid in the world's need for alternative energy resources.

### **LIVING THE DREAM-ADVANCED PRACTICE NURSING ROLES**

By: Marissa Emerson, Kathleen Yong, Cash Jaime

Nursing

Faculty Mentor: Wendie Medina

As senior undergraduate nursing students the world of clinical practice is soon at hand. Determining a clinical specialty is a necessary first step. Becoming a clinical expert as an advanced practice nurse (APN) is a future dream. Mentoring by a nursing professor who is living the dream and conducting a meta-analysis comprised an honors independent project. The meta-analysis examined the literature for educational requirements of APNs, particularly in Illinois, APN roles related to wound care for patients in long term care (LTC) facilities and the benefits of utilizing APNs. The meta-analysis revealed that APNs in LTC provide continuous, direct wound care with ongoing holistic assessments, as well as professional self-education and provision of continuing education for LTC staff. The outcomes of APN role implementation include ensuring evidence-based, consistent, and cost-effective wound care practices. The need for competent wound care in the LTC setting is increasing due to a variety of factors, which are exacerbated by notable deficiencies in education and inadequate practice among staff members. The advanced practice nurse (APN) can greatly benefit wound care in LTC settings when dreams become reality.

### **DYNAMICS OF THE CHAOTIC WATERWHEEL**

By: Amy Erxleben, Lam Nguyen, David Sweeney

Physics

Faculty Mentor: George Rutherford, Epaminondas Rosa

The chaotic waterwheel is a simple mechanical system that models the famous Lorenz equations, which are often considered the starting point of the modern study of chaos. In this system, a tilted wheel with leaky cups attached to its perimeter is fed with water at its highest point. As water fills the cups near the top of the wheel, gravity pulls the filled cups downward, thus rotating the wheel. If the filled cups do not empty before they rotate to the other side, they will act to slow the wheel's progress, perhaps even reversing the wheel's sense of rotation. If friction is introduced, the wheel's motion can become chaotic, with rotation reversals coming at unpredictable times. Although the chaotic nature of this system's dynamics has been known since the early 1970's, no systematic experimental investigation has ever been published. Our research group has recently constructed a waterwheel capable of such investigation, and we will present a brief description of the wheel's design as well as preliminary data and analysis. The discussion will include the numerical techniques necessary to transform the raw data into the dynamical variables required for analysis. Experimental behavior of the wheel will be compared to the predictions of computer simulations of an idealized wheel. In addition, we will discuss determination of the experimental parameters that control the wheel's behavior and the prospects for manipulating those parameters to exercise control of the wheel's dynamics. The prospects for synchronizing the wheel's motion to a small sinusoidal signal will be discussed.

### **SUPER-OXIDE AND SINGLET OXYGEN PRODUCTION BY A CARBAPORPHYRIN-KETAL**

By: Nicholas Esposito

Chemistry

Faculty Mentor: David Cedeno

The research performed studied the synthesis of super-oxide and singlet oxygen species by the illumination of a Carbaporphyrin-Ketal compound. Super-oxide detection was done by illuminating the Carbaporphyrin-Ketal in a Polyvinylpyrrolidone(PVP)/Water solution with a phosphate buffer, EDTA or NADH and nitroblue tetrazolium (NBT). Super-oxide production was measured by quantifying the amount of formazan (product of reaction between super-oxide and NBT) produced in comparison to a blank using UV-Vis spectroscopy. The protocol for super-oxide formation and detection was tested using Ofloxacin, which is a well-known generator of super-oxide. Singlet Oxygen production was tested by illuminating the Carbaporphyrin-Ketal in a PVP/Water solution in the presence of a phosphate buffer and TEMP (singlet oxygen trap), and measuring the amount of trapped oxygen using EPR spectroscopy in comparison to a blank and a Rose Bengal Standard.

### **JOHN RAINBOW**

By: Adam Farcus, Stephanie Lebak, Dan Mrva, Gavin Bunner

Art

Faculty Mentor: Michael Wille

John Rainbow has been producing works of art that are readily available to a large audience, both in the art world and the general public. This is achieved through rearranging mainstream culture and using cheap and recycled materials. The idea is to break away from institutional and traditional views of art and art making, therefore challenging what art can really be.

The process of creation is very intuitive and involves a particular system. Though John Rainbow is one name, he actually consists of four people. These include Richard Maple (a.k.a. Adam Farcus), Neil Vine (a.k.a. Gavin Bunner), Lane Woodbridge (a.k.a. Stephanie Lebak), and Mister Pine (a.k.a. Dan Mrva). The method of making work involves these members passing a piece of art in progress around until John Rainbow decides the piece is finished. It is stamped with a seal, date of approval and critiqued.

Through this process, the members of John Rainbow are allowed to experiment with concept through these narratives and compositions. It is a form of release through expression that may normally not be explored in each member's solo work. We currently have around 200 pieces completed, since October, 2005.

Our goal is to show the collaborative John Rainbow work along side of each member's solo work. In this situation contrasts and comparisons can be made on the nature of John Rainbow and how he relates to each person individually. What follows is the epic of John Rainbow:

John Rainbow's life began when he was conceived under a willow tree along the river Thames by his Bohemian parents. He was born under the same tree 9 months prior. Little Johnny was shot out from his mother's womb into a basket along the river. He traveled the seas until he finally landed in Manitoba. He was then adopted by a family of otters because they were in awe of his remarkable fishing skills he had gained from his months at sea. His otter parents made an income through selling crafts (and eventually artwork). The meaning of their artwork was on the surface, and therefore readily accessible to a large audience.

At the age of 18, post-modernist beavers assassinated John's parents while he sat in another room of their house listening to his ABBA tapes.

After a short mourning period, John decided to travel south from Canada to the United States. As he crossed the border he was struck in the head with a large rock and suddenly knew how to speak German. In order to exact revenge on his parent's death, he traveled by raft down the Mississippi River trapping beaver for their pelts, and selling them for big cash. Upon reaching Alabama there was an earthquake that caused the Mississippi to flow backwards and bring John to central Illinois. Upon his arrival, he was drawn and quartered by the ever-present post-modernist beavers. Luckily, in his travels he was exposed to a radioactive starfish, which allowed his body parts to safely regenerate into four new people.

#### **RADIOACTIVE ISOTOPES AT A UNIVERSITY: USE PATTERNS AND LOW-LEVEL RADIOACTIVE WASTE REDUCTION**

By: Christopher Fish

Environmental Health and Safety

Faculty Mentor: George Byrns

Radioactive isotope usage in research and medical procedures and the low-level radioactive waste (LLRW) generated by their use is a common issue faced by many institutions. The following study examined research uses of radiation at a university by means of interviews with staff and a review of data collected by the university's radiation safety program. The data demonstrated a trend in the reduction in purchasing of radioactive isotopes over a 14-year period. These findings are the result of many factors including improved imaging technologies, laboratory waste minimization procedures, alternative research methods and increasing costs of purchasing and disposal of radioisotopes.

#### **GENDER DIFFERENCES IN REPORTED DATING VIOLENCE: PERCEPTIONS AND EXPERIENCES**

By: Steffanie Flack, Leola Manley, Shirley McCauley, Special Morgan, Jenny Konrad

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this study was to examine gender differences in terms of dating violence. It was hypothesized that men and women would view what constituted dating violence differently and that significantly more women than men would have experienced dating violence in any form. For this study, 276 students at Illinois State University were surveyed about what types of behaviors would be considered dating violence, whether they knew anyone who had experienced any of these behaviors while on date, and whether they had experienced these behaviors. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypotheses. Results showed that men and women show some consensus on what constitutes dating violence, however some significant differences were noted. Women were significantly more likely to see being punched, pushed, and embarrassed or being called names as dating violence. About half of the men and 63% of the women knew of others who had been victims of dating violence. Of the total sample 22 men and 21 women had experienced some form of dating violence. Men reported being slapped and punched significantly more than women. Women reported being embarrassed or humiliated or performing sex unwillingly significantly more than men.

#### **LACK OF DESICCATION RESISTANCE IN AERIALY DEVELOPING KILLIFISH EMBRYOS**

By: Amy Flowers, Bridget Lahey, Sean McBride

Biological Sciences

Faculty Mentor: Robert Preston, George Kidder

Euryhaline killifish, *Fundulus heteroclitus*, spawn in estuaries on spring tides. The embryos develop in moist air or shallow water, hatching about two weeks later. We tested the hypothesis that aerially developing embryos are intrinsically resistant to desiccation. Fish were collected from N.E. Creek, Mt Desert Island, ME and held in seawater (SW, 30 ppt). Oocytes were manually expressed from females and fertilized in vitro. The embryos were held at 20 C in air in equilibrium with 10 ppt SW. Single stage 36 (13-14 days) embryos were placed on a weighing pan in a closed chamber in a microbalance in which relative humidity (RH) was set by equilibration of the air with saturated salt solutions. Embryo weight was measured over time at 5 RHs (0, 33, 62, 84, 100% RH). The effect of desiccation on survival was determined by placing 15 embryos in jars with set RHs. After 2 hours, 10 of the embryos were flooded to induce hatching, while 5 were used for analysis of the presence of stress protein mRNA (heat shock protein, Hsp 70). With the exception of those at 100% RH, all embryos showed rapid water loss in at least 2 phases. Embryos held in 75-100% RH had very high hatching rates, while those held at <75% RH hatched very rarely. Embryos in all RHs showed high expression of Hsp70 mRNA. These results do not support the hypothesis that the embryos are uniquely impermeable to water. Damage due to desiccation may be mitigated by Hsp expression. We speculate that in nature survival is likely dependent upon water or high RH in the microenvironment around the embryo. (NSF-CRUI 0111860)

#### **MANIPULATION OF SOCIAL STATUS USING CAFFEINE, EPHEDRINE AND CAFFEINE-EPHEDRINE COMBINATIONS: EFFECTS ON INDIVIDUAL AND GROUP MATCHING IN AN OPTIMAL FORAGING PARADIGM.**

By: Jenna Freytag, Katrina Lakin, Candace White

Psychology

Faculty Mentor: Valeri Farmer-Dougan

Ideal free distribution predicts that the ratio of time spent by a group at two food patches will equal the ratio of obtained food at the patches. Unlike the matching law, however, it makes no prediction regarding individual member behavior. Indeed, previous studies show that group behavior conforms to the matching law, but individual behavior does not necessarily. Rather, competitive status of individual members correlates with undermatching values for individuals. Our previous research has shown that disruption of competitive status alters not only individual but also group matching. In the present study we manipulated status of the best and worst matcher in three groups of 5 rats via exposure to caffeine, ephedrine or their combination. These agents are established DA agonists with behavioral activation effects. Baseline rates of matching and social status were obtained for each animal and the group using CONC FT FT schedules in a large foraging box. High and low matching rats were identified. The high or low status rat was then exposed to caffeine, ephedrine or caffeine-ephedrine combinations. Changes in sensitivity to reward occurred during drug exposure across both the group and individuals, as expected.

## **DO COUNSELOR REFLECTIONS AND INTERPRETATIONS AFFECT THE CORRELATION BETWEEN CLIENT DISCLOSURE AND SESSION SMOOTHNESS AND DEPTH IN THERAPY SESSIONS?**

By: Daniel Gadke, Lisa Neavear

Psychology

Faculty Mentor: Jeffrey Kahn

During counseling it is important that the counselor is able to recognize what facilitates a smooth and deep session. If possible then the counselor can guide the sessions in a more appropriate and helpful direction. Past research has not addressed whether or not client self-disclosure contributed to greater smoothness and depth. It has been noted that counselor reflections and interpretations regarding the clients' experiences led to deeper sessions. Our hypotheses was it is possible that sessions in which clients frequently self-disclose and counselors provide reflections and interpretations could lead to greater depth and smoothness? Four undergraduates voluntarily participated in clients in brief psychotherapy sessions. Four first year doctoral students were the counselors. Each session was then transcribed, unitized, and coded. The sessions were also rated on smoothness and depth by a pair of raters who were blind to the intent codings. After all the data were collected we grouped them into high and low counselor reflections and interpretations. This grouping was done to see if a greater number of interpretations and reflections led to greater smoothness and depth. Weak correlations were found between client disclosure and session depth in both groups. Strong positive correlations were found between client-disclosure and session smoothness in both groups. Moderate positive correlations were found between sessions depth and session smoothness for both groups. Our results demonstrated that sessions that tend to be rated as smooth by the observer also tend to be rated as deep. Both the high R and I group and the low R and I group showed almost no correlation between percent of client disclosures and observer rating of depth. However, both groups showed a surprisingly high positive correlation between percent of client disclosures and observer smoothness. Even though these latter correlations were not statistically significant, we were able to replicate this high correlation between the two groups. Overall our hypothesis was only partially supported by the data. Sessions in which clients frequently self-disclose and counselors provide reflections and interpretations were associated with greater smoothness but not greater depth.

## **THE WEB OF LAW**

By: Marissa Gaines

Communication

Faculty Mentor: Megan Houge

In the 1970s, legal philosopher Ronald Dworkin created an imaginary judge named Hercules who had knowledge of every legal case ever decided. Hercules viewed the American legal network as a web of past precedents he could use to rule infallible decisions on all future cases. But since imaginary friends are not typically looked upon favorably beyond second grade, and because no judge has supernatural reasoning abilities like Hercules', Dworkin's friend is still only a figment of his imagination...until now. Lawyers at the University of Texas at Houston have invented the Web of Law, using computer technology to study the way our legal system operates and evolves. Like our friend Hercules, the Web of Law would have the ability to predict the outcome of any given case by studying past cases similar in nature. According to the Economist of August 25, 2005, by representing our legal system as a visually-represented interconnected web, this invention could fundamentally change the way our legal system works by giving lawyers, judges, defendants, and scholars a greater understanding of the law's complexity and fallibility. These computer models promise to not only deepen our knowledge of the legal system, but increase its speed, its efficiency, and, most importantly, its fairness. To fully understand more about this remarkable system, we will first look at the ideas surrounding the web of law, next understand how this can be used, before finally we will explore the implications of this wonderous web.

## **CANNIBALISM IN THE SOUTHWEST UNITED STATES: THE ARCHAEOLOGICAL EVIDENCE AND THE NATIVE AMERICAN RESPONSE**

By: Vincent Gallacci

Accounting

Faculty Mentor: James Skibo

"Cannibal" and "Cannibalism" are highly charged terms that have a social stigma associated with them. The first written account of cannibalism comes to us from Herodotus, who wrote of a distant primitive people that participated in the atrocious act of consuming the flesh of his fellow man. These people were presented as amoral, uncivilized, and evil, which is the common way that cannibals are portrayed around the world. The practice of cannibalism, however, was quite common worldwide in traditional societies and is often associated with ritualistic activities associated with warfare or ancestor worship. One of the strongest cases for prehistoric cannibalism has been made for the prehistoric people of the Southwest. The documentation of cannibalism by archaeologists, however, has been controversial both among the archaeological and Native American community. This paper presents the archaeological arguments for a claim of cannibalistic activity in the North American Southwest and the Native American reaction to those claims.

### **A COMPARISON OF BODY COMPOSITION MEASUREMENTS IN KINDERGARTEN AND FIRST GRADE STUDENTS**

By: Lindsay Gallovitch, Tracy Gallovitch

Kinesiology and Recreation

Faculty Mentor: David Thomas

Obesity and overweight are demonstrating an increased prevalence among younger populations. The assessment of overweight and obesity among children is of crucial importance in establishing incidence rates. Little research has been conducted on the assessment of body composition among children. **PURPOSE:** To investigate the relationship between body composition measurements determined by skinfold assessment (SF) and use of the Air Displacement Plethysmography (ADP). **METHODS:** Thirty-seven (20 boys, 17 girls) kindergarten and first grade students (5-8 yrs. old) participated in the study. The participants came from Metcalf Laboratory School, children of ISU employees, and from the local community. Informed consent was obtained from the parents of each subject and assent was obtained from the children. Body composition measurements were taken by using SF and ADP assessments. Harpendon calipers were used to take the SF measurements at the medial calf and triceps. ADP measurements were obtained using the BOD POD. The Bod Pod uses a pressure-volume relationship between the two chambers to estimate body volume. The volume of the subject is determined by measuring pressure changes produced by a computer controlled pump. **RESULTS:** A Pearson Product-Moment correlation was conducted to determine the relationship between the sum of SF and body density as determined by ADP. A significant negative correlation was found,  $r = -0.75$ ;  $p < 0.01$ , demonstrating a strong inverse relationship exists between the variables. **CONCLUSION:** Based on the results of this study, it appears that there is a significant negative correlation between the sum of the triceps and medial calf skinfolds and body density as determined by the ADP in kindergarten and first grade students. Since these two variables are significantly related, if you wanted to measure body composition and did not have much time or a Bod Pod, measuring skinfolds may be an alternative technique that can be used.

### **PHOTOPHYSICAL PROPERTIES OF NOVEL PORPHYRIN DERIVATIVES: ACENAPHTHOPORPHYRINS**

By: Dan Gardner

Chemistry

Faculty Mentor: David Cedeno

Porphyrin molecules have shown great potential in recent years for use in photodynamic therapy. Preliminary studies on the acenaphthoporphyrin family showed particularly interesting absorbance spectra and singlet oxygen production that could make them valuable photosensitizers for such uses. Experimental data on the excited states of mono, di, and tetra-acenaphthoporphyrins was collected to determine and compare the porphyrins' quantum yields of triplet states and singlet oxygen. Luminescence experiments showed low fluorescence yields for the porphyrins while photoacoustic calorimetry experiments gave varying results on the porphyrins' ability to relax by interconversion. Triplet states and singlet oxygen development were detected by NIR emissions above 800nm using a liquid nitrogen-cooled germanium detector. The quantum yield of singlet oxygen was measured by exciting with a nitrogen dye laser and detecting the NIR emissions, performing sound analysis on the photoacoustic calorimetric signals, and again by detecting NIR emissions using an argon ion laser. The three methods gave significantly different values, which suggests that there may be another mechanism to be studied or that another experimental factor needs to be taken into account. Further comparison of the acenaphthoporphyrins with similar porphyrins with varying side chains and other porphyrin families in future research can help us learn more about the acenaphtho- group's effects on the porphyrin chromophore.

### **RECONSTRUCT EMBEDDED IMAGES USING TRANSMITTED LIGHT\***

By: Tim Garvin

Physics

Faculty Mentor: Charles Su

We show that in the regime where the traditional diffusion theory breaks down for a highly modulated source, with modulation frequencies ( $\gg$  GHz) only the ballistic and quasi-ballistic photons survive. This regime becomes accessible for imaging applications. We develop an iterative quasi-analytical scheme to compute the radiance transmitted from a thin plane parallel layer of turbid media illuminated by high frequency intensity modulated light. We compare the spatial distribution of the transmitted signal obtained from iterative calculations with that obtained from numerical random walk simulation.

\* Supported by grants of the NSF, Research Corporation.

[1]G.H. Rutherford, M. Marsalli, Q. Su and R. Grobe, Phys. Rev. E 68, 066618 (2003).

[2]K.N. McGill, Q. Su and R. Grobe, Las. Phys. (in press).

### **SYNTHESIS OF SEVERAL DIVALENT YTTERBIUM COMPLEXES**

By: Kristin Geary, Samantha Robinson

Chemistry

Faculty Mentor: Gregory Ferrence

In inorganic chemistry, a molecule or ion that binds to a metal cation to form a complex is known as a ligand. Study of the interactions between and chemical reactivity of new ligand and metal combinations is a critical aspect of modern chemistry. Our research group has been studying the chemistry of complexes containing the element ytterbium in the divalent (+2) oxidation state, and the ligand named hydridotris(3-tert-butyl-5-methyl-pyrazolyl)borate, abbreviated  $\text{Tp}^{\text{tBu,Me}}^-$ . Ytterbium is one of the lanthanide elements, found in the bottom section of the periodic table. Most lanthanides prefer to reside in the trivalent (+3) oxidation state. What makes our chemistry fascinating is the ability to work with ytterbium in the much less common divalent oxidation state, something facilitated by use of the  $\text{Tp}^{\text{tBu,Me}}^-$  ligand. To prepare this ligand, pinacolone and ethyl acetate are combined under basic conditions to form 5,5-dimethylhexan-2,4-dione. Condensation of this  $\beta$ -diketone with hydrazine yields 3-tert-butyl-5-methylpyrazole,  $\text{HPz}^{\text{tBu,Me}}$ . Subsequent reaction between a melt of  $\text{HPz}^{\text{tBu,Me}}$  and potassiumborohydride,  $\text{KBH}_4$ , yields the potassium salt of the desired ligand,  $\text{KTp}^{\text{tBu,Me}}$ . To prepare the ytterbium, Yb, for ligand attachment, solid Yb metal is oxidized using diiodoethane in the common organic solvent known as tetrahydrofuran, thf. This reaction forms the divalent ytterbium compound  $\text{YbI}_2(\text{thf})_2$ .

where the n indicates that some of the thf solvent is attached to the metal. A double displacement metathesis reaction takes place upon addition of  $\text{K}(\text{Tp}^*(\text{tBu},\text{Me}))\text{Yb}(\text{thf})$  in thf to form the target complex  $(\text{Tp}^*(\text{tBu},\text{Me}))\text{Yb}(\text{thf})$ . This target will ultimately be used to prepare subsequent complexes critical to studies of the interactions between and chemical reactivity of the  $\text{Tp}^*(\text{tBu},\text{Me})^-$  ligand and divalent ytterbium metal combination. We will present descriptions of the details regarding  $\text{HPz}^*(\text{tBu},\text{Me})$ ,  $\text{K}(\text{Tp}^*(\text{tBu},\text{Me}))$ , and  $(\text{Tp}^*(\text{tBu},\text{Me}))\text{Yb}(\text{thf})$  preparation as well as Nuclear Magnetic Resonance (NMR) studies that confirm the product identities.

### **A QUALITATIVE ANALYSIS OF PARENT KNOWLEDGE OF PRETEND PLAY: A COMPARISON OF FOSTER CARE AND NON-FOSTER CARE FAMILIES**

By: Sarah Gerson

Psychology

Faculty Mentor: Patricia Jarvis

Pretend play is a form of play through which children can operate between the worlds of reality and pretend through mental representations of objects. Benefits to those who engage in pretend play have been noted in cognitive, language, and motor abilities, as well as social and emotional functioning. A combination of pretend play literature and pretend play techniques were used to broaden the knowledge of foster care and non-foster care parents and encourage them to increase this type of play with their children. Their improvement in knowledge of pretend play is measured through a pre- and post-training questionnaire. Children whose parents participated in the pretend play workshop were expected to demonstrate greater knowledge about the importance of such play in comparison to the children whose parents participated in the control workshop that did not involve pretend play. Such knowledge was also expected to be related to improved socio-emotional scores for children on posttest across the two groups, but that analysis is beyond the scope of what is reported herein. Results from this study are currently being analyzed using qualitative analysis of the questionnaires.

### **DEVELOPMENTAL DIFFERENCES IN CALIBRATION OF DOMAIN-SPECIFIC TEXTS**

By: Sarah Gerson

Psychology

Faculty Mentor: Corinne Zimmerman

Comprehension monitoring is an important metacognitive skill that is necessary for students to become proficient readers and learners. Calibration is one measure of comprehension monitoring and is calculated by comparing actual comprehension (i.e., score on a test) to perceived comprehension. Domain of text was investigated as one source of calibration variability. In two experiments, we provide evidence that the domain of text can influence calibration performance, and this effect varies with the age and educational level of the individual. Younger students (junior high and high school) were relatively well calibrated, but college students demonstrated both underconfidence (e.g., in physics) and overconfidence (e.g., in psychology). That is, although an "illusion of knowing" has previously reported in the literature, in some domains students showed an "illusion of not knowing."

### **AGRICULTURAL LAND USE COMPARED TO AGRICULTURAL PRODUCTION IN THE UNITED STATES**

By: Grant Gilliland

Geography-Geology

Faculty Mentor: Jill Freund Thomas

In the past century land use in the United States has drastically changed, with one of the most affected areas being agricultural land. America is one of the breadbaskets of the world, but it has been losing much of the land that it considers so precious. Over one million acres of agricultural land is being lost per year in the continental United States ([www.farmlandinfo.org](http://www.farmlandinfo.org)). The main reason for this loss is urban sprawl from around cities. The concern that so many agricultural acres are being lost to development is legitimate, however the worry that we will run out of farmland to help feed the world is not as critical as some assume. The reality is that even though we are losing land, nearly every state's gross agricultural production has increased from year to year. ([www.nass.usda.gov](http://www.nass.usda.gov)) Why is this? One reason is that agricultural practices have continued to improve over the years, through processes such as hedging and ditching for erosion eradication and the more effective use of pesticides and insecticides. The main reason agricultural production is on the rise is because bioengineering has become nearly essential to a high yield product. It appears that the continued loss of agricultural land has had little effect on the production of crops. This poster will show through graphic illustrations that even though we are losing agricultural land, crop production across America is on the rise.

### **THE INTERACTION OF SULFUR DIOXIDE WITH O- AND N-CONTAINING COMPOUNDS**

By: Piotr Gorczynski

Chemistry

Faculty Mentor: Jean Standard

Density functional theory (DFT) methods have been applied to the study of the interactions between  $\text{SO}_2$  and oxygen- and nitrogen-containing compounds in the gas and liquid phases. The complexes studied were  $\text{SO}_2\text{-NH}_3$ ,  $\text{SO}_2\text{-NH}_2\text{CH}_3$ ,  $\text{SO}_2\text{-NH}(\text{CH}_3)_2$ ,  $\text{SO}_2\text{-N}(\text{CH}_3)_3$ ,  $\text{SO}_2\text{-H}_2\text{O}$ ,  $\text{SO}_2\text{-CH}_3\text{OH}$ , and  $\text{SO}_2\text{-O}(\text{CH}_3)_2$ . The level of theory used was B3LYP and the basis sets were 6-31+G\* and 6-311++G\*\*. The gas phase and liquid phase complexes show significant differences in terms of geometry, energies, and other properties. Some examples of this are demonstrated in the dipole moment, for which the solution phase dipole moment was significantly larger than the gas phase dipole moment; on average the dipole moment difference ranged from 1.31 Debye for O-containing compounds to 3.50 Debye for N-containing compounds. Other trends were also observed for the S-N and S-O bond lengths. The S-N and S-O bond lengths for the solution phase were much shorter than the gas phase distances; on average the distances differed by 0.17 Å for S-O bond lengths and 0.33 Å for S-N bond lengths. The binding energies of these compounds also exhibited trends; on average the gas vs. solution phase binding energy difference ranged from 1.44 kcal/mol for O-containing compounds to 4.81 kcal/mol for N-containing compounds.

## **MORAL DISTRESS IN THE LONG-TERM CARE SETTING**

By: Amy Green

Nursing

Faculty Mentor: Brenda Jeffers

Moral distress has the potential to affect every practice setting in nursing; however little research has been conducted that examines the presence and impact of moral distress for nurses working in long-term care. This article reports the results of a pilot study that examined the experience and presence of moral distress of registered nurses in a long-term care setting. A convenience pilot sample of 6 nurses participated in audio-taped open-ended interviews. Interview questions were formulated using Corley's theory of moral distress as the theoretical framework. Findings indicated that nurses' experiences of moral distress were precipitated most often by disagreements with family regarding treatment decisions for residents that impacted quality of life and lack of resources to meet residents' assessed needs. Moral distress had both a positive and negative impact on nurses, with nurses reporting that the presence of moral distress had little impact on the quality of care received by residents.

## **REVISITING THE MILGRAM PARADIGM - BEHAVIORAL ATTRIBUTIONS FOR GROUPS AND INDIVIDUALS**

Heather Handwerker

Psychology

Faculty Mentor: Glenn Reeder

Previous research on the Milgram paradigm contends that observers make strong dispositional inferences about teachers who obeyed an authority's order to deliver painful shocks to a learner (Bierbauer, 1979; Safer, 1980). Ross (2001) argued that observers fail to account for the situational forces influencing the teachers' behavior and fall prey to the Fundamental Attribution Error. Our preliminary research on the Milgram paradigm showed that participants refrained from making harsh dispositional attributions about the teacher, and that inferences of perceived motives influenced trait attributions. The current research examines the possibility that attributions can be influenced by lingual artifacts, and examines differences in attribution between group and individual behavior. Participants read a transcribed description of the Milgram (1963) experiments and were asked to make judgements about the teacher's behavior. We expect that participants will rate the group as having more negative, dispositional motives than individuals. Results are forthcoming.

## **ANALYSIS OF CONSTRAINTS TO PARTICIPATION IN OUTDOOR RECREATION PROGRAMS FACED BY UNIVERSITY STUDENTS**

By: Erin Harvill, Mike Wold

Kinesiology and Recreation

Faculty Mentor: Amy Hurd

Campus recreation services strive to meet the needs of students on most college campuses. Heavy demands on student time, program costs, and lack of interest are just a few of the obstacles these service providers must deal with. A survey was administered to 150 students on a Midwestern university campus to determine how campus recreation services could meet the needs of the students through outdoor programming. The criteria that were the primary focus of this survey included: student participation and interest in outdoor recreation programs, familiarity with outdoor programs, and influential factors that inhibit student participation. The Hierarchical Model of Leisure Constraints (Crawford, Jackson, & Godbey, 1991) was used to examine the intrapersonal, interpersonal, and structural constraints that keep students from participating in outdoor recreation programs. Intrapersonal constraints are those "individual psychological states and attributes which interact with leisure preferences rather than intervening between preferences and participation" (Crawford, Jackson, & Godbey, 1991, p. 311). These constraints exist when individuals do not develop leisure preferences for an activity because of such things as abilities, personality needs, and attitudes of friends and family to an activity. Interpersonal constraints result from social interaction with friends, family, and others. These constraints may impact both an individual's leisure preferences and leisure participation and includes such things as friends not liking outdoor recreation. Lastly, structural constraints are things that intervene between leisure preference and participation including such things as fear of injury and lack of transportation and/or time. The respondents indicated on a 4 point Likert scale that they were most interested in white water rafting ( $x=3.70$ ), international trips ( $x=3.68$ ), and camping ( $x=3.64$ ). In looking at constraints, it was determined that there were no differences in intrapersonal, interpersonal, or structural constraints based on gender, year in school, or residence (on-campus/off-campus) other than juniors were more interested in outdoor activities than seniors ( $p=.027$ ) and freshmen were more likely to see lack of transportation ( $p=.045$ ) as a constraint than seniors. In examining the means on a 5 point Likert scale, the constraints that were experienced most by students were lack of time because of work ( $x=4.15$ ), cost of activities ( $x=3.54$ ), and knowledge of trips ( $x=3.53$ ).

## **OPTIMAL MUTATION RATES FOR DIGITAL EVOLUTION: EXPLORING AVIDA**

By: Nora Hayes, Joshua Hallam, Ryan LaCosse, Sarah Wagner

Mathematics

Faculty Mentor: Fusun Akman

We are exploring Avida, revolutionary software created to study the biology of self-replicating and evolving digital organisms which are nothing but simple computer programs. Since evolution of real-life organisms is impossible to observe accurately, studying digital organisms allows us to record many generations in a short period of time. These organisms compete for "energy" (food) which enables them to copy their genetic code and reproduce asexually. Experiments have shown that Avida not only models but also explains the mechanisms behind the key ingredients of evolution, such as adaptation, in nature.

In this project we make adjustments to the mutation rate, the environmental settings, and the initial population, and run the program for several generations. A mutation rate in Avida is the probability that a digital organism will have some of its code or instructions changed. A mutation can occur as a copying error or through point mutation, which is the replacement of an instruction with another instruction. Environmental settings are tasks that need to be performed (such as addition of binary strings); the organisms that adapt best to the environment through mutated genes (programs) are rewarded with more energy to replicate themselves. The initial population is the set of primitive organisms that are present when the world begins.

The adaptation of one organism or a whole population is measured by a function called the "Fitness Level." The fitness level is inversely proportional to the gestation period. Our objective is to find the optimal mutation rates to maximize the fitness levels. We will create a new digital world that is 60 by 60 cells and contains four different types of organisms. These organisms will contain a

code with “nop” commands (similar to “junk DNA”): they will not be able to reproduce at first. The organisms will gain the ability to replicate through random point mutations. We will start the world with a certain point mutation rate. After 100,000 generations we will extract the dominant genotype and put it in an environment where the point mutation is 0. After 25,000 generations in this new environment, we will look at the average fitness level for the population. We will repeat the experiment 50 times, each with different point mutation rates, and compare fitness levels to see which point mutation rates maximize the fitness level.

### **SUSPENDED ANIMATION WELCOMES ZOMBIE DOGS**

By: Ryan Henneberry

Communication

Faculty Mentor: Megan Houge, Michael Graupmann

The Safar Center for Resuscitation Research, at the University of Pittsburgh, has found a new way of resuscitating trauma patients facing potentially fatal injuries. Suspended animation, the new technique used by the scientists at the Safar Center, has involved testing thus far in which dogs are sedated, put into hypothermia, while their blood is replaced with saline solution, and finally, the dogs are brought back to life with a small electric shock while the blood is flushed through the circulatory system. This technique can be applied in both military and medical applications, and the scientists hope to see these applications within the next year. Now, although suspended animation could save the lives of nearly 1,200,000 people yearly, it has its share of challenges – which doctors are confident in overcoming. Suspended animation could change our lives within the next year.

### **THE RELATIONSHIP BETWEEN SELF-ESTEEM AND WORKING OUT AMONG COLLEGE STUDENTS**

By: Ann Hennig, Samantha McCoy, Jeanne Arbuckle

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this study was to examine the relationship between working out and overall self-esteem. It was hypothesized that college students that engaged in regular exercise would have a significantly higher self-esteem than those who do not exercise regularly. For this study, 276 students at Illinois State University were surveyed about their exercise habits. Questions regarding the frequency and intensity of workouts were included. In addition, a 7-item measure of self-esteem was administered to the students and the items were combined to create an overall self-esteem score. Data were analyzed using SPSS. Independent t-tests and Pearson Correlation were used to test the hypothesis. Results showed no significant difference in self-esteem between students who exercised regularly and those that did not exercise regularly. However, of those that exercised regularly, the longer the workout time, the higher the self-esteem score. Also, the greater intensity of workout reported by the respondents, the higher their self-esteem scores. Results of this study point to the need for further research on the effects of exercise habits on overall health and well-being.

### **IT'S JUST A PLANT**

By: Erin Henry

Communication

Faculty Mentor: Michael Graupmann

According to the February 28, 2005 edition of the Village Voice author Ricardo Cortes, a former high school D.A.R.E. officer created the book with the intention for 6-12 year olds to have a dose of “reality- based education” by still encouraging children to say no to the drug, but stopping short of condemning responsible adult use. Because of the unique “reality based” educational approach that Cortes takes in communicating with children, and the employment of colorful images and seemingly credible characters, the self-published book has just recently sold out of the first pressing, and is currently in the process of re-releasing, making Cortes’ techniques are worthy of analysis and begging the question: How does “It’s Just a Plant” employ pedagogical techniques in an effort to shape children’s views on controversial issues? To answer this question, we will look to Derrin Pinto’s “Indoctrinating the youth of post war Spain: A discourse analysis of a Fascist Civics” published in the 2004 Edition of Discourse and society. This model describes how Authoritative Discourse may be employed in order to indoctrinate children into a specific belief system through the use of textbooks, making this model especially appropriate for this analysis. In order to better understand the communicative techniques employed by “It’s Just a Plant,” we must first gain a better understanding of this model; next, apply it to Ricardo Cortes’s techniques; and finally, conclude with some vital implications.

### **TERM PAPER: GERMANY**

By: Molly Hesterman

Management and Quantitative  
Methods

Faculty Mentor: Iris Varner

For the final term paper in my MQM 349 Business in a Multicultural Environment class, I chose to research factual, historical, and cultural aspects of Germany in relation to International Business. I had studied in Germany for eight months that previous semester and therefore chose to continue learning about the country through this assignment.

The purpose of this assignment was to learn the different cultural aspects of a society and to relate them to International Business. Understanding cultural differences between countries is crucial to successfully doing business internationally, because all aspects of a society’s heritage, history, and traditions are reflected in its business structure. The models of cultural differences that I based my research off of were Edward T. Hall’s “The Silent Language” and Geert Hofstede’s Cultural Dimensions.

The focus of my paper was based on research of the following questions: How important is context in communication? How important is hierarchy and who makes decisions? What is the relationship between the individual and the group? What is their attitude towards change? What is the time orientation and how important is time? Each of these questions addresses a different aspect of cultural differences in society. All of my research was done from an American self-reference criterion as a basis of comparison. My research concluded that Germany has a low context culture, meaning that what is meant is directly said, and rules and regulations are customary. This compliments Germany’s negative attitude toward change and its avoidance of ambiguity, what is known as its high uncertainty avoidance. In addition, Germany is considered to have a low power distance, which according to Hofstede, means that organizations follow an egalitarian system. Furthermore, despite common belief that Germany is extremely individualistic, I found

their culture to contain a mixture of individualism and collectivism, allowing for personal uniqueness to positively benefit the group. Finally, my research proved that Germany has a strong time orientation, meaning that schedules are prominent and sights are set to the future.

Understanding each of these characteristics supplies the learner with a basic knowledge of a foreign country and effectively prepares him or her for business in that country. Therefore, when an American does business with a German, he or she should be prepared to receive detailed, written contracts, to be organized and on time, and to be accepted as an equal.

### **WILL ANY ORGAN DO?**

By: Michelle Hill

Accounting

Faculty Mentor: Megan Houge

In the summer of 2005, four patients at a hospital in Dallas, Texas died after contracting rabies. When looking for the common connection between these deaths, researchers and physicians were led back to a man named William Beed. Mr. Beed had been admitted into the hospital days earlier after a fatal crack-cocaine overdose. After he died, his organs were harvested and given to unsuspecting individuals. They didn't know that they were receiving compromised organs. They simply thought they were saving their lives. However, this leads us towards a growing crisis in the organ donation arena. Because of the intense shortage of organs available for donation, individuals have started seeking their own means of getting organs. Billboards and internet sites are popping up, and people are compromising their health by agreeing to take mediocre organs. While (at first glance) these organs seem to have the potential to save lives, the acceptance of mediocre organs will cause disastrous problems in the future. This research analyzes the "mediocre organ list" and draws critical conclusions about the negative repercussions of the proposed list.

### **TECHNOLOGIES THAT MAKE A DIFFERENCE: VIDEO INTERVIEWS OF DEAF STUDENTS**

By: Heather Hollowell, Jamie Pemberton, Katie Simon, Heather Lievens

Special Education

Faculty Mentor: Maribeth Lartz, Julia Stoner

Teachers are constantly searching for technology that allows deaf students full access in general education classrooms. During this presentation, audience participants will view videotaped interviews of deaf/hard of hearing college students discussing the role that technology has played in their assimilation into classrooms at the university level. Interviewees include students with a variety of communication modes (ASL to spoken English) and hearing loss levels discussing their preferences for specific technology use, suggestions for conducting group discussions, role of interpreters with technology, and how to best incorporate technology into interpersonal communication. A question and answer session will follow the presentation.

### **NON-RADIOACTIVE ASSAY FOR NATURAL KILLER CELL ACTIVITY**

By: Kris Homb

Biological Sciences

Faculty Mentor: Laura Vogel, George Stanton, Jeff Kramer, Ricardo Vallejo

The immune system has two branches to protect an individual from diseases. The innate immune system consists of phagocytic cells and physical barriers which act quickly in response to pathogens. The adaptive immune system consists of lymphocytes, which act much more slowly and provide protection for future responses. While the innate immune system cannot distinguish between different pathogens, the adaptive immune system has very precise recognition, for example it can tell the difference between different strains of influenza. Recent studies have focused on the important function of a population of white blood cells known as Natural Killer (NK) cells. These cells are important due to their ability to lyse and kill foreign cells quickly and are thought to be a link between innate and adaptive immunity. Thus, being able to measure their function in different experimental conditions would provide important information about the overall immune response of an individual. NK cells attack the membrane of foreign cells, such as cancer cells or virally infected cells, and release perforins, cytolytic chemicals, into the cell. The perforins seek out the nucleus and degrade it, thus killing the cell. The traditional method used to measure NK cell activity involves radioactivity to measure target cell lysis. Due to the danger of radioactivity a new non-radioactive method to measure NK function has been developed. My work focuses on optimizing this non radioactive method for future immunological experiments involving NK cells. An efficient, non-radioactive protocol for measuring NK cell activity will have widespread applications in the growing field of immunology.

### **DISPARITY IN SENTENCING**

By: Brandy Horan

Finance, Insurance and Law

Faculty Mentor: Katrin Varner

Disparity in sentencing occurs when two seemingly similar offenders commit similar crimes, yet they receive drastically different sentences. The purpose of this study was to determine if sentencing disparity is present in the United States criminal justice system. The paper looks at the United States governments sentencing objectives and introduces common types of sentences that an offender should receive. The analysis starts with a look at the main types of disparity; disparity in mandatory sentencing, racial disparity, gender disparity, disparity in drug cases, and disparity in death penalty cases. There are several real world case examples that help to illustrate the concept of disparity in our criminal justice system. The research concludes with a look at what the causes of disparity could be and points out guidelines that help to reduce disparity.

### **THE PERCEPTIONS OF EDUCATORS VERSUS NON-EDUCATORS ON INCLUSION IN THE CLASSROOM**

By: Nichole Hudson, Julie Kuefner, Rachel Wolff

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this research is to compare the opinions of educators and non-educators with regards to inclusion education. It was hypothesized that education majors would have significantly different opinions of inclusion education than non-education majors. Inclusion education is defined as the provision of appropriate instruction for students with disabilities in general education classrooms. An inclusive school is a place where everyone belongs, is accepted, offers support and is supported by his or her peers with regular education classes so that students with disabilities do not feel as left out as they would otherwise. Students with disabilities placed in a regular school setting have more of an opportunity to engage with students that do not have disabilities. Inclusive education also requires general educators to assume more responsibility for the design and implementation of student's educational programs and to teach students with disabilities and those without, at the same time. For this study, 276 students at Illinois State University were surveyed about their opinions on inclusion in elementary and secondary schools. Education majors were compared with non-education majors to see if there significant differences in their responses. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypotheses. Results showed that education majors were much more favorable of inclusion in the schools than non-education majors. Education majors were significantly more likely to favor inclusion in the public school and significantly more comfortable about putting their own child in an inclusion classroom than non-education majors. In addition, education majors were more likely to believe that inclusion classrooms were more beneficial to students with disabilities and to students without disabilities than non-education majors. However, non-education majors were more likely to feel comfortable putting their own child in an inclusion classroom at the preschool or kindergarten stage, whereas education majors were more likely to prefer having their own children in inclusion classrooms later, like at the primary or elementary level.

### **PLACE OF RESIDENCE AND ITS RELATIONSHIP TO DIETARY PRACTICES**

By: Lisa Hunter, Ashley Alewelt, Samantha Strimpel

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this research was to compare the eating habits of college students living on and off-campus. It was hypothesized that students living off-campus would eat more nutritiously than those residing in dormitories. For this study, 276 students at Illinois State University were surveyed about place of residence and their overall eating habits. Those students living in houses and apartments off-campus, in Greek houses, or with parents were considered off-campus residents. Those students that identified dorms as their place of residence were considered on-campus residents. Questions related to eating habits included self-reported servings of healthy food like fruits, vegetables, lean meats and meat substitutes. Also included were self-reported servings of snack food like chips, cookies, and ice cream. Fast food choices were recorded. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypothesis. Results showed that was very little difference in the eating habits of on-campus and off-campus residents. The only significant difference was that on-campus residents were significantly more likely to eat fresh fruit for breakfast than off-campus residents. Also off-campus residents were significantly more likely to patronize McDonald's and Quizno's fast food restaurants, whereas on-campus residents were significantly more likely to choose Subway for a fast food alternative. Although there were not very many differences between the eating habits of on-campus and off-campus college students, it appears that almost all the students in the sample eat poorly, consuming too many snacks and high-fat main courses and few healthy alternatives. Results of this study point to the need for nutrition education for all students attending college.

### **VICTORIAN WOMEN AND HENRY JAMES'S THE TURN OF THE SCREW**

By: Matthew Husky

History

Faculty Mentor: Richard Soderlund

My project for this mentorship is my thesis for the History Honors Program. Over the past few months I have looked into a short novel by Henry James entitled *The Turn of the Screw*, a work about which many literary critics have debated. My contention is that the work is best understood as a product of the historical period in which it was written. In particular the work reflects nineteenth century English perceptions of women and their proper place in society. Meanwhile, based on an understanding of James' other works, one can uncover the author's views about the aforementioned place of women in Victorian Britain. What emerges is a nuanced portrait of how these women confronted and dealt with societal limitations. Henry James, unique among male writers of his time, sympathized with women and their problems, yet still maintained his belief in social conventions.

### **ATTITUDINAL AND BEHAVIORAL DIFFERENCES IN DATING VIOLENCE DURING ADOLESCENCE:**

By: Janette Jesse

Psychology

Faculty Mentor: Marla Reese-Weber

The current study investigates physically violent behaviors and attitudes toward dating violence among high school students. Analysis will include responses from high school students in Bloomington, Illinois. Participants viewed a pre-recorded violent video clip, and researchers coded their responses. Participants also completed surveys on dating violent behaviors. The present study will consider three hypotheses. First, adolescents who have been in a relationship for less than one month or longer than 10 months will report less violence than those in a relationship between one month and 10 months. Next, high school students who have more dating experience will report more dating violence than those with less dating experience. Finally, adolescents who have had more dating experience will have more accepting attitudes towards violence than those who have had fewer dating partners. A general discussion of the results and future implications will be included.

## **OSTRACISM AND OBESITY: DO PEOPLE SHUN PERSONS WHO ARE OBESE?**

By: Joely Jobst, Samantha Walley

Psychology

Faculty Mentor: John Pryor

Prejudice and stereotyping are integral behaviors in every culture, and their continued existence is of great interest to sociologists, anthropologists, and psychologists. One particular prejudice that has outlasted the social condemnation of ageism, sexism, and even racism is the social exclusion and open (or hidden) hostility towards overweight persons. The purpose of this study is to find out if individuals are more likely to take part in ostracizing another person if that person is overweight. The experiment included two tasks. This first task consisted of a ball-tossing computer game, called Cyberball, that tested the subjects' reactions to ostracism by others. The second task of the experiment was a PowerPoint presentation that paired Chinese symbols with pictures of either healthy weight or obese women. This particular portion of the experiment was used as an implicit measure of the participant's beliefs about obesity. The Cyberball portion of the experiment was a 2 x 2 design where subjects were randomly assigned to one of two conditions. In one condition, two of the individuals playing the game with the participant ostracized another player. In the second condition no one was ostracized. In addition, part of the time one of the players in the Cyberball game appears to be over weight while part of the time there are no over weight players in the game. The computer collected data of the number of throws that the participant makes to each of the other players. After completion of the game the participant filled out a questionnaire that measured their feelings toward the other players in the game. As stated previously, in the second task Chinese symbols were paired with a picture of either healthy weight or overweight women. Participants were then asked to rate the pleasantness of the Chinese character. A questionnaire was then given to measure the participant's attitudes toward obesity. The participants for this study were chosen on a volunteer basis and consisted entirely of college students attending Illinois State University. Data collection for the experiment is currently underway and will be completed by the Undergraduate Research Symposium.

## **EVALUATION OF SUBSTRATE ANALOGS WITH ENZYME ACTIVITY**

By: Eric Johnson

Chemistry

Faculty Mentor: Marjorie Jones, Timothy Lash

Porphyrias are a group of diseases that cause defects in the syntheses of porphyrins (ring structured molecules that are essential molecules in the body). One such disease is Hereditary Coproporphyria, a disease that inhibits the formation of an intermediate substrate in the syntheses of Heme, a crucial component of hemoglobin (the molecule that carries oxygen in the blood). This genetic disorder can lead to several problems for organisms such as being anemic, and having a high sensitivity to the sun. This research focuses on the enzyme and substrate correlated with the Hereditary Coproporphyria disease.

The purpose of this research is to test the enzyme coproporphyrinogen oxidase (CO) with a substrate analog (diB) and compare its results with the normal biological substrate Coproporphyrinogen-III (C-III). The substrate analog structure is almost identical to that of the biological substrate, but differs slightly as a single carbon has been added to two different carbon chains. The current model proposed for our enzyme suggests that the substrate binds to the enzyme in an active site (pocket) and then is converted to a new product. This product then continues down a pathway to finally be converted to heme. By comparing the product formation of the biological substrate with the analog, conclusions can be drawn about how specific the binding pocket of the enzyme is with the substrate.

The data presented here show that the addition of the single carbon to the two carbon chains can hinder the product formation drastically, and enzyme activity greatly decreases. This leads me to conclude that the active site of the CO enzyme is very specific and that even small variation in the substrate can affect product formation thus affecting the over production of heme. By comparing the difference in product formation with diB to C-III as well as other analogs, one can understand the specificity of the active site much better. This will allow for a more accurate model of CO to be developed and could lead to better understanding of the Hereditary Coproporphyria disease.

## **SYNTHESIS OF TRAPEZOIDAL EXPANDED PORPHYRINS**

By: Sarah Jones

Chemistry

Faculty Mentor: Timothy Lash

Porphyrins are fascinating molecules that are found in nearly all living organisms. They are vital molecules in nature, and increasingly applications for these versatile molecules are being developed. The basic structure of a porphyrin consists of a skeleton of four small pyrrole rings linked together to form a larger ring. Porphyrin analogues where the macrocycle has been modified by expansion or ring substitution also show unusual properties that could lead to applications in the future. Vinyllogous expanded porphyrins with two or more carbon bridges between the pyrrole subunits were first investigated by Franck and LeGoff. These early studies resulted in the synthesis of expanded porphyrins such as (22)-porphyrin[3.1.3.1] and other "rectangular" or "square" shaped porphyrin-type systems. However, no reports on the synthesis of more distorted vinyllogous porphyrins[m.m.n.n] with two adjacent bridging units longer than the other two connecting bridges have been published previously. In this project, we are investigating the synthesis of (22)-porphyrins-[3.3.1.1]. Fischer esterification of iminodiacetic acid with sulfuric acid and ethanol, followed by neutralization with sodium acetate and reaction with acetic anhydride afforded an amide derivative. This was condensed with benzil in the presence of sodium methoxide and following treatment with NaOH in ethylene glycol at 180 °C afforded 3,4-diphenylpyrrole. The pyrrole was then treated with 3-dimethylaminoacrolein and phosphorus oxychloride (vinyllogous Vilsmeier-Haack conditions) in refluxing 1,2-dichloroethane, and following hydrolysis a dialdehyde was isolated in good yields. A tripyrrane intermediate has also been prepared and the synthesis of the trapezoidal stretched porphyrin system is currently under investigation. This work will provide insights into the aromatic characteristics of these macrocycles, as well as allowing metalation studies to be conducted.

### **CLASSIFYING THE BEHAVIORAL CHARACTERISTICS OF PEM FUEL CELL**

By: Nicholas Jurasek

Physics

Faculty Mentor: David Marx

In this talk I will present research that I have been working on since the beginning of the semester. My research has focused on describing the behavioral characteristics of a PEM fuel cell. The goal of the research is to ultimately determine the feasibility of using a fuel cell in ISU's next solar vehicle. The specific areas of my research have been to determine what conditions the FC performs the best in, as well as looking at modifications to the current design in order to improve performance, and determine the maximum efficiency of the FC in order to determine hydrogen usage.

### **PLASMA LASER INTERACTIONS: ANALYSIS**

By: Thomas Juskevics, Justin Berry

Physics

Faculty Mentor: Brian Clark, Epaminondas Rosa

We analyze phase space plots and Fourier transforms to study how a plasma reacts to light from a diode laser at different conditions. These plots show how the modulated laser signal changes the characteristics of the plasma. The plasma discharge is maintained in a hollow cathode lamp filled with neon gas. During the discharge, electrons move from the cathode to the anode, colliding with and exciting neon atoms along the way. The output of a diode laser that is frequency modulated near an atomic neon resonant transition is focused into the center of the discharge and modifies the plasma characteristics as it interacts with neon atoms. In this work we analyze data from our experimental setup, and check for synchronization between plasma and laser.

### **THE ADULT ATTACHMENT Q-SORT: INITIAL PSYCHOMETRIC STUDIES**

By: Katelyn Kanwischer, Jamie Starkey, Megan Belleavia, Rebecca Morelli

Psychology

Faculty Mentor: Gary Creasey

The methods used to assess generalized attachment representations are time consuming (Adult Attachment Interview) or have questionable validity (questionnaires). Thus, we tested the efficacy of an alternative measure. The Adult-Adolescent Attachment Q-sort (AAQS) constitutes a 100-item card-sorting method that assesses performance of 2 major GAR outcomes—the adolescent-caregiver relationship, and self-functioning. Our goal was to provide initial psychometric information for this instrument.

#### **METHOD**

Sample: Late adolescents (N = 71) were recruited from a university setting.

#### **Instruments**

Adult-Adolescent Attachment Q-sort (Creasey, 2005): The AAQS represents a 100-item card sorting method that assesses attachment functioning. Respondents first sort the cards into 3 piles, ranging from "not at all like me" to "very much like" and eventually must sort the cards into 9 piles reflecting a normal distribution. The AAQS contains 4 scales that assess the parent-adolescent relationship (e.g. ability to use parent as effective support figure; parent idealization) and 4 scales that measure self-functioning (e.g., emotional autonomy; comfort with exploration). Parent idealization constitutes an important assessment because it reflects defensive processes (e.g., "My mother is always perfect").

Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991): The RQ contains four paragraphs describing 4 attachment styles: Secure, Dismissing, Preoccupied, and Fearful. Respondents, on a 7-point scale, indicated the applicability of each category when considering their own attachment style.

#### **Results**

The AAQS scales demonstrated good internal consistency. Further, the AAQS adolescent-parent relationship scales were correlated with the self-functioning scales. The parent idealization scale was negatively associated with adolescent emotional autonomy, exploration, and the ability to function as a competent attachment figure; the remaining parent-adolescent relationship scales were not significantly associated with these self-functioning scales. However, these scales were positively associated with the self-functioning scales when controlling for parent idealization. The AAQS scales were next correlated with the RQ scales. The only AAQS scale related to the RQ was parent idealization; respondents that were more idealistic were more secure on the RQ.

#### **Discussion**

The AAQS demonstrated good reliability and validity. Relationships between AAQS and RQ scales were weak, although more idealistic youth rated themselves as more secure on the RQ. Adolescents that scored high on the parent idealization scale indicated poor emotional autonomy and exploration concerns. The other scales that assessed the parent-adolescent attachment relationship were positively associated with these aforementioned self-functioning scales, but only after controlling for parent idealization. Implications for future AAQS research will be discussed.

### **SYNTHESIS AND CHARACTERIZATION OF NOVEL OXADIAZINES DERIVED FROM CHIRAL, NON-RACEMIC ALCOHOLS**

By: Chris Kelley

Chemistry

Faculty Mentor: Shawn Hitchcock

The use of chiral auxiliaries to control stereochemistry during the synthesis of enantiomerically pure medicinal agents is very important. Some auxiliaries are more effective than others so it is desired to use chiral relay auxiliaries that will provide the greatest amount of stereoselectivity while still allowing for substantial percent yields. In the past compounds known as oxadiazinones were used as chiral auxiliaries. Although they exhibit sufficient ability to direct stereochemistry there is difficulty with these chiral auxiliaries undergoing the cleavage of the asymmetric aldol products. We now seek to create a new class of chiral auxiliaries that have greater ability to undergo the necessary cleavage reactions. Current efforts are on synthesis on a class of compounds known as oxadiazines. Although similar to the previously used oxadiazinones, it is thought that oxadiazines may have the desired ability to more readily participate in the cleavage of the aldol products.

## **THE MYSTERY OF THE UNKNOWN ARTIFACTS**

By: Nicole Kidd

Geography-Geology

Faculty Mentor: Jill Freund Thomas

In this paper, I will argue that a collection of unidentified artifacts located at Illinois Wesleyan University is part of the John Wesley Powell collection. Artifacts collected by John Wesley Powell are on display at Illinois Wesleyan University's Ames Library. These artifacts were obtained in the mid 1880s from Powell (www.iwu.edu). While organizing the Archives storage room at the university, the director came across three unidentified boxes of artifacts. The artifacts were, coincidentally, also obtained in the mid 1880s. This, however, is the only information that is known about the objects. No information on where they came from or the time period they came from is available. It has been suggested that the unknown artifacts are part of Powell's collection. I will show that these objects are part of the Powell collection, they, however, were misplaced and not found till now. I will demonstrate this claim by finding out data about where, when, how and why the artifacts were used. By researching books and articles, performing comparison analysis with the artifacts, conducting interviews with specialists, and making some logical guesses. I hope to find this data. Artifacts are an important part of understanding the past and this paper presents a step by step process of how to identify artifacts that were forgotten, but are still important.

## **WOMEN AND HUMOR**

By: Anne Kincade

Communication

Faculty Mentor: Megan Houge

In his book, "Language and Women's Place," Robin Lakoff explains that "Women have no sense of humor...they neither effectively tell nor get jokes." The mentality of women having an underdeveloped understanding of humor has been around for a long time, and the implications of such a mindset are far more damaging than we realize. In fact, the women's movement, as a whole, has been limited by women's limited access to humor. By examining the causes, effects and solutions of this uninformed mindset, we can more easily understand how this frame of mind came about and how we can use discourse to remedy it.

## **PROJECT RUNWAY**

By: Jessica Klemm, Sarah Rausch, Rebecca Stoker, Jaclyn Weiss

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The connection between gender, personal maintenance of hair, and appearance spending habits of college aged individuals is a topic that has not been investigated by many researchers. Data regarding whether males or females spend more financially on apparel and connecting that to hair maintenance expenses is inconclusive. The purpose of this study is examine the relationship between gender, hair maintenance, and overall expenditures on appearance, including apparel, hair and skin maintenance, and overall health and beauty expenditures. For this study, 276 students at Illinois State University were surveyed about their spending habits in regards to hair, beauty and make-up as well as apparel. Questions related to appearance expenditures, hair color, and gender were included in the survey. Data were analyzed using SPSS. Chi-Square statistics and Analysis of Variance were used to test the hypothesis. Results showed that redheads were significantly different than all other respondents in terms of buying apparel that complimented their hair color and they were the least likely to enjoy purchasing clothing that is worn close to the hair like tops and shirts. Those respondents who dyed their hair not only spent more on hair maintenance than those with natural colored hair, but also for make-up and beauty products as well as clothing. They also were significantly more likely to report compulsive buying behavior and they shopped for apparel more frequently than those with natural colored hair. Finally, in terms of gender, men were significantly more likely to choose apparel because of the brand or the store it comes from, whereas women consider fit a significantly more important reason to purchase apparel. In addition, men were significantly more likely to enjoy purchasing swimwear and coats than women. The results of this research have important implications for professionals in apparel retail that are trying to appeal to the college age market.

## **OSMOREGULATORY ABILITIES OF TWO SPECIES OF KILLIFISH**

By: Kevin Kocot, Jason Crowner, Matthew DeBerge

Biological Sciences

Faculty Mentor: Robert Preston, George Kidder

*Fundulus notatus* is a small minnow-like fish which inhabits creeks and streams throughout the central United States. *Fundulus heteroclitus macrolepidotus* is a related species that inhabits estuarine marshes and tidal creeks in the NE coastal United States. *F. heteroclitus* has been shown to be a very effective osmoregulator that thrives in freshwater, saltwater, and intermediate salinities. The focus of this study was to compare the osmoregulatory abilities of *F. notatus* to those of *F. heteroclitus*. Eight fish were placed in each of four 10 gallon aquaria and acclimated to a salinity of 1 ppt. One aquarium was maintained at 1 ppt and the salinity in the other three aquaria was increased at a rate of 2 ppt per day using aquarium salt to final salinities of 10 ppt, 20 ppt, or 30 ppt. Fish were left 24 hours at the final salinity and were then anesthetized using MS-222. Body fluids were collected and the osmolality of the fluids was measured using vapor pressure osmometry. For *F. notatus*, it was found that the mean body fluid osmolality at 1 ppt was  $399 \pm 16$  mOsM (n = 34), at 10ppt  $443 \pm 12$  mOsM (n = 43), at 20ppt  $583 \pm 12$  mOsM (n = 52), and at 30 ppt  $754 \pm 9$  mOsM (n = 21). For *F. heteroclitus*, the mean body fluid osmolality at 1 ppt was  $350 \pm 4$  mOsM (n = 107), at 10ppt  $356 \pm 5$  mOsM (n = 28), at 20ppt  $384 \pm 10$  mOsM (n = 22), and at 30 was  $431 \pm 4$  mOsM (n = 140). *F. notatus* does not survive more than a few days at 30 ppt but can tolerate salinities < 20 ppt for long periods. We conclude that *F. notatus* is a much less effective osmoregulator than *F. heteroclitus* but is capable of tolerating short-term salinity stress. The cellular osmoregulatory mechanisms that may contribute to this osmotolerance are being investigated. (NSF-CRUI 0111860).

#### **INTRODUCING IRIS.4: THE MIND PROJECT ROBOT**

By: Roy Kolak, James Barr, Vince Cima, Bob Arrigo

Philosophy

Faculty Mentor: David Anderson

An international collaboration of computer scientists and technologists is hard at work creating Iris.4, the latest and greatest Mind Project mobile robot. The Mind Project's development team has produced a robot equipped with a vision system, two arms, a voice, and a mechanical body. These features are being combined to create a robot capable of interactively playing tic-tac-toe in "human" ways. Iris communicates in English, and manipulates a real tic-tac-toe board. Even more exciting, Iris actually \*learns\* to play tic-tac-toe, as opposed to being hard-coded with an algorithm that automatically wins every time. Thus Iris exhibits the human powers of speech, learning, communication via a natural language, and causal impact on the world. The hard work of the development team has made this project a success and we encourage you to stop by our table... Iris.4 would love to meet you! [Disclaimer: This is a work in progress. Some robotic functions may not yet be fully implemented at the time of the symposium.

#### **REVIEW OF THE WORLD TRADE ORGANIZATION'S DISPUTE MECHANISM AND CASES**

By: Alexei Kourinov

Management and Quantitative  
Methods

Faculty Mentor: Elango Balasubramanian

This project has the following three objectives: 1. To describe the mechanism for trade dispute resolution in the World Trade Organization; 2. To organize and categorize the recent trade dispute cases filed by the United States; 3. To analyze the data and to establish, if any, trends in the data.

#### **HYPNOANESTHESIA**

By: Kayla Krippner

Communication

Faculty Mentor: Megan Houge

As the surgeon's knife cut into her chest, 46 year old Pippa Plaisted should have been in agony. Normally, the 45-minute-breast cancer operation she underwent required a general anesthetic, but Plaisted had not been given any anesthesia or painkillers. Instead, she asked for hypnotherapy. Eyes closed but awake, Plaisted could hear the surgeon explain each stage of the procedure. Although Pippa's surgery sounds like a horror tale of malpractice, her surgery is actually an example of the latest method of anesthesia used in health care practices, hypnosis. According to the New Scientist of Aug 6, 2005, hypnosis can be used as an anesthesia for a variety of surgeries including breast cancer surgery, cervical endocrine surgery, and thyroid surgery. The article goes on to state that this hypno anesthesia treatment is easier on the body than local anesthetics and that scientists believe this practice will be beneficial to patients who will be able to recover faster from surgeries. In order to get a better understanding of this new medical treatment we'll first discover how hypnotherapy works, then explore some of its applications, and finally consider some of the implications of hypnotherapy.

#### **SEMIOTICCS FOR DUMMIES**

By: Alex Kritselis

Communication

Faculty Mentor: Michael Graupmann

According to the May 16, 2004 edition of the Boston Globe, "Semiotics is the study of meaning itself, or rather how images and words come to mean anything to us at all [...] Put another way, semiotics is about how we derive meaning from context." Now if you're thinking, "Semiotics? That sounds terrifying." Don't be scared, because as semiotician Daniel Chandler tells us in his 2001 book, "Semiotics: The Basics", "A working understanding of the key concepts in semiotics, including their practical application, can help to make us aware that we are always dealing with signs, and not with an objective reality." Semiotics is a theory that has been near and dear to the hearts of scholars for nearly a century, and it has found its way into nearly every aspect of our every day lives. In fact, the April 13, 2004 edition of the Financial Times tells us that semiotics is now more important than ever, as it is being applied across the board to the disciplines of psychology, philosophy, sociology, anthropology, communication, and even business administration. So, in order to gain a better understanding of why the London Times of January 5, 2005 states that, "Semiotics, as a scientific attitude, is a critical way of approaching the objects of other sciences," we must first gain a better understanding of what semiotics is and how it works. Next, we'll take a look and how it's being used today, so that finally, we can take a sneak peek at some of its critical future applications.

#### **EFFECTS OF NEGATIVE AND POSITIVE EMOTIONAL INHIBITION AND IMPLICATIONS RELATED TO DEPRESSION AND ANXIETY**

By: Jillyn Kyarsgaard

Psychology

Faculty Mentor: Jeffrey Kahn

Approximately 10% of college students have been diagnosed with depression and 7% of college students have some form of anxiety disorder (NMHA, 2003). If predictors of depression and anxiety can be identified, tragedies such as suicide, which is the second leading cause of death for college students (NMHA, 2003), can be prevented. One possible predictor of depression and anxiety is the inhibition/expression of emotion. Questionnaires such as the Berkeley Expressivity Questionnaire (BEQ) (Gross & John, 1997) and Emotional Self-Disclosure Scale (ESDS) (Snell et al., 1988) show one's positive and negative emotional expression. Depression and anxiety may be two potential outcomes of negative emotion inhibition. Research with the BEQ has shown that more negative expressivity is predictive of anxiety (Mennin et al., 2005). It is also known that the expression of negative emotions has been significantly correlated to neuroticism; neuroticism is a factor of depression (Trierweiler, et al., 2002). Research has not looked at how specific positive emotions (such as happiness or calmness) or specific negative emotions (such as anger, depression, or fear) are related to or predictive of depression and anxiety. By looking at these certain emotions rather than all of them together as either positive or negative, psychologists can begin to look at patterns of depression and anxiety related to specific emotions. From this research better

treatments can be given and preventative measures can be taken by those patients in need.

To test the hypothesis there were a total of 552 participants; 295 females and 257 males completed questionnaires. Participants ranged in age from 18 to 35 with a mean of 19.51 (SD = 1.85).

The questionnaires completed by the participants consisted of ten other questionnaires. The three questionnaires looked at for this study was the Berkeley Expressivity Questionnaire (Gross & John, 1997), the Emotional Self-Disclosure Scale (Snell et al., 1988), and the Mood and Anxiety Symptom Questionnaire (Watson et al., 1995). The predictor variable was the emotional expressivity scores of the participant on the ESQS and the BEQ. The criterion variable was the participant's scores on the General Distress: Anxiety and General Distress: Depression scales of the MASQ.

After completing an informed consent form each participant was given a questionnaire packet. Participants were read the instructions for completion. When everyone was done the debriefing was read. When the participants handed in their questionnaire they were given a blue extra credit card.

### **GENDER DIFFERENCES IN TERMS OF APPEARANCE EXPENDITURES**

By: Laura Leman, Allison Hall, Kristin Ori, Kristin Aquilina, Alyssa Nicoline

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this study was to compare men and women in terms of the amount of money spent on appearance and perceptions related to the importance of physical appearance. It was hypothesized the women would spend significantly more money on their appearance than men and that they would consider their physical appearance to be more important than men. For this study, 276 students at Illinois State University were surveyed about their expenditures on clothing as well as hair, skin and cosmetic products. Questions related to whether the expenditures for these items seemed worthwhile and the importance of physical appearance were also included in the survey. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypothesis. Results showed that men were much more likely to shop for clothing only when necessary than women who were more likely to purchase clothing even if they did not need it. Total expenditure for clothing was not significantly different between genders. Men spent significantly less than women on hair, nails, cosmetics and beauty products, however when asked whether the total amount spent on appearance was worthwhile, there was no significant difference between men and women. Women were significantly more likely than men to rate their own physical appearance as being important.

### **JUMPING FROM ANIMAL TO HUMAN: AN EVOLUTIONARY COMPARISON OF HIV/AIDS AND THE INFLUENZA VIRUS AS POTENTIAL PLAGUES**

By: Jessica Lensink

Sociology and Anthropology

Faculty Mentor: Martin Nickels

In this paper I discuss the evolution of two epidemic diseases present in our society today: the HIV virus that has spread so rapidly throughout Africa in recent years and the avian influenza virus that originated in Asia and has spread to Africa and Europe. Both diseases are viruses that originated in animals and have moved to the human species, the HIV virus from primates and the influenza virus from birds, particularly waterfowl. I consider biological as well as cultural aspects of this development. In this paper I describe how both viruses mutated from their original state in their respective animal vectors to the forms found today in the human species. In addition, I consider the human behaviors and cultural practices that contribute to the spread of these diseases. I will also attempt to offer some insight on possible ways of managing and/or controlling these potential pandemic diseases.

I believe that the transference of these two diseases has to do with the virus's ability to evolve and mutate in its animal vector and the fact that it continues to do so once it has been transferred to the human species, as well as the behaviors and practices that contribute to the spread of these diseases. I support this claim with data from books, articles, journals, and websites. As these two diseases continue to spread in a pandemic-like fashion this paper offers a look into some of the reasons why and how they continue to spread and some insight and suggestions of ways to best culturally manage and control these diseases in the future.

### **COLLEGE WOMEN AND SEXUAL COMPULSIVITY: IMPLICATIONS FOR SEXUAL HEALTH**

By: Lauren Lewandowski

Health Sciences

Faculty Mentor: Sara Cole

Objectives: Although sexual compulsivity has largely been studied among men, it may have important implications for the sexual health of women as well, particularly those undergoing intense sexual development, such as those in college. A better understanding of the behavioral characteristics of sexual compulsivity in women may be helpful to the development of more effective sexual health programs for this population. Methods: Data collected from 561 female college students were analyzed to assess the differences in sexual health behaviors between women who had high levels of sexual compulsivity and those with low levels of sexual compulsivity. Results: Women high in sexual compulsivity (n=45) reported significantly more partners for unprotected vaginal (p<.01) and unprotected oral (p<.001) intercourse during the past three months. However, they were less likely to report being in a sexual relationship (p<.001) at the time of the study. Those higher in compulsivity were also more likely to report having sex in a public or semi-public place within the three months preceding the study (p<.001). Furthermore, the more highly compulsive participants were more likely to have sought sexual health information within the past ninety days (p<.01). Conclusions: Among women, sexual compulsivity has associations with a range of behaviors that could impact health. Assessing and responding to sexual compulsivity may result in the development of more effective sexual health programs for women, particularly as a result of more focused attention on the types of behaviors and the settings in which they occur.

Learning Objectives:

- Participants will be able to describe the nature of sexual compulsivity among college-aged women.
- Participants will be able to describe associations between sexual compulsivity and high risk sexual behaviors.
- Participants will be able to describe strategies for assessing and responding to sexual compulsivity among women.

Keywords: Women, women's sexuality, sexual compulsivity

### **COMPUTER SIMULATIONS OF THE SHORTEST TIME OF TRAVEL PROBLEM**

By: Ryan Lodes, Nick Pieroni, Anthony Battaglia, Nathan Kidwell, Randi Prettyman

Physics

Faculty Mentor: Charles Su

We have designed a computer program to simulate a ball rolling down a track from point A to point B in a vertical plane. The ball's motion is under the influence of gravity, as well as normal force from the track, friction from the track and air drag. The program calculates the time it takes between the two points for a set of curves. We have studied the various track types and friction conditions. Using this data we have computed an algorithm for an optimal design.

### **A RHETORICAL ANALYSIS OF LETTERS FROM GOD**

By: Jacob Long

Communication

Faculty Mentor: Megan Houge

Trips to the mail box may have gotten a bit more exciting. Now, in the assortment of bills and advertisements you may just find a letter from the world's biggest celebrity: God. For \$5.95 directfromgod.com founder Linda Pearl will construct and mail a letter from God to whomever you wish. The *Chicago Tribune* of September 29, 2004 explains that the letters were not written to inspire any religious movement, but rather as comfort for soldiers and their families. Moreover, the letters have expanded, covering everything from the death of a loved one to a humorous birthday greeting for Gramps. However, the BBC's World Today Show of September 30, 2004 notes that while some see the letters as harmless, others see it as presumptuous or even heretical to speak on behalf of God. Considering the March/April 2005 *Utne Reader*, fundamentalism has become mainstream, with any new presentation of God having the potential to make current divides more rigged, absolute and fractured, forcing us to pose the question: Within the Judeo-Christian context, what is the impact of speaking not on behalf of God, but using God's voice? To this end, we will utilize Franklyn S. Haiman's article "Ghostwriting and the Cult of leadership," as published in the October 1984 edition of *Communication Education*. To better evaluate the ethics of directfromgod.com, we will first further acquaint ourselves with Haiman's methods, then see how they apply to Pearl's letter, and finally look at the implications that can be derived from God's first ghostwriter since the Bible.

### **VIOLENCE WITHIN SIBLING AND ROMANTIC RELATIONSHIPS AMONG LATE ADOLESCENTS**

By: Lirone Losoff

Psychology

Faculty Mentor: Marla Reese-Weber

The purpose of this present study is to examine the relationship between violent sibling relationships and violent romantic relationships among late adolescents. Late adolescents completed a survey that included the Conflict Tactics Scales (CTS) and Personal and Relationships Profile (PRP), with questions regarding the occurrence of violence in their sibling and romantic relationships. It is hypothesized that higher reports of violence within sibling relationships will be highly correlated with higher levels of violence approval and violent behaviors and romantic relationships.

### **TRUST IN SCHOOLS: PERSPECTIVES OF MOTHERS WITH DISABILITIES**

By: Kelly Lough, Dana Naumann, Marissa Pearlman, Elizabeth Schlak

Special Education

Faculty Mentor: Julia Stoner, Maureen Angell, Debra Shelden

Trust between school personnel and families is essential if students are to achieve their highest potential. Trust may be defined as "one party's willingness to be vulnerable to another party based on the confidence that the latter party is benevolent, reliable, competent, honest, and open" (Hoy & Tschannen-Moran, 1999, p. 556). An individual's ability to trust school personnel is influenced by his or her past experiences and feelings of vulnerability. The current literature base is focused on trust between school personnel and families of children without disabilities. However, there is little research on if and how the nature of trust differs with families of children with disabilities. The current study examines perspectives of mothers of children with disabilities on trust with educational professionals. Interviews conducted with 12 mothers were transcribed. Qualitative methodology was used to analyze the data. Line by line coding was completed and cross-case analysis was conducted to identify key themes. Analysis of the data revealed the unique perspectives of mothers of children with disabilities regarding trust with educational professionals.

### **THE AMERICAN STUDIO GLASS MOVEMENT: THE SOCIAL INFLUENCES AND OUTCOME OF AN ART MOVEMENT.**

By: Thomas Ludwigen

Sociology and Anthropology

Faculty Mentor: Gina Bessa

In this paper I will argue that in order to express themselves better, American artists in the 1950's to the 1960's, found the new art form; glass. The American Studio Glass Movement was born out of necessity in the late 1950's early 1960's. Until the late 1950's everything glass in the United States was utilitarian in nature, but dramatically overnight artists started to use glass to make art. Since this dramatic movement started glass has spread all over the United States, first seen as only a craft and not an art form in the public eye. I will show that in order to change social opinion about glass figures such as Harvey Littleton, who "founded" the American Studio Glass Movement, and Dale Chihuly help promote glass as art on a national level. Also I will touch on how the movement created other industries in the United States. The movement will also be compared to other glass movements in the world and will show how the American movement is unique in nature. I believe the analysis of the American Studio Glass Movement will show the important social networks an art form has created, the social evolution of the American artist in the global realm and the importance American Studio Glass will have in the future.

### INHIBITION STUDIES OF ALKALINE PHOSPHATASE BY ORTHOVANADATE COMPLEXES

By: Lisa Manus

Chemistry

Faculty Mentor: Craig McLauchlan

Vanadium complexes have been shown to enhance the effects of small quantities of insulin present in the bloodstream by inhibiting phosphatase activity. There is the potential for these compounds to be used in the regulation of individuals with type II *diabetes*. The kinetics of alkaline phosphatase were explored by examining the chemical rate properties with various concentrations of *p*-nitrophenyl phosphate while holding alternating factors of experimentation constant. In addition, inhibition studies were completed using a known inhibitor of alkaline phosphatase, sodium orthovanadate. Using a Lineweaver-Burk plot the  $K_m$  and the  $V_{max}$  were found to be 22.03 mmol/min and 16.2 mM, respectfully. Studies of similar nature were also run varying enzyme concentration and time of incubation. Based on the preliminary data presented, sodium orthovanadate indeed retarded the activity of alkaline phosphatase.

### HOW DOES PROGRESSION OF COUNSELING SESSIONS AND USE OF POSITIVE AND NEGATIVE EMOTION WORDS AFFECT A CLIENT'S MOOD?

By: Megan Marcello

Psychology

Faculty Mentor: Jeffrey Kahn

According to Harris and Packard (1985), a counselor's ability to understand a client's emotions is very important to therapy. The ability to understand and interpret emotions is also linked to one's ability to empathize with another. This study looks at the change in a client's mood over three counseling sessions. Also, this study looks at the correlation between the amount of emotion words used by a client and their perceived mood during a counseling session. When looking at the change in mood over counseling sessions, I believe the client's mood will improve. For example, mood will change from unpleasant to pleasant and from high to low arousal. Also, Linguistic Inquiry and Word Count (LIWC) scores will contribute to mood change (Booth, Francis, Pennebaker, 2001). That is, the use of more positive emotion words and less negative emotion words will result in improved mood. The participants used in this study consisted of 11 clients, who were undergraduate students and 6 counselors, who were first year doctoral students. Counseling sessions were transcribed and then coded using the Verbal Response Mode (VRM) taxonomy (Stiles, 1992). The transcripts were analyzed using a text analysis program called the Linguistic Inquiry and Word Count (LIWC). The LIWC is a computerized method of counting words in different categories. The categories focused on for this study are affective and emotional processes. The clients' mood was assessed using a Session Evaluation Questionnaire (Stiles, 2002). The purpose of this study is to assess how client's emotions change over sessions. For example, results will show if clients become more comfortable or less comfortable over sessions. If counselors expect clients to feel some anxiety and be somewhat uncomfortable in their first sessions, they can change their counseling procedure to ease client's anxiety. Also, practitioners will be able to understand how the types of emotion words used in sessions affect a client's mood. If the amount of emotion words used in a session affects a client's mood, counselors can learn to encourage clients to use a variety of emotion words.

### SYNTHESIS OF VANADIUM COPLEXES WITH POTENTIALLY INSULIN ENHANCING PROPERTIES AND RELATED TRIS-HIS ENZYME ANALOGUES.

By: Nick Marshall

Chemistry

Faculty Mentor: Craig McLauchlan

It has been shown in several clinical studies, starting in the mid 1800's, that compounds containing vanadium aid in the treatment of diabetes mellitus type II. Originally, sodium orthovanadate [Na<sub>3</sub>(VO<sub>4</sub>)] was given to diabetic patients, but it was shown to have some adverse side affects. Variation of the ligands bound to the metal can change the solubility and the ability of the body to uptake a vanadium complex. Nearly all of the oxidation states of vanadium have been shown to be effective at treating diabetes, but the most effective known insulin enhancing vanadium complex, bicolinatovanadyl, VO(C<sub>6</sub>H<sub>4</sub>NO<sub>2</sub>)<sub>2</sub> [VO(pico)<sub>2</sub>], has a vanadium center in the +4 oxidation state. This compound can be synthesized by oxidizing a related compound, tripicolinatovanadium (III), V(C<sub>6</sub>H<sub>4</sub>NO<sub>2</sub>)<sub>3</sub> [V(pico)<sub>3</sub>], under acidic conditions. Studies of the properties of V(pico)<sub>3</sub>, the properties of the oxidized VO(pico)<sub>2</sub>, and the mechanism by which the former compound becomes oxidized to the latter were performed. Tris-histidine active sites of metalloenzymes are also an area of interest in many bio-inorganic studies. Tris-histidine metal binding sites can be mimicked by tripodal tris-imidazolyl ligands such as tris[2-imidazolyl]carbinol (2-TIC, (C<sub>9</sub>H<sub>9</sub>N<sub>2</sub>)<sub>3</sub>COH). Tripodal imidazolyl ligands are interesting ligand systems in regards to insulin enhancing vanadium complexes because of their biological relevance. The ultimate aim of this research is to find a compound that would help those afflicted with diabetes by giving them a more efficient alternative treatment to those presently available. This presentation will show the synthetic strategy and selected properties of V(pico)<sub>3</sub> and VO(nacnac)<sub>2</sub> complexes as well as complexes using the 2-TIC ligand and other first row transition metals (Ni, Co).

### INVESTIGATION OF THE CATALYTIC ROLES OF ASPARTATES 143 AND 164 IN RAT & #945; CTP:PHOSPHOCHOLINE CYTIDYLTRANSFERASE

By: Elizabeth Marshall

Chemistry

Faculty Mentor: Jon Friesen

The protein CTP:phosphocholine cytidyltransferase (CT) is an enzyme in mammalian cells that catalyzes a reaction contributing to the production of phosphatidylcholine which comprises a large percentage of the mammalian cell membranes. The enzyme's ability to bind magnesium in the reaction is a critical step in forming cell membranes. After comparing forms of CT in different mammals, the hypothesis is that aspartate 143 and aspartate 164 are critical for the enzyme to bind magnesium.

This research focuses on determining the role of these amino acids in CT's ability to bind magnesium. The DNA sequence encoding aspartate 143 and aspartate 164 has been changed to encode alanine at both locations using site directed mutagenesis. The two mutant DNA strands were inserted into a vector and introduced to *E. coli* cells. The mutant DNA was then sequenced to confirm the

mutations, and the altered proteins have been produced and purified. Enzyme assays are currently being done to determine the effect of the altered amino acid sequence on the catalytic ability of CT. Double mutations are now being made to determine the effect of more than one amino acid change at a time.

#### **USING VERMICOMPOST AS A POTTING SUBSTRATE AMENDMENT FOR *CLEOME HASSLERIANA***

By: Heather May

Agriculture

Faculty Mentor: Gary Bachman

The use of vermicompost is gaining interest in the ornamental horticulture industry. Vermicompost is produced through the action of earthworms breaking down and stabilizing organic waste materials. Amending potting substrates with vermicompost has resulted in enhancements of chemical and physical substrate characteristics as well as plant growth. The objective of this research was to evaluate the growth of the popular flowering garden plant, *Cleome hassleriana*, grown in vermicompost amended potting substrate. ProMix BX, a popular commercial potting substrate, was amended with vermicompost, produced from beef cattle manure collected at the ISU Farm, creating the treatments of 0% (control), 10%, 20%, and 40% by volume. Seedling plugs of *Cleome hassleriana* were transplanted into 4" round containers filled with the described treatments. Each treatment was replicated seven times. After 23 days the plants were transplanted into larger, 6" diameter containers. After 57 days the plants were harvested. Data collected included height and growth index (23 and 57 DAT), stem weight (57 DAT), and leaf area (57DAT). The treatment of 40% by volume (VC40) reacted most positively toward the vermicompost. The 40% vermicompost treatment produced the greatest height, growth index, and dry stem weight. The 10% vermicompost treatment consistently tested poorly in all categories with the exception of leaf area. There was no statistical difference in leaf area amongst the treatments, although there was high statistical difference in both height and growth index. All treatments flowered with the exception of 10% vermicompost treatment. Overall, the 40% vermicompost treatment showed the most productivity enhancement. More research needs to be undertaken with more plant species to fully elucidate these positive enhancements.

#### **NA/K ATPASE AND CFTR MRNA EXPRESSION IN DEVELOPING KILLIFISH EMBRYOS.**

By: Sean McBride, Bridget Lahey

Biological Sciences

Faculty Mentor: Robert Preston, George Kidder

The killifish, *Fundulus heteroclitus*, spawns in estuaries with fluctuating salinity. The embryos develop aeriually or in shallow water for ~14 days before hatching. These embryos are readily permeable to water and we hypothesize that developing embryos must be able to osmoregulate. To test this, embryos at various developmental stages were analyzed for changes in mRNA expression of the sodium pump (Na/K ATPase) and the chloride channel, CFTR. Oocytes were fertilized in vitro and held at 20°C in 10 ppt seawater. RNA was extracted from 10 embryos (in triplicate) per stage and quantified spectrophotometrically. cDNA was prepared (1 µg RNA/prep) and used for real-time PCR. Specific primers for Na/K-ATPase (α1 subunit), CFTR, L-8 (a highly conserved region of 23s rRNA) and actin were used. Relative to unfertilized oocytes, Na/K ATPase mRNA increased at a constant rate throughout development. CFTR and actin mRNA expression remained nearly constant up to day 9 and increases significantly on day 14 (4 fold). L-8 mRNA expression dramatically increased (200 fold) during embryo development. Since the total RNA content increases 10-40 fold during the 14 day development period, the mRNAs that appear "constant" (actin and CFTR) increase likewise proportionally. Na/K ATPase increases above this basal level, especially in hatchlings. L-8 appears to be a good marker for the general increase in mRNA expression. These data are consistent with the hypothesis that *Fundulus* embryos actively osmoregulate during development. (NSF-CRUI 0111860)

#### **CHILDREN'S ART IN DARFUR AND THE MURALS IN NORTHERN IRELAND**

By: Kelly McCarthy

Communication

Faculty Mentor: Megan Houge

Human Rights Watch workers have uncovered the first visual evidence of the genocide in the Darfur region of the Sudan, children's drawings. According to the Canada Newswire on September 9, 2005, the exhibit, "The Smallest Witnesses: The Conflict in Darfur through Children's Eyes" is the product of the children in the refugee camps in the Sudan. Given crayons and paper while their parents were interviewed by Human Rights Watch workers, these children produced disturbing and vivid images of the atrocities they witnessed, without instruction or prompting. According to the July 7, 2005 International Herald Tribune, these 27 works were compiled to form an art exhibit. This exhibit highlights the nature of this conflict as well as the international inaction regarding it. Because the graphic nature of these pictures in conjunction with the perceived innocence of its authors is being used to illicit public awareness and action, this exhibit warrants further analysis and begs the question: How will the introduction of children's voices effect awareness of the Sudanese conflict? To answer this question, we will use Katherine J. Robinson's 2002 doctoral dissertation for Texas Woman's University: *A Rhetoric of Peace and Protest: Discourse Analysis, Semiotics, and the Murals in Northern Ireland*. In her article, Robinson examines the public murals in Northern Ireland and argues that they are a "critical catalyst for change, a strategy with the potential to activate both individuals and communities," making this model especially appropriate for this analysis. So, in order to gain a better understanding of the techniques utilized in The Smallest Witnesses art exhibit, we will first, further examine Robinson's model, then apply these ideas to The Smallest Witnesses art exhibit, and finally, draw some critical implications from this analysis.

## **CAN PERSONALITY BE MEASURED WITH REACTION TIMES? USING THE IMPLICIT ASSOCIATION TEST TO MEASURE EARLY MALADAPTIVE SCHEMAS OF DEFECTIVENESS AND SHAME**

By: Tamara McKenna

Psychology

Faculty Mentor: William Schneider

Young's Early Maladaptive Schemas (1994) are aspects of personality that include beliefs, attitudes, and perceptual biases learned early in life that lead to vulnerabilities to mental illness and interpersonal problems. Early Maladaptive Schemas are, in theory, mostly unconscious; in practice, however, they are typically measured with self-report questionnaires such as Young's Schema Questionnaire.

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is an innovative method of using people's reaction times to words that are sorted into compatible and incompatible categories. The differential reactions times are used to infer aspects of unconscious cognition. This study investigates whether an IAT measuring Young's Early Maladaptive Schema of Defectiveness/Shame (the belief that one is inwardly defective and worthy of shame) is a valid predictor of important life outcomes, beyond what can be predicted with Young's Schema Questionnaire, a self-report measure.

In a sample of 186 university students, multiple regression analyses suggest that the Defectiveness/Shame IAT was significantly related to a number of important life outcomes even after controlling for self-reported Defectiveness/Shame. After controlling for the Big Five Personality Factors and Young Schema Questionnaire Defectiveness/Shame subscale, the Defectiveness/Shame IAT accounted for between 2-4% additional variance in life outcomes such as having many short-lived romances, having been cheated on in a relationship, and having few close friends. Results suggest that the Defectiveness/Shame IAT may have utility in indirectly measuring

## **FAIR TRADE AS AN ALTERNATIVE TO FREE TRADE**

By: Amber Mead

Geography-Geology

Faculty Mentor: Jill Freund Thomas

Free trade eliminates the protective barriers or tariffs on the flow of goods and services between nations. Because the most powerful nations often define the terms of free trade, underdeveloped nations have little opportunity to see economic gain from the agreements. Specifically, the countries involved in the Andean Free Trade Agreement (AFTA) and the Central American Free Trade Agreement (CAFTA) are feeling the negative impact of free trade policies and economics. The economic dependency occurring as a result of these agreements will be difficult to alleviate without acknowledging and examining free trade alternatives. Stamping out globalization is a rather daunting and unrealistic goal, therefore other options and alternatives need to be considered. One such alternative is the fair trade movement, which is intended to give producers and growers from underdeveloped nations the right to set fair prices on their goods.

This study examines the theory of fair trade as an alternative to free trade with respect to the AFTA and CAFTA countries. Economic variables within these integrated Latin American countries will be juxtaposed with the present free trade initiatives. An introduction to the concept of fair trade along with some general statistics will be examined within the context of Latin American economies and the environment. In addition, existing data will be used to explore the effectiveness and potential challenges which face the fair trade movement as it continues to expand from a grassroots movement. Overall, this study will use the countries involved in AFTA and CAFTA in order to show the importance of free trade alternatives.

## **FASHION BEHAVIOR**

By: Tonoah Merritt, Tyaisha Robinson, Ashley Reed, Kara DeDecker, Jessica Caldwell

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The purpose of this study was to examine the relationship between body image and shopping habits. It was hypothesized that students who were influenced by different people (parents, friends, celebrities, etc.) in terms of appropriate body image would feel differently about shopping and would engage in different shopping habits. Moreover, it was hypothesized that feelings about being overweight or underweight would be significantly related to desire to purchase different clothing items like swimwear, pants, shirts, skirts and coats. For this study, 276 students at Illinois State University were surveyed about their campus body image, what and who influences their body image, shopping habits, and what was their favorite and least favorite item of apparel to purchase. Data were analyzed using SPSS. Chi-Square and Analysis of Variance were used to test the hypotheses. Results showed students who felt their parents influenced their opinion on body image were significantly more likely to believe that the clothing they select reflects their feelings about their body than those who are not influenced by parents. Also, those students reporting that celebrities influence their body image are significantly more likely to report enjoying the shopping experience than those that are not influenced by celebrities. There was no significant difference among students who self-reported their weight classification (going from very underweight to very overweight) and overall shopping habits. However, students that reported being very underweight or somewhat underweight were the least likely to enjoy purchasing swimwear, pants and coats. Likewise, students that felt they were somewhat overweight or very overweight were significantly more likely to say they did not enjoy buying swimwear, pants and coats than those reporting normal weight. The results of this research has implications for the apparel merchandising industry, particularly in area of apparel promotion.

### **EFFORTS TOWARDS THE ASYMMETRIC SYNTHESIS OF THE UNNATURAL ENANTIOMER OF THE TAXOL (PACLITAXEL) C-13 SIDE CHAIN AND THE CALCIUM ANTAGONIST DILTIAZEM**

By: Kelly Mesch

Chemistry

Faculty Mentor: Shawn Hitchcock

There has been considerable interest in the diastereo- and enantioselective synthesis of substrates that contain an alpha-halo-beta-hydroxycarboxyl functional grouping. This is primarily due to their utility as reactive intermediates in the asymmetric synthesis of natural products. A variety of chiral auxiliaries have been used to address the need for this alpha-halo-beta-hydroxy functional grouping. We had previously demonstrated that structurally novel oxadiazinanones derived either from (1R,2S)-ephedrine or (1R,2S)-norephedrine could be employed as chiral auxiliaries in the asymmetric aldol addition reaction. Based on this work, we became interested in investigating the potential of oxadiazinanones in the alpha-haloaldol addition reaction and the use of these products in the synthesis of medicinally active compounds such as diltiazem and the taxol C-13 side chain.

Diltiazem is a calcium-channel antagonist prescribed in the treatment of hypertension or cardiovascular disease. Taxol is a highly promising anticancer natural product that is an anti-microtubule agent isolated from the bark of *Taxus brevifolia*. Our research group is interested in synthesizing a fragment of this molecule that is known as the C-13 side chain. This work will be accomplished by using compounds known as oxadiazinones. Oxadiazinones are structurally novel chiral auxiliaries that have shown promise in the asymmetric aldol reaction.

This presentation will summarize the results that have been achieved thus far in the synthesis of diltiazem and the taxol C-13 side chain.

### **BOLDLY GOING WHERE NO TESTS HAVE GONE BEFORE; THE VALIDITY OF COMPUTERIZED BATTERY OF ATTENTION TESTS**

By: Rebecca Mesch

Psychology

Faculty Mentor: William Schneider

Although a wide variety of attention tests have been developed for clinical assessment, their ability to predict major life outcomes is less than impressive. It is common for objective attention tests to be uncorrelated with both self-reports of attention-related difficulties and with observations of attention problems by informed raters. This lack of correspondence between measurements probably results in the misdiagnosis of people without any disorders and the failure to diagnose legitimate cases of attention-related disorders.

It is unclear whether the low correlations between attention tests and attention questionnaires are due to the low validity of the questionnaires, the low validity of the attention tests, or both. Most self-report questionnaires for attention problems require subjective evaluations of statements such as "I am inattentive." There is good reason to believe that some people are unable to evaluate their own attention problems very accurately. People with attention problems tend to experience certain negative events (e.g., accidents, miscommunications, consequences of forgetfulness and impulsivity) more often than those without attention-related problems. Thus, it is possible that people are able to more accurately report these negative events than they are able to make accurate subjective evaluations of their attentional abilities. This study evaluated the validity of a newly developed questionnaire that samples the kinds of negative life events that are more likely to occur to those with attention problems.

Traditional objective tests of attention may fail to correlate with behavior ratings of attention problems because they are too simple compared to real life situations. This study evaluated the validity of a newly developed computerized battery of attention tests that are intended to simulate the kind of complexity found in everyday tasks.

Data collection is ongoing but when completed, roughly 100 participants from the ISU Psychology Participant Pool will have completed traditional self-report questionnaires, traditional attention tests, the newly developed self-report questionnaire, and the newly developed computerized attention tests. It is hypothesized that the new self-report and new computerized attention tests will correlate more strongly than the traditional measures will correlate with each other. Hypothesis will be tested using bivariate correlations followed by Fischer's r-to-Z transformation and hierarchical multiple regression analyses.

If these hypotheses are supported and replicate in clinical populations, researchers and clinicians might be able to use these findings to develop better measures of attention and move closer to more valid, nuanced and accurate diagnoses of attention-related disorders.

### **ADOLESCENT ATTITUDES OF DATING VIOLENCE AS PREDICTORS OF VIOLENT DATING BEHAVIOR**

By: Devon Minch

Psychology

Faculty Mentor: Marla Reese-Weber

The purpose of the present study is to help clarify the mixed findings of past research on the relationship between attitudes about dating violence and violent dating behaviors. We asked 121 high school students from a local public high school to watch a video of a violent interaction between two adolescents. Participants were asked to stop the video each time they saw violence occur, as well as report their reaction to the video, as a measure of attitudes toward violence. The participants also completed the Conflict Tactics Scale as a measure of violent dating behavior. We predicted that those who had more accepting attitudes of dating aggression would be more likely to be in violent dating relationships.

### **LIONS, TIGERS, AND LIARS: USING MASKED PRIMING TO EXAMINE THE MENTAL LEXICON**

By: Christa Mitchell

Psychology

Faculty Mentor: John Cutting

Using a word (e.g., 'lion') seems like a pretty simple thing. However, "a word" may actually consist of several related mental representations, including meaning, syntax, and form (e.g., sounds and spelling). To further complicate matters, it is possible that different representations may be used depending on whether we are trying to understand or produce a word. The current set of experiments used a masked priming task to examine what types of word representations are shared by production and comprehension

### **ENSEMBLE VERSUS FREQUENCY AVERAGES FOR A RANDOM SCATTERING MEDIUM\***

By: Matthew Narter

Physics

Faculty Mentor: Charles Su

Our system of randomly arranged plane-parallel dielectric layers with randomly varying index of refraction and width, we compare the reflection coefficient derived from the Maxwell equations with that of the Boltzmann theory [1-3]. For a strictly monochromatic field this coefficient is an oscillatory function of the laser frequency. We show how suitable frequency or ensemble averaging permits a comparison of the two theories [4]. The calculation of the usual Boltzmann scattering coefficient from microscopic parameters can be improved to permit a better agreement with the exact Maxwell data [5]. The frequency averaging in practice is much simpler to perform often times than the ensemble averaging. We would like to use this new result on the generator level to see if it is possible to get an improved theoretical equation of the Boltzmann equation.

\* Supported by grants of the NSF, Research Corporation.

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[4]S. Menon, Q. Su and R. Grobe, Phys. Rev. E 65, 051917 (2002).

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### **ARE POSITIVE AND NEGATIVE EMOTION WORDS RELATED TO SESSION OUTCOMES IN DIFFERENT WAYS AS THERAPY PROGRESSES?**

By: Kate Nash

Psychology

Faculty Mentor: Jeffrey Kahn

Research suggests that writing about emotional topics improves one's health with implications that talking about emotional experiences may have the same effect (Pennebaker & Graybeal, 2001). To further explore this issue, the output of the LIWC program will be analyzed to assess the use of positive and negative emotion words that are expressed by a client to his/ her therapist during three therapy sessions. Specifically, the types of emotion words uttered by the client will be correlated with the depth and smoothness throughout the three sessions. My first hypothesis is that the use of positive and negative emotion words in the first session will be correlated with rougher sessions than the following two sessions. My second hypothesis is that the positive correlation between positive and negative emotion words and session depth will increase with each session. Eleven undergraduate students who signed up for a research experience served as the clients and first year doctoral students served as the counselors. Each client had three sessions with their counselors, which were all videotaped and later transcribed by trained undergraduate students. The Linguistic Inquiry Word Count (LIWC) program was analyzed, which is a computerized method of counting words that are in different categories (Pennebaker, Francis, and Booth, 2001). For our study we focused on affective or emotional psychological processes, which assessed the use of positive emotion words (i.e., happy, certainty, pride) and negative emotion words (i.e., nervous, afraid, tense, cry) that were uttered by the client during their counseling session. A Session Evaluation Questionnaire (SEQ) was used to evaluate good and bad counseling sessions. The SEQ examined how powerful and valuable (versus weak and worthless) and how relaxed and comfortable (versus tense and distressing) the counseling sessions went, also known as depth and smoothness (Stiles, Gordon, & Landi, 2002). A group of skilled undergraduates watched the counseling sessions and rated the sessions using the SEQ, which served as an important outcome variable in our study. It is expected to find that the use of positive and negative emotion words will improve session outcome. Since past research has primarily focused on writing about emotional words, future research could further examine the use of language and talking about positive and negative emotion words and how that affects session outcomes.

### **MODERN TIMES CALL FOR ANCIENT MEASURES: AN EVALUATION OF BUSINESS ANTHROPOLOGY**

By: Brian Nauss

Sociology and Anthropology

Faculty Mentor: Gina Bessa, James Skibo

Anthropology is now being applied in the corporate arena in a field referred to as "business anthropology." Here anthropologists apply their theories, methods and techniques to solve practical business problems. While this new approach is supported by many in the anthropological community, there are others who find this work troubling, even unethical. This paper introduces the topic of business anthropology and then explores both the positive and negative aspects of this new approach. I will assess the impact of business anthropology not only on the corporate world, but on the field of anthropology as well.

## **A STUDY OF FASHION TRENDS: FORMAL VERSUS CASUAL DRESS BETWEEN MALES AND FEMALES IN DIFFERENT GEOGRAPHICAL LOCATIONS**

By: Claire Nevell, Emily Morgan

Family and Consumer Sciences

Faculty Mentor: Julianne Trautmann

The purpose of this research was to determine how widely accepted the trend towards casual dress has become in today's Western society. Other factors studied include the way gender, geographic area, and specific location affect the frequency of the casual wear trend. To study this issue, the research questions were: How prevalent is today's trend towards casual dress in central Illinois as compared to suburban and metropolitan areas in Illinois? And, Does gender or the situation one is in have an impact on one's tendency to dress casually? To examine these questions, the researchers gathered data through an observational study. Data was collected at seven sites, including college campuses, fine dining establishments, businesses, shopping establishments, churches, hangouts, and grocery stores in three different population areas (i.e., the metropolitan city of Chicago, the suburban cities of Gurnee or Orland Park, and the central Illinois city of Normal). In total, 6,591 individuals were observed over the course of the study: 3,077 men and 3,514 women. In relation to geographic area: 2,759 individuals were observed in Chicago, 1,793 in the suburbs of Chicago, and 2,039 in central Illinois. A fashion count method was utilized to gather data by tallying the number of people observed wearing casual dress and the number wearing formal dress, according to predetermined operational definitions. Results showed that the majority of the observed subjects dressed casually in traditionally casual situations (e.g., grocery stores, college campuses) and formally in traditionally formal occasions (e.g., church, fine dining establishments). The researchers found no considerable difference between the formality of dress choices between men and women. The composite results showed that about 61% of the subjects in the suburban and central Illinois areas dressed casually in all seven locations, while closer to 50% of the metropolitan population dressed casually in the same situations. Therefore, people in metropolitan areas appear to dress more formally than those in suburban or rural areas, regardless of gender or the situation one is in. Geographic locale appears to be the strongest factor that determines whether people dress more formally or more casually.

## **CONDITION OF COUNTY WATER USE IN ILLINOIS**

By: Bradley W. Newman

Geography-Geology

Faculty Mentor: Jill Freund Thomas

The population of the United States is expected to grow by 50 million people, or 18% by the year 2020. During this time period, the population of Illinois alone is expected to increase by 1.5 million persons. Subsequently, an increase in population means an increase in our societal constraints on water, one of our most important natural resources.

Nestled between the mighty Mississippi River, and Lake Michigan, it is not surprising to find out that most Illinois citizens believe that an abundance of water is literally flowing through their backyards. In fact, this simple geographical view of the land and our water supply is far from the truth. Because of a growing population, increasing energy consumption, and standing regulations on our existing water delivery systems; the reality of the situation presents a story of advancing water shortages.

Through the use of maps and other visual data, I show that county water needs are greater than the public perception. Ben Dziegielewski, a professor of Geography at Southern Illinois State University authored a recent report "County-Level Forecast of Water Use in Illinois: 2005-2025" on just this subject. Professor Dziegielewski has focused on several water use sectors that he sees as having the greatest impact on water levels. Of his seven classifications, I will be using data analyzing thermoelectric, irrigation, self supplied commercial/industry, self supplied domestic, and public supply to call attention to future Illinois water needs and regulations by 2025.

## **TEACHER IMMEDIACY AND PERCEIVED TEACHER EFFECTIVENESS**

By: Kristina Nollinger, Amy Stumpf

Communication

Faculty Mentor: Mark Comadena

This study seeks to determine if students associate different levels of verbal and nonverbal immediacy behaviors with teacher effectiveness. Eighty-seven undergraduate students at a large Midwestern university were surveyed. In this experimental study, participants were asked to think about either the most effective or least effective teacher they have ever had and rate that teacher's verbal and nonverbal immediacy behaviors. Immediacy behaviors were rated using scales developed by Gorham (1988) and Richmond, Gorham, and McCroskey (1987). Data reported herein indicates that students associate high levels of both verbal and nonverbal teacher immediacy with teacher effectiveness.

## **ROMANTIC PARTNER Q-SORT: A NEW METHOD TO ASSESS ATTACHMENT PROCESSES IN ROMANTIC RELATIONSHIPS**

By: Alexandra Noriega, Angela Marotta

Psychology

Faculty Mentor: Gary Creasey

Attachment experiences with romantic partners become internalized as relationship-specific attachment representations (Treboux et al., 2004). The adult's model of the self relates to the degree to which the adult has internalized a sense of self worth and considers himself/herself a viable attachment figure to the partner. Likewise, the model of the attachment partner concerns schemas regarding the availability and support of the partner (Simpson et al., 2002). The methods used to assess PAR are time consuming or have questionable validity. For example, while PAR garnered from the Current Relationship Interview (CRI; Crowell & Owens, 1996) forecast marital stability, the interview is time consuming. Thus, this method is viewed as an inaccessible instrument for most professionals. Conversely, there are questionnaires that assess adult thinking about attachment relationships. Although economical, experts have voiced concerns about their validity as legitimate measures of attachment; attachment ratings from these instruments are weak predictors of observed romantic relationship behavior.

To address these concerns, we have developed an alternative attachment measure. The Romantic Partner Attachment Q-sort (RPAQ; Creasey, 2005) constitutes a 100-item card sorting method that provides an assessment of partner attachment representations. Its goal is to assess performance of major representation outcomes—the adult's model of the self as a competent attachment figure, as well as the partner. The RPAQ is more economical than the aforementioned CRI; yet, guided by a comprehensive theoretical framework that provides a thorough attachment assessment. Methodologically, the sort requires a person-centered description; the sorter must consider a single item with all of the other items in the set. Also, the sorter must create a distribution of responses, which discourages response sets. The RPAQ more likely activates attachment representations than an attachment questionnaire; most adults frequently report it is a challenge to sort cards into a fixed distribution. The task itself may activate the attachment system and provide a more accurate assessment than questionnaires. Over the course of the semester, we have tested the viability of this instrument by administering it to a sample of college students, along with general mood measures and attachment questionnaires. It is our theory that RPAQ performance will be distinct from general mood assessments, and be modestly related to attachment functioning as assessed via these questionnaires. Implications for future research will be discussed and sample items provided.

## **REDUCING BACK PAIN IN NURSING HOMES BY USING MECHANICAL LIFTS**

By: Jacob Nowicki, Erin Cropsey

Health Sciences

Faculty Mentor: George Byrns

A cross-sectional pilot study of two nursing homes in central Illinois collected information on back pain status, lifting patterns, lift equipment use patterns, among other demographic variables. Staff that reported back pain were 3.5 times more likely to have performed an unassisted hazardous manual lift (fallen resident). Those with back pain were 2.8 times more likely to have not used a mechanical lift. The use of mechanical lifts appeared to be protective. Our study also showed a marked difference between site #1 & site #2 in the frequency of doing these unsafe manual lifts. Site #2 had a rigorously enforced no-lift policy; employees were significantly less likely to perform these dangerous lifts. The implications are that facilities should strictly enforce existing "no-lift" policies and enhance mechanical lift capabilities to reduce work related back pain incidence in nursing home staff.

## **TEAM MERCURY: ILLINOIS STATE UNIVERSITY'S SOLAR CAR RACE TEAM**

By: Nathan Nutter, Chris Bush, Nick Jurasek

Physics

Faculty Mentor: Daniel Holland, Brian Clark, David Mark

In just a few months Team Mercury was able to construct a race-worthy vehicle. Lack of time, money, and other resources challenged the team as obstacles to be overcome. The team qualified, a feat in itself, and completed in the North American Solar Challenge in our first year. We were the last car to cross the finish line but we were not the last car listed on the race standings. This is because two other teams were unable to complete the race. The design of Mercury 1, the principles of Team Mercury, and the experience of the 2005 North American Solar Challenge will be shared with the public through a series of slides, multimedia, and interviews with team members. Concerning the design of Mercury 1, an overview of the electrical systems (battery storage, motor control, solar array) and the mechanical systems (body, motor, suspension) will be available. We purchased the shell of Mercury 1 from the University of Minnesota to jump-start our program.

From the mechanical side, the project consisted of modifying the body to meet current regulations as well as redesigning several key mechanical components such as the drive train, roll bar, and battery enclosures. We discuss the modifications made for the 2005 race as well as planned future modification based on our experiences.

From the electrical side the project consisted of designing and implementing the entire electrical system, from the solar array to the batteries to the motor. Information about the current electrical system as well as future plans will be presented.

## **DYNAMICAL SYNCHRONOUS COMPETITION**

By: Nathan Nutter, Matthew Davis

Physics

Faculty Mentor: Epaminondas Rosa

Coupled nonlinear oscillators abound in nature and in man-made devices. Think, for example, of two neurons in the brain competing to get the attention of a third neuron, and eventually developing some sort of synchronization process. This is a common feature of oscillators in general, and can be studied using numerical simulations and/or experimental setups. Here we present results, both numerical and experimental, involving electronic circuits and plasma discharge tubes showing interesting behaviors related to the types of oscillators and the complexity of couplings. In particular, for the case of two oscillators competing for synchronization with a

third one, we observe that the target oscillator synchronizes alternately with one or the other of the competing oscillators. The time durations of synchronization states vary in a random-like manner.

#### **MONTE-CARLO SIMULATIONS FOR LIGHT SCATTERING IN MILK\***

By: Alison O'Connell

Physics

Faculty Mentor: Charles Su

We inject an angularly collimated laser beam into a scattering medium of a non-dairy creamer-water solution and examine the distribution of the scattered light along the optical axis as a function of the source-detector spacing. The experimental and simulated data obtained from a Monte Carlo simulation suggest four regimes characterizing the transition from un-scattered to diffusive light. We compare the data also with theoretical predictions based on a first-order scattering theory for regions close to the source, and with diffusion-like theories for larger source-detector spacings. We demonstrate the impact of the measurement process and the unavoidable absorption of photons by the detection fiber on the light distribution inside the medium. We show that the range of validity of these theories can depend on the experimental parameters such as the diameter and acceptance angle of the detection fiber.

\* Supported by grants of the NSF, Research Corporation, Illinois State Honors Program.

[1] For related work see <http://omlc.ogi.edu/software/mc/index.html>

[2] S. Menon, Q. Su and R. Grobe, Opt. Lett. (in press).

[3] S. Menon, Q. Su and R. Grobe, Phys. Rev. Lett. (in press).

#### **UNDERSTANDING MOVEMENT OUTCOMES THROUGH TEXT SEQUENCE AND PRIORITIZATION OF INFORMATION**

By: Jared Olesen

Sociology and Anthropology

Faculty Mentor: Richard Sullivan

This research explores a method to identify movement outcomes through protest event frame analysis, assessing changes in the subject/object patterns within news media coverage of global justice protest events. The aim is to identify changes that reflect shifts in the social agreement or framing surrounding the legitimacy of movement claims. The analysis is based upon the coding of subject/object sequences in newspaper text, in order to identify patterns in sequencing that may reflect changes in the public framing of contentious protest action. This method is adapted from one used in the examination of media reports surrounding criminal violence. In the past, analyses of reports surrounding criminal behavior have been shown to reflect certain existing social agreements about the justifiability of violent acts (Cerulo 1996).

In the following, I argue that these ways of understanding violence constitute frames that also exist in the broader social mind concerning the justifiability or legitimacy of movement actions. These frames are shown to be reflected in subject/object sequences within news text concerning collective action in the same way they are reflected in violent action. By identifying movement actions in newspaper text and then combining the results with coding for subject/object sequencing, the data suggests that the way in which the public frames global justice actions has indeed changed over the course of three years between events in Seattle 1999 and events in Miami 2003.

On average, 61.7% of protester-"state" interactions surrounding the 1999 incidents in Seattle and published in the NYT and AP were framed in a manner that favored the protesters. Four years later, the coverage of the Miami demonstrations produces coverage in which 43.3% of the interactions are framed in a way that favors protesters, a drop of 18.4% in favorable description. In a span of only four years, it seems that the public's framing of global justice protest events has crossed a critical boundary in which support of the movement's claims has dropped significantly.

This research has important implications for the study of social movements and collective action. Since text sequence analysis allows a clear look into the cognitive structures of justifiability, it offers a method for assessing movement outcomes. Newspaper text can now be examined in order to determine what a movement may be doing right or wrong, by providing a reliable means to determine the way the public is viewing actions of a movement.

#### **DETERMINING THE RELATIONSHIP BETWEEN CONDOM SELF-EFFICACY AND CONDOM USE AMONG WOMEN ATTENDING AN STD CLINIC**

By: Lauren Park

Nursing

Faculty Mentor: Caroline Mallory

Condom use has directly impacted the spread of HIV. If individuals do not utilize protection from condoms during sexual activity, HIV infection is an increased and serious risk. Many factors influence the decision on whether or not an individual chooses to use a male condom when engaging in sexual activity. This study seeks to understand the relationship between condom self-efficacy and the use of male condoms. A cross-sectional, descriptive correlational design of 75 women recruited from an STD clinic was used to collect and analyze information. Participants were 18 to 51 years old ( $M=27$ ,  $SD=9.2$ ), primarily English speaking, and HIV negative. Most women were White (70.3%), heterosexual (82.4%), single (72%), childless (60%), and have completed a high school education ( $M=13.30$ ). The results of the study indicate that of 67 recorded women, most women have had vaginal sex one time in the past three months ( $n=14$ ). Most women did not use a condom the very last time they had sex ( $n=49$ ) and 36% of the women never use a condom with their partner when having vaginal sex. A negative relationship exists between the frequency of protected vaginal sex and the frequency of women putting a condom on their partner ( $r = -.419$ ,  $p = .000$ ). A negative correlation also subsists between the frequency of how often a participant puts a condom on their partner during vaginal sex and the amount of times during the last three months a participant had vaginal sex without a condom ( $r = -.449$ ,  $p = .000$ ). There is a positive relationship involving the frequency of how much of a problem starting over using a new condom if it is put on the wrong way and how often in the last three months a participant had sex without a condom. A positive relationship connects the frequency of the participant's problems with carrying a condom with them in the past three months and problems with unrolling a condom fully to the base of a penis ( $r = .641$ ,  $p = .000$ ). These findings

suggest a relationship between condom self-efficacy and condom use. Additional testing with a larger sample size and more generalizable population would assist in confirming this correlation.

### **OXADIAZINONES AS CHIRAL AUXILIARIES: THE ASYMMETRIC SYNTHESIS OF A PROPOSED HYDROXYETHYL ISOSTERE OF A HUMAN T-CELL LEUKEMIA VIRUS (HTLV-1) PROTEASE INHIBITOR**

By: Raleigh Parrott

Chemistry

Faculty Mentor: Shawn Hitchcock

Oxadiazinones are a family of chiral auxiliaries that have shown high diastereoselectivity with asymmetric aldol reactions. A persistent problem that occurs throughout several of the oxadiazinone systems is hydrolytic cleavage. Due to this issue, a new method for hydrolysis has been developed based on amine protecting group chemistry. Removal of the N4-substituent before hydrolysis may offer an advantage towards the success of hydrolytic cleavage at the N3-amide bond. After successful cleavage, the research will be directed towards the synthesis of a proposed hydroxyethyl isostere of a Human T-cell Leukemia (HTLV-1) protease inhibitor.

### **PLASTIC POLYMER RECYCLING**

By: Raleigh Parrott

Chemistry

Faculty Mentor: Craig McLauchlan

Plastic recycling is a common idea today and has become very popular throughout the world. However, knowledge of the composition of the recycled materials is not so well known. The plastics that are recycled everyday in the United States are derived from specific chemicals and sometimes a mixture of chemicals. The chemicals chosen for a specific plastic will determine the characteristic that the final product will have (durable, clear, flexible, etc.). This presentation will explain the overall process of recycling and the common chemical components that are used in everyday plastics.

### **CONVERSION OF GASOLINE POWERED ENGINE TO HYDROGEN POWERED**

By: John Penczak, Lam Nguyen

Physics

Faculty Mentor: David Marx

As problems with fossil fuel energy production, such as pollution and cost, increase, it has become more evident that it is necessary to investigate other sources of energy production. Many sources have been investigated, but one of the most promising leads is the use of hydrogen as a fuel. Some engines have already been built which can use hydrogen as a fuel. Hydrogen has two important advantages. First, the byproduct of its combustion is water, unlike the many carbon and nitrogen based pollutants formed from the combustion of fossil fuel gasoline. Also, hydrogen gas can be generated from water through the process of electrolysis.

In efforts to investigate the possibility of using a hydrogen engine we are attempting to convert a regular 2-stroke gasoline engine into a hydrogen-fueled engine. The primary goals of this experiment is to actually have a running engine fueled only by hydrogen and measure the performance characteristics, including the fuel consumption rate.

### **GO LIGHT ON POLLUTION**

By: Tracey Plackett

Geography-Geology

Faculty Mentor: Jill Freund Thomas

Light Pollution is a problem which has grown steadily since the time electricity was discovered and towns started blooming into major cities. Light pollution is the "Illumination of the night sky by electric lights, as in an urban area, that interferes with astronomical observation." (Wikipedia) Not only are there too many lights on at night, but the lights on are not shining in the right direction; downward. Light pollution is impacting the night skies and the way people see the stars. People want to be safe at night, walking the streets, or preventing break-ins of their homes or businesses. But the over use of electrical lighting is expensive and can reduce security, along with making the starry skies too bright to see, hiding the stars.

This poster will illustrate how the night sky has increased in luminosity since 1970, as well as the amount of money states spend on electricity. And how using alternative, cost effective new lighting sources can reduce light pollution and save money.

Fixing the light pollution problem would help out the astronomers and others who enjoy the night sky. In turn it would cost America less money, and would be just as safe at night. The flat-lens cobra luminaire light fixture is just one of the newer lights that do reduce light pollution. It ensures that light is directed downward instead of upward or outward. By using less intensive lighting people can make light pollution less severe and have America seeing the night skies again.

### **THE WHYS AND HOWS OF USING CENTERS IN THE K-3 CLASSROOM**

By: Lauren Ptak

Curriculum and Instruction

Faculty Mentor: Ellen Spycher

This research presentation will examine the history, theory, and practice of using learning centers in the K-3 classroom. The research involved combining readings in current research with ideas for actual practice and use of centers in the classroom. Emphasis will be placed on how to plan, maintain, manage, and assess centers. In addition, the use of centers will be correlated with the current focus in aligning classroom activities with appropriate learning standards.

### **MORE THAN JUST STORIES: HOW FOLKLORE SHAPES CONTEMPORARY SOCIETIES**

By: David Retzer

Foreign Languages

Faculty Mentor: Roger Thomas

The differences between Eastern and Western societal views are shaped by the traditions and histories that are both consciously and unconsciously impressed upon the members by their respective cultures. One such example is through the use of folklore and mythologies. Cultural norms and outlooks on life are shaped by implicit meaning within these stories. Through linguistic analysis of various tales and corresponding cultural practices I will show both dissimilarities and similarities between Eastern and Western social standards. In particular I will focus on Japanese, Norse, Greek and Roman myths. In many ways the principles behind the texts will line up and transcend the variations between the civilizations, but others will perpetuate the differences between the Eastern and Western practices. This study presents a cross-cultural comparison that will help in societal understanding of these individual cases as well as provide observations and points applicable to societies throughout the world.

### **GENDER AND TECHNOLOGY**

By: Rachel Ripley

Sociology and Anthropology

Faculty Mentor: James Skibo

In this paper I will examine the relationship, cross-culturally, between pottery technology and gender. Pottery making, worldwide, is closely associated with gender as women are usually the potters in household where men get involved once it becomes a full-time craft. For example, in small towns around Ra'quira Colombia women make the traditional cooking pots, water jugs, and other food preparation vessels where as in Sogamoso, an urban center, men make table wear and planters on a sidesaddle kickwheel. In this paper I will explore this relationship between pottery and gender through an analysis of data collected by the Human Relations Area Files. Once the long known pattern between pottery making and gender is also demonstrated with these data, I will explore the reasons behind this strong relationship. Why do men get involved in potting when it becomes a full time craft, and why do women in some societies continue to make pottery even when it is done at the workshop level? The economic and social factors involved in this transition will be explored.

### **THE FOREIGN INTELLIGENCE SURVEILLANCE COURT: FOUNDING, STRUCTURE, FUNCTION, AND CONTROVERSY**

By: Kyle Roberts

Politics and Government

Faculty Mentor: Robert Bradley

My research focuses on the Foreign Intelligence Surveillance Court and the controversy currently surrounding it. In looking at the court, excluding the controversy, my research focuses on three key sections, including: the court's founding, structure, and function. In addition, my research briefly examines the impacts of the USA Patriot Act on the FISC. When looking at the current controversy, my research examines the December 16, 2005, New York Times article, which first informed the public of the domestic wiretaps authorized by President George W. Bush. From there, my research goes on to examine the controversy utilizing statements from various political figures, including: congressmen from both parties, President Bush, and other influential political figures in Washington DC. Finally, I attempt to assess the future of the FISC, taking into account the possible ramifications of the controversy and any potential legal actions.

### **FRACTAL DIMENSION OF RIVER SYSTEMS VERSUS GEOLOGICAL AGE**

By: Bryan Robinson, Brian Schmalzer, Andrew O'Connell, Michael Urbanc

Mathematics

Faculty Mentor: Fusun Akman

There are many naturally occurring objects that seem to repeat themselves infinitely many times as we observe them at higher and higher resolutions. For example, parts of silhouettes of mountain ranges, shorelines, branching trees, bronchi, and river systems when studied on a smaller scale tend to have the identical shape (on the average) as the larger object. These "self-similar" or "fractal" objects do not live in the same Euclidean world as the rest of us, in the following sense.

Unlike perfect geometric shapes, fractals are far from being smooth. The fractal dimension of such an object is a measure of the "wiggleness" of the object (which does not change even after a change of scale). As a crude example, we consider a sheet of paper which is normally two-dimensional. If we start crumpling it, the sheet starts looking thicker than 2-D due to the creases, and when completely balled up it almost looks three-dimensional. It is believed that the human eye perceives a landscape whose fractal dimension is 0.2 to 0.3 higher than the supposed Euclidean dimension as "natural". Thus the rugged Blue Ridge Mountains look natural with dimension 2.2-2.3, whereas the super-rugged Bryce Canyon in Utah (dimension 2.5) looks alien. Computer-generated images of fractal landscapes have been used in cinematography for a long time, arguably starting with "The Wrath of Khan" (Star Trek II).

During this project we will obtain highly detailed digital images of river basins and data on the ages of the same rivers as measured by geologists. We will use these pictures to carefully define and calculate the fractal "box-counting" dimension of each, using standard software. We will then relate the fractal dimensions of these rivers to the ages of the rivers: we hypothesize that older river basins have higher dimension. In the crumpled paper example above, we notice that as time progresses the wiggleness (dimension) of the sheet increases; this is believed to be a common feature of many natural formations.

Another aspect of our project will be the comparison of mathematical concepts such as "fractal dimension" to geological concepts such as "sinuosity" that describe river systems quantitatively and the creation of a partial dictionary. We will be asking for the help of experts from the Geology Department at ISU in locating geological software that computes variables related to the fractal dimension.

### **IMPORTANCE OF GOALS IN FORMING A RELATIONSHIP**

By: Derek Rohleder

Psychology

Faculty Mentor: Glenn Reeder, Susan Sprecher

Goals can exist in many different forms for an individual, such as financial goals, career goals, material goals, and goals for

relationships. It is specifically an individual's goal for a relationship that this study seeks to examine. This study asks questions about what variables are important for an individual to form a relationship. Does an individual feel that in order to become involved in a relationship, the possibility of having and raising children must be present? Or is an individual interested in forming a relationship in an attempt to increase their self-esteem or social status? We are also interested in determining how an individual's relationship goals may change throughout their college experience. In an attempt to discover if any difference does indeed exist, incoming freshmen and graduating seniors will both be issued surveys. It may be seen that the graduating seniors are more interested in beginning a family and in achieving a high level of economic success, making these variables more important than the incoming freshmen. It may also be seen that the incoming freshman may want to form a relationship that allows them independence as well as increasing their social standing. Another prediction would be that men who are graduating may believe that the possibility of having children is more important than the graduating women do. I believe that after finishing college, many women would want to begin their career and that starting a family would be less important for them. In addition, this study is also measuring the perceived stereotypes of the sexes concerning relationship goals. These surveys will be administered to sophomore and junior undergraduate students. One prediction is that the males will believe that sharing one's emotions would be important for the females. The females would probably believe that maintaining individual independence would be important for the males. It will be fascinating to discover what differences exist between the relationship goals of freshman and the seniors; as well as what stereotypes are present among the sexes.

### **EFFECTIVENESS OF ENERGY MANAGEMENT UNIT ON REDUCING ENERGY CONSUMPTION OF CAMPUS VENDING MACHINES**

By: Kevin Rohrer, Jake Nowicki

Environmental Health and Safety

Faculty Mentor: Guang Jin, Tom Bierma

As universities and other institutions seek to become more energy efficient in order to save money and improve environmental performance, the energy consumption of vending machines is an important priority. New vending machines are often built to meet Energy Star standards for energy efficiency. However, the energy-efficiency of existing machines can only be improved with the addition of energy management units designed to better control compressor cycling and reduce overall energy consumption without compromising product quality or vending machine lighting.

During a five-week testing period (11/03/2005 through 12/15/2005) an add-on energy management unit was placed on two vending machines in separate campus buildings at Illinois State University. The units were turned on and off on alternating weeks to control for varying weather conditions and vending rates. Energy usage was continuously measured and logged at 8.5 -17 minutes interval using Watts up? PRO data loggers from Electronic Educational Devices. Average power demand (in watts) and average energy consumption (in watt-hours) were compared for each machine between times that the energy management unit was on and when it was off.

Results indicated energy saving significantly smaller than expected. However, the energy management unit did apparently reduce the cycling of the compressor, suggesting that the technology would have the benefit of extending the life of the compressors and reducing maintenance costs. Our results agree with the work of others in terms of reduced compressor cycling, but differ from others in terms of energy savings. Possible reasons for these differences are explored.

### **CURRENCY AND RELATED CONCEPTS IN CROSS CULTURAL PERSPECTIVES**

By: Joshua Rosen

Sociology and Anthropology

Faculty Mentor: Gina Bessa, James Skibo

This thesis examines the concepts related to currency in non-market and market economics. A variety of social relationships is established through currencies and the behaviors that are associated with them. Some form of currency is essential to all societies as a system for exchange. The use of currencies and concepts related to it vary cross-culturally especially in respect to concepts of value and time that are associated with currency. Through a variety of case studies this thesis will examine the effects and changes of the introduction of new concepts of currency from market economic cultures to non-market economic cultures and how they affect concepts of value and time within each culture. These relationships will be examined in order to gain a better understanding of the introduction of market economies and their effects on traditional societies.

### **ADOLESCENTS' AGREEABLENESS AND ATTRIBUTIONS ABOUT PEERS**

By: Magan Sage

Psychology

Faculty Mentor: Renee Tobin

Studies have suggested that children's aggressive behavior affects their attribution to interpersonal scenarios (Dodge, 1980). Aggression was defined as "a hostile and assertive response to perceived threat or intentional frustration" (Dodge, 1980). A child's level of aggression relates to how they will perceive non-aggressive situations. This study focuses on the level of agreeableness, rather than aggression, in predicting perception of ambiguous, hostile, and accidental situations. Agreeableness, defined as a voluntary behavior to promote a positive approach towards others in maintaining a smooth relationship, is the main personality trait looked at in this study (Graziano & Eisenberg, 1997). A child's level of agreeableness will relate to how they will perceive the various situations. Seventeen adolescents, ages 13-16, viewed ten scenarios consisting of hostile, accidental, or ambiguous acts performed by an unknown peer. Following each scenario each participant was asked a series of questions to assess their attributions about each scenario. Measures of agreeableness were obtained from both the parent and the adolescent using the Big Five Inventory (John & Srivastava, 1999). Similarly, measures of aggression were obtained from both the parent and the adolescent using the second edition of the Behavior Assessment System for Children (BASC-2; Kamphaus & Reynolds, 2004). These individual difference variables were used as predictors of responses to the ambiguous, hostile, and accidental peer-provoked scenarios. It was hypothesized that children with low aggression and high agreeableness will view these interpersonal scenarios as accidental, whereas children with high aggression and low agreeableness will view them as done on purpose. Results will focus on hypothesis testing and describing the interrelations of these variables.

### **PNEUMATIC CONVEYING**

By: Steve Sajenko

Physics

Faculty Mentor: David Marx

Pneumatic conveying of materials with vacuum pick-up and pressure discharge provides a new approach to handling products such as, injection molding of bottle caps with product discharge thru the vacuum conveyor to storage hopper for discharge to boxes for shipment; loading candy, chocolate, or licorice products from staging to coating such as coating a nugget with chocolate and then conveying the coated product to packaging; or moving any material from one location to another without having to physically handle the products which may be hot (as with injection molding), sanitary (as in candy or chocolate) and cumbersome as in scooping products rather than picking them up, as with a vacuum cleaner but with a sanitary means.

### **GENDER DIFFERENCE IN THE RELATIONSHIP BETWEEN TELEVISION VIEWING AND AGE AT DATING INITIATION**

By: Heitor Saraiva

Psychology

Faculty Mentor: Rocio Rivadeneyra

The teenage years seem to be a crucial time in people's lifespan as much identity formation takes place during these years. Sexuality is one of the central points to identity exploration in adolescents. Research has found a correlation between television viewing among boys and girls and their sexuality (Ward, 1995). When taking a closer look at television shows, various analyses on television programs have found and documented numerous references to dating and sex (Shapiro & Kroeger 1991; Haferkamp 1999). In fact, it has been reported that nearly seven in ten television programs contain a sexual message (Kunkel 2001). Moreover, an average of ten references to intercourse per hour occurs in soap operas (Greenberg & Busselle 1996; Heintz-Knowles 1996) and an average of twenty instances per hour in programs most preferred by adolescents (Ward 1995). Teenagers who believe these television programs to be the norm may be more open to sexual experimentation as seen in the research done by Ward and Rivadeneyra in 1999. Participants who perceived the sexual situations viewed on the television shows to be more likely to happen in their own lives were the ones that reported greater levels of sexual relationships (Ward & Rivadeneyra, 1999). Although the connection between television viewing and sexual outcomes has begun to be examined, there seems to be little study on how this may affect the age of dating initiation among teenagers. This study will look at survey data from 160 teenagers on their television viewing and a regression analysis with a cross product variable will be performed. Based on past research on the relationship between television viewing behaviors and sexual initiation and sexual relationships, this study hypothesizes there will be a stronger correlation between television viewing and age of dating initiation for girls than for boys. If supported, this study could give basis for a change in the way teenage girls are being taught in sex education classes as well as making a push for television education, especially for girls.

## **LATIN IS NOT DEAD: THE INFLUENCE OF ANCIENT LATIN ON MODERN DAY ENGLISH**

By: David Schauer

English

Faculty Mentor: Aaron Smith

Through borrowing, ancient Latin has had a powerful influence on modern day English. Many people may say that Latin is a dead language, an exact definition of which is that a dead language is “a language, such as Latin, that is no longer learned as a native language by a speech community; a language that is no longer learned as a native language” (Dictionary.com, 2006). Though it mentions Latin specifically in the definition, in this paper I challenge this notion and conclude that it is only somewhat true. Except for the Roman Catholic Church, most do not write or speak in Latin and certainly the teaching of Latin is rare and perhaps increasingly so. However, English is a thriving language, used daily on virtually every continent all over the world. Because of the influence that Latin has had on English, we can say that in some sense, Latin lives on, living not as itself, but disguised as English. Hidden beneath the growth and mossy changes that languages take on, Latin has evolved and grown. Most people are aware that English has borrowed many words from Latin (and its daughter languages, e.g. French, Spanish, etc.) but few are as aware of how Latin, because of the important role it has played in literary English, has influenced even the grammatical structure of English. Therefore in this paper, I argue that the influence of Latin on English is more pervasive and deep than many have previously accepted and thereby underscores my assertion that in some sense Latin is very much a living entity.

## **MENTAL ILLNESS STIGMA AND PERCEPTIONS OF DANGEROUSNESS**

By: Kim Schubert, Talia Dart

Psychology

Faculty Mentor: Glenn Reeder

Our study aimed to identify reactions to people who have been diagnosed with a mental illness. 160 participants watched a movie in which they saw a man named Harry either go to see his dentist or his psychiatrist. Participants were told before the start of the movie that the man had either a severe dental or severe mental problem. Also, some participants watched the same man at a party demonstrating an ambiguous behavior that could be interpreted as being aggressive. He played a game with a friend where he slapped the friend's hand. The participants were then asked to answer questions regarding their opinions about his behavior. They were randomly assigned to have either four seconds to read and answer each question or to go at their own pace. Following those questions, participants filled out questionnaires regarding their intentions and motivation to control prejudice, disgust sensitivity, their need for cognition, and their perceptions of people with mental illnesses. These questionnaires were given in opposite order for every other participant in each group. We predict that we will see a higher rating of fear and perceived dangerousness when the participants see Harry go to the psychiatrist.

## **THE HUMAN GENOGRAPHIC PROJECT**

By: Kyle Schultz

Communication

Faculty Mentor: Megan Houge

A new research project by the National Geographic project is attempting to pick up where the wildly successful Human Genome Project left off, by attempting to trace the movement and migration of ancient humans as they migrated out of Africa. The massive, privately funded project is attempting to fill the gaps in our understanding of history using the clues locked inside human DNA. Around the world, scientists are taking thousands of genetic samples from members of indigenous tribes and asking volunteers to mail in samples. The project hopes to build and analyze the world's largest genetic database in an effort to gain an understanding of the way in which our world was populated.

## **SYNTHESIS OF VANADIUM (III) CAGE CLUSTERS FOR CATALYTIC USE**

By: Andrew Scott

Chemistry

Faculty Mentor: Craig McLauchlan

Vanadium coordination complexes have been found to have many practical uses including catalytic oxidation. It has been shown that the extended structure of the formula  $\text{VOPO}_4$  acts as an oxidation catalyst in formation of maleic anhydride, which is industrially produced on a massive scale. It is a goal of our research to make a discrete molecular structure of the general formula  $\text{V}_4\text{P}_4\text{O}_{12}\text{R}_4\text{R}'_4$  (“ $\text{V}_4\text{P}_4$ ”), which has a cube-like structure and contains a V(III) with a tetrahedral coordination environment. This cube-like complex is thought to have a high surface area, which would be beneficial as a catalyst. These complexes will be characterized via X-ray crystallography, NMR, EPR, IR, UV-Vis, and magnetic susceptibility. In our lab, a  $\{(\text{MeO})\text{VO}_3\text{P}(\text{tBu})\}_4$  cage complex has been crystallized. The next cage complex to be produced in our lab is that using vanadium tris(pyrazolyl)borate and methyl-phosphonate salt.

## **MAINTAINING THE GYPSY IDENTITY**

By: Laura Sharick

Sociology and Anthropology

Faculty Mentor: Gina Bessa

When you say the term “Gypsy”, various images, some true and others not, usually come to mind. In this paper, I will be focusing on how the ethnic identity of the ‘Gypsies’ has been constructed and maintained in contemporary US and Europe by examining their language, ideology, customs and beliefs, laws, traditions, and music. For centuries, Gypsies have been the victims of persecution and discrimination. Consequently, I will also be looking at their history and the traditional Gypsy identity and see how it has ultimately shaped their present existence. Finally, I will be looking at the variability in Gypsy identity by examining kumpanias (bands of people) from different areas of the world.

### **THE SOCIAL CONSTRUCT OF GENDER IN PORNOGRAPHY**

By: Melissa Sierra

Sociology and Anthropology

Faculty Mentor: James Stanlaw, Lori Fitton

It has been observed that the social construct of gender has affected all aspects of life, including sex and sexuality. There are specific roles or scripts that occur within the context of sexual expression that mimic roles in everyday life. Such roles are so adherently engraved on the social mind that they have been internalized by men and women to be seen as “normal” or “natural”. One must ask then, where these notions of normalcy come from. In this paper I suggest that much of one’s notion about what role to play in the confines of their sexuality come from media portrayal of highly sexualized imagery. There are two features of media that proliferate the sex roles that accompany gender. These are the highly sexualized advertisements that subjugate women, and explicit pornography. I will show that the same positions and body placement that is used in the two aforementioned media types are also present and pervasive in non-sexual media. I will demonstrate this by examining and comparing media images where the gender roles are strongly defined, ambiguous, or reversed. There will be a strong correlation between the position of power, and or status, and the degree of gender (how masculine, or how feminine) that is presented. By examining these correlations, I will be able to further examine the value judgments that are given socially and sexually to one’s perceived gender.

### **THE RELATIONSHIPS BETWEEN MEN AND WOMEN'S EATING PATTERNS WHEN FACED WITH STRESS**

By: Jason Sjo, Kristen Zambreno, Lauren Piagentini, Nick Schwab

Family and Consumer Sciences

Faculty Mentor: Jean Memken

The lives of college students are becoming increasingly more hectic as many students try to combine work and family with getting a college degree. The purpose of this research was to compare students’ lifestyles, in particular, those aspects of life that could be related to increased stress levels among college students with their eating patterns. It was hypothesized that students who lead more stressful lives would be more likely to have poor eating habits at home, eat more often at fast food restaurants, not make a conscious effort at reducing fats or following the food pyramid, and would be more likely to skip breakfast. For this study, 276 students at Illinois State University were surveyed about their lifestyle and their eating habits. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypothesis. Stress inducing behaviors included: taking an overload of college credit, being a married student or a student with children, working, spending significant amounts of time doing homework, or not getting an appropriate amount of sleep each night. Data were analyzed using SPSS. Chi-Square statistics were used to test the hypothesis. Results showed that although some eating behaviors differed between those students who were not stressed and those that were, patterns for both groups were comparable. The hypothesis was not supported. The results of this research have implications for college administrators, wellness programs, and other professionals who work with college age students.

### **A TEST OF GENERATION EFFECTS IN RECOGNITION, FAMILIARITY AND IMPLICIT MEMORY**

By: Laura Skarren

Psychology

Faculty Mentor: Dawn McBride

Recognition memory involves dual processes of familiarity and recollection. The distinction between processes is that familiarity is an automatic process and recollection is a conscious process. For example familiarity is unintentionally recollecting the source of information and recollection is being able to identify the source of information. Previous research has indicated that conceptual processing shows an increase in estimates of familiarity in a recognition task. In addition conceptual processing increases automatic memory estimates in a conceptual task (e.g. word association). However, these effects have not been found in automatic memory estimates derived from perceptual tasks (e.g. word stem completion). Comparisons that have been made of the relationship of familiarity to conceptual and perceptual automatic memory have been done across studies. The present study was conducted to provide a direct test of the relationship between familiarity and automatic memory. A generate-read manipulation was used to test the effects of conceptual processing in familiarity and automatic memory estimates. It was predicted that automatic memory estimates in a recognition and word association task would be higher for items encoded in the generation condition versus the read condition. In contrast, it was predicted that automatic memory estimates in a word stem completion task would be higher for items encoded in the read condition versus the generation condition. The process dissociation procedure (Jacoby, 1991) was used to obtain automatic memory estimates in these tasks. The results indicated that the automatic memory estimates in a recognition and word association task were higher for items encoded in a generation condition compared to a read condition, whereas these effects were not found in the automatic estimates derived from the word stem completion task. These results suggest that conceptual automatic memory and familiarity may have similar underlying processes that are distinct from perceptual automatic memory.

### **IDEOGRAPHIC SHIFTS IN EUGENICS DISCOURSE**

By: Jason Smith

Communication

Faculty Mentor: Megan Houge, Michael Graupmann

The passage of Civil Rights legislation in the 70's saw the abrupt end of American Eugenics programs, which for over forty years had sterilized individuals falsely designated 'inferior' because of their socio-economic status, race, or mislabeled behavior. This presentation focuses upon the rhetoric surrounding Joanna Schoen's discovery of these programs' harms, and her subsequent public disclosure of Eugenics in an 2002 article series published in the Winston Salem Journal. Given the changes in the attitudes surrounding Eugenics revealed through the differences between its contemporary and incipient discourses, this presentation addresses the question of exactly how Schoen's rhetoric contributes to contemporary perspectives on Eugenics. This analysis will be conducted through the rhetorical lens of Marouf Arif Hasian's 1996 method: The Rhetoric of Eugenics in Contemporary American Thought.

### **SYNTHESIS OF NOVEL PORPHYRIN ETHERS**

By: Breland Smith

Chemistry

Faculty Mentor: Timothy Lash

Porphyryns, such as heme and chlorophyll, play important roles in many biological processes. In addition, porphyryns with fused exocyclic rings are also present in petroleum, and studies on these geological pigments may increase our understanding of the origins of fossil fuels. In earlier studies in Dr. Lash's Lab, syntheses of geochemically significant porphyryns with five, six, or seven membered exocyclic rings were developed. These porphyryns were synthesized from pyrroles with fused carbocyclic rings, which in turn were prepared from cyclic ketones. For instance, cyclohexanone reacted under Knorr-type conditions to give tetrahydroindoles, pyrroles with fused six-membered rings. In this project, the synthesis of porphyryns with fused cyclic ethers is under investigation. These may have novel binding properties and represent a new class of porphyryn structures. Tetrahydropyranone reacted with oximes or phenylhydrazones in the presence of zinc and propionic acid to give a novel bicyclic heterocycle. A related system has also been prepared from 4-chromanone. The tetrahydropyranone derived heterocycle will be used as the key intermediate in the synthesis of the targeted porphyryn ethers.

### **FEEDBACK AS A CUE OF ABILITY AND EFFORT INFORMATION: ASSOCIATIONS WITH INTELLIGENCE, IMPULSIVENESS & TYPE OF FEEDBACK**

By: Heather Snyder

Kinesiology and Recreation

Faculty Mentor: Peter Smith

Research shows that adult feedback provides important ability cues for children and adolescents. Research in the academic domain (Barker & Graham, 1987) has found meaningful developmental differences in the interpretation of evaluative feedback. In simple terms, children aged less than 11 years did not dissociate between effort and ability, while those older than 11 years did (thus, for older children and adults, praise would infer lower ability). Initial attempts to replicate these results (Amorose & Weiss, 1998, Amorose & Smith, 2003) did not succeed with participants over 11 years of age (i.e. adults did not dissociate between effort and ability; praise inferred high ability, while blame inferred low ability), but Flesch, Amorose and Smith (in preparation) did replicate the findings by using pictorial rather than videotaped scenarios. However, the effect sizes in Barker & Graham's (1987) study were considerably larger than those of Flesch et al., suggesting other moderator variables may still diminish the effect within the physical domain. Given that the attribution process by which effort and ability are dissociated is relatively complex, and there has been some discrepancy in the extant literature regarding the age at which dissociations between effort and ability appear, this study will examine whether the strength of dissociation varies across adult individuals according to measures of intelligence and impulsivity. Thus, this study will consider the relationship between intelligence (as measured by a suitable intelligence test such as the WAIS-III or Raven's Standard Progressive Matrices) and impulsivity (as measured by Eysenck et al's 1985 impulsivity scale) and the tendency to dissociate between effort and ability identified by Barker and Graham (1987). Participants (N = around 100) will be shown pictorial scenarios depicting athletes and coaches interacting following an athlete's attempts to hit a softball. Within each scenario, the coach will have provided the athlete with either evaluative (praise or blame), neutral, or no feedback. Participants will then rate the athletes' ability and effort. On a subsequent and separate testing day, participants will complete the assessments of impulsiveness and intelligence. The general expectation is that individuals scoring higher on the intelligence tests and lower on the impulsiveness scale will be more likely to dissociate between effort and ability in the manner described by Barker and Graham (1987).

### **THE EFFECTS OF SAME VERSUS OPPOSITE SEX COUNSELING DYADS ON THERAPY OUTCOME AND DISCLOSURE**

By: Stephanie Stilling

Psychology

Faculty Mentor: Jeffrey Kahn

Sex differences in counseling have been the focus of many studies done in the past two decades, but results have been inconclusive. The present study will look at the differences in therapy outcomes and verbal response modes, specifically disclosure, in 4 female client/female counselor pairings and 4 female client/male counselor pairings. Videotaped therapy sessions were transcribed, unitized and coded for form and intent using Stiles (1992) verbal response mode taxonomy system. Client perceived outcome was measured using the Session Evaluation Questionnaire (Stiles, et al., 1994). It is hypothesized that the same sex dyads, female client with a female counselor, would result in higher frequency of client disclosure, and in turn, better client outcomes than opposite sex dyads. I expect to find a significant difference in the amount of disclosures made, with same sex dyads disclosing more than opposite sex dyads. I also expect to find that clients in the same sex condition have better outcomes than clients in the opposite sex condition. Since the literature on this subject has been unconvincing, this study will help to clarify the relationship between sex dyads and their effects on disclosure and client outcomes. When this relationship has been established there will be a lot of practical implications for the counseling community, including a quick and cost-effective way to improve the quality of therapy.

### **CYANIDE-ION-SPECIFIC ELECTRODES FOR STUDY OF MACROPHAGE-INDUCED CYANATION REACTIONS**

By: Kali Stinson

Chemistry

Faculty Mentor: Frank Shaw, James Webb

Our interest in the cyanide-ion-specific electrode is relevant to a continuing study of how the macrophages of the immune system generate cyanide and how cyanide subsequently reacts with metallo pharmaceuticals, initially gold. The project looks at how cyanide reacts specifically with gold-based anti-arthritis drugs and the reaction of gold cyanide metabolites with other species. The measurement device for this reaction is a cyanide-ion-specific electrode, which has been calibrated from 1mM to 10uM. All reactions using this electrode must be done in the pH range of 10 to 14. This can be done by taking out an aliquot of the reaction and adding a calculated amount of 10M NaOH. The initial reaction to which it is being applied is  $[Au(CN)_4^-] + 2GSH \rightarrow [Au(CN)_2(GS)_2] + 2HCN$ .

The electrode detects the HCN product. Thiols, such as glutathione (GSH), react with the cyanide-ion-specific electrode. To stop these reactions, an aliquot of the thiol reaction is treated with a NEM solution to alkylate the thiol and stop it from reacting with the

electrode. Future plans are to begin to change some of the variables such as temperature and the amount of GSH to test the parameters of the basic reaction. Detailed results of these experiments will be presented in the poster itself.

#### **GEOLOGICAL INVESTIGATIONS ON PAPER**

By: Emerson Stone

Art

Faculty Mentor: Sarah Smelser

"Geological Investigations on Paper" is a processes oriented body of artwork that attempts to address connections between art and science by using geological research as a vital element in the creation of a series of prints. For this project, sedimentary rocks were gathered from various areas of Illinois and used as subjects. Visual information was gathered from the surfaces of the rocks and this information was transformed into imagery that has been abstracted through digital and printmaking processes. Any fossils that were imbedded in these rocks were then extracted and served as the source of inspiration for forms that were constructed out of paper. These forms were then incorporated into the images derived from the rock surfaces, now completing the pieces. Utilizing facets of printmaking, painting, sculpture, installation, and performance, Geological Investigations on Paper consists of twenty-one unique works of art, all of which was made possible through the Honors Summer Research Mentorship award.

#### **COMPUTATIONAL INVESTIGATIONS INTO THE CADMIUM-MEDIATED FOLDING OF THE RABBIT LIVER METALLOTHIONEIN ALPHA DOMAIN**

By: Jehu Strange

Chemistry

Faculty Mentor: Frank Shaw

In recent times, computational methods have been invaluable in the identification of factors that influence protein folding and, in the future, are likely to be essential for prediction of native structures from nucleotide and amino acid sequences. For many proteins, it seems that primary structure provides the blueprint for native conformations. In general, thermodynamically and kinetically favorable interactions among the solvent, peptide backbone, amino acid side chains, and/or certain prosthetic groups, including various metals and organic compounds, appear to drive the spontaneous, rapid, and precise formation of defined arrangements. Computational investigations into the folding pathways of large proteins are currently unfeasible due to the limitations of modern computers, so small proteins, such as the metallothioneins (MTs) must be used as models. MTs are ubiquitous in nature, and their roles have been implicated in a multitude of physiological processes, including response to stress, detoxification of heavy metals and reactive oxygen species, and normal metabolism of certain dietary minerals. MT folding is metal-mediated, as is the case for many proteins, which may be stabilized by sulfide bonds on metal centers. Based on the folding hypothesis of Robbins and Stout and an alternative hypothesis proposed by Muñoz et al. for the cadmium-mediated folding of the rabbit liver MT alpha domain, nine models involving different Cys-S-Cd connectivities and/or protein secondary structure characteristics have been proposed for investigation via molecular mechanics energy minimization and dynamics simulations. These models represent possible intermediates in the folding pathway and will likely suggest a plausible mechanism. Recent work has focused on the parameterization of force fields and preliminary minimization calculations.

#### **SYNTHESIS OF -TERTBUTYL-5-METHYL-1,2,4-TRIAZOLE**

By: Kathleen Stull

Chemistry

Faculty Mentor: Gregory Ferrence

Metal chemistry is of great importance to the world. The chemistry of metals is dominated by the formation of "coordination complexes" where some molecule "attacks" and attaches itself to a given metal. These attaching groups are commonly called ligands, and metal ligand interaction studies continues to be a major topic of investigation by scientists. The Ferrence Research group is interested in the coordination chemistry of the "rare earth" elements, often referred to as lanthanide elements. Lanthanides are the commonly forgotten elements that appear at the bottom of the periodic table. There remains a lot to be discovered about the chemistry of these elements. We are specifically interested in metal complexes involving the lanthanide ytterbium in its divalent (+2) oxidation state, which is unique because most lanthanides prefer to be in the trivalent (+3) oxidation state. The current ligand we are targeting for synthesis is the potassium salt of hydridotris(3-tertbutyl-5-methyl-1,2,4-triazolyl)borate K(TztBu,Me). To prepare this new ligand, synthesis of the 3-tertbutyl-5-methyl-1,2,4-triazole must be carried out. The first step involves the synthesis of an ionic compound called an imidate ethylester. Neutralization of this species is done via sodium hydroxide, yielding a neutral imidine ethylester. Addition of pivaloyl chloride to this compound affords an N-acyl acetimidine ethyl ester, which combines with hydrazine to cyclize the ring forming 3-tertbutyl-5-methyl-1,2,4-triazole, HTztBu,Me, our final product. In due course HTztBu,Me will be used to synthesize the targeted K(TztBu,Me); however, in this presentation we will describe the details regarding the imidate ethylester, imidine ethylester, N-acyl acetimidine ethyl ester, and HTztBu,Me preparations as well as Nuclear Magnetic Resonance (NMR) studies that confirm the product identities.

### **CANCER PAIN MANAGEMENT**

By: Traci Sucharski, Allison Schacht

Nursing

Faculty Mentor: Wendy Woith, Cindy Malinowski

Quality of life is a significant issue for cancer patients. Although, there have been numerous efforts made by health care professionals to improve quality of life, it is a complex issue with multiple factors. Pain remains one of the greatest fears and concerns in this group of patients. Part of the problem is the great knowledge deficit among nurses and patients about managing cancer pain. The purpose of this study is to come to understand the most effective ways to manage cancer pain. All of our research suggests that education is a major factor in cancer pain management. The other major issue is the best approach to combination therapies. Data was collected on patient education, patient's perceptions and evaluations of pain and pain therapy as well as nurse education. Findings suggest that there are numerous therapies available but without the proper education of both staff and patients, pain will not be managed effectively.

### **CRYSTALLOGRAPHIC TUTORIAL BASED LEARNING**

By: Elizabeth Tabler

Chemistry

Faculty Mentor: Gregory Ferrence

X-ray Crystallography is an analytical method used by chemists to examine the sub-nanomolecular structure of molecules. The realm of crystallographic structure determination has traditionally been limited to specialists trained through years of apprenticeship. With the rapid advances in the power of desktop computers in the past decade, it has become possible for non-specialists to become reasonable practitioners of crystallography. Moreover, the ready availability of the computers and powerful software needed for crystallography have made it possible to teach practical, "hands-on" crystallography to undergraduates. Materials, particularly worked examples and tutorials, to teach crystallography remain scarce. Through the use of Lectora™, we are designing and building tutorials for aid in the teaching of crystallography. Specifically at ISU, these materials are being designed for use in the special topics chemistry course CHE 380.45, "X-ray Diffractometry". This project involves the development of tutorials to help users learn to manipulate specific crystallographic software including WinGX, SirWare, sXgraph, and shelxl. Ultimately these tutorials will be used as components of a distance learning chemical crystallography course designed for majors hoping to enhance their knowledge of crystalline structures and corresponding molecular compounds. The tutorial on display represents an introduction for students beginning study in X-ray crystallography. This tutorial details information specific to WinGX and how the software takes a diffraction data set and translates it into a set of atomic coordinates representing the three-dimensional atomic structure of molecules in the solid state.

### **BINGE DRINKING AND SEXUAL BEHAVIOR AMONG COLLEGE STUDENTS**

By: Jayme Taylor

Criminal Justice Sciences

Faculty Mentor: Jeffrey Walsh

Binge drinking and its effects is discussed frequently in the media. It is believed, that college students are out of control when consuming alcohol and that this out of control behavior may lead to sexual promiscuity and other risky behaviors. The present work is an exploratory study using data comprised of Illinois State University students (n=225). Students were surveyed about their use of alcohol and participation in other risky behaviors. Findings suggest that students that live on campus binge drink more often than students who live off campus, students do not believe that alcohol affects their grades, and students are more likely to engage in unprotected sex while under the influence of alcohol.

### **DYKES ON BIKES AND VERNACULAR DISCOURSE**

By: Aubrey Taylor

Communication

Faculty Mentor: Megan Houge

The Dykes on Bikes organization was denied copyright protection by the US patent and trademark office because "Dyke" was considered a vulgar word. The Dykes on Bikes made the argument that the word was not offensive within the marginalized group. After three appeals the Dykes on Bikes got their trademark. The Purpose of this analysis is to see how Dykes on Bikes engaged in vernacular discourse to make it a part of their groups every day/vernacular language. We will be able to do this by comparing Dykes on Bike's rhetorical strategies a vernacular discourse methodology. The theoretical framework that will be used to examine the Dykes on Bikes copyright controversy will be, The Critique of Vernacular Discourse published in the March 1995 issue of Communication Monographs by Kent Ono and John Sloop. This methodology is appropriate for this comparison because it speaks about marginalized groups and the tenets needed to participate in vernacular discourse. Ono and Sloop state that "Uncovering vernacular discourse is a worthwhile goal, but a more important goal is to construct a critical framework within which to discuss vernacular discourse; uncovering vernacular discourse is not, by itself, a liberatory practice." The process by which a vernacular discourse was created will be discussed in light of Ono and Sloop's methodology before, finally, drawing critical implications from this analysis.

## **PURIFICATION AND CHARACTERIZATION OF LISTERIA MONOCYTOGENES HMG COA REDUCTASE**

By: Amy Theivagt

Chemistry

Faculty Mentor: Jon Friesen

*Listeria monocytogenes* is a gram positive, rod-shaped bacterium that causes the disease listeriosis, potentially fatal in humans, especially in immunocompromised individuals, pregnant women, and infants. HMG-CoA Reductase (HMGR) catalyzes the NAD(P)H dependent reduction of HMG-CoA to mevalonate. This enzyme is critical for cellular cholesterol synthesis in mammals and cell wall isoprenoid synthesis in certain pathogenic bacteria. We have isolated the gene encoding HMG-CoA Reductase from *Listeria monocytogenes* and expressed the recombinant 6x-His-tagged form in *Escherichia coli*. The purified enzyme exhibited dual coenzyme specificity, utilizing both NADPH and NADH in catalysis. The enzyme efficiently catalyzed HMG-CoA reduction; however, no activity was detected for mevalonate oxidation *in vitro*. Using NADPH, the enzyme exhibits a  $V_{max}$  value of 19.77  $\mu\text{moles}/\text{min}/\text{mg}$  and a  $K'$  (Hill constant) value of 2.19  $\mu\text{M}$  for HMG-CoA and a  $K'$  value of 2.21  $\mu\text{M}$  for NADPH. Using NADH, the enzyme exhibits a  $V_{max}$  value of 0.656  $\mu\text{moles}/\text{min}/\text{mg}$  and a  $K'$  value of 1.83  $\mu\text{M}$  for HMG-CoA and a  $K'$  value of 0.97  $\mu\text{M}$  for NADH. The statins mevinnolin and mevastatin are weak inhibitors of *L. monocytogenes* HMG-CoA Reductase in either the lactone or acid form as demonstrated by  $K_i$  values in the micromolar range. Chemical crosslinking using the heterobifunctional crosslinker sulfo-SMCC indicated the enzyme is multimeric, likely a tetramer.

## **THE CONSCIOMETER**

By: Amara Thomas

Communication

Faculty Mentor: Megan Houge

The June 14, 2005 issue of *Slate Magazine* reports that “Neuroscientists are rapidly getting closer to identifying the specific neural networks and activity that generate the vague but vital thing we call consciousness.” This set of tests, which is now being referred to as the Consciometer, will be able to detect levels of consciousness as well as the limits of when consciousness begins and ends. With the potential of putting many controversies to rest, the consciometer may be neurologists’ gift to those debating whether or not to end the life of a loved one. Because cases like Terri Schiavo’s are being contemplated each day and to better address the ethical questions raised by such a device, it is important that we examine what the Consciometer is, what it can be used for, before finally examining its future implications.

## **CHANGES IN RESPONSE TOPOGRAPHY MAY EXPLAIN CHANGES IN REWARD SENSITIVITY DURING EXPOSURE TO DA D1, D2 AND D3 RECEPTOR AGONISTS**

By: Michelle Toelle, Rachel Knight, Clint Boyle, David Martinez, Marie Falco,

Lindsay Ulman

Psychology

Faculty Mentor: Valeri Farmer-Dougan

Dopamine D1, D2 and D3 receptors have differential effects on sensitivity to reward obtained during responding to CONC VI VI schedules. Differences in reward sensitivity appear to be due to changes in the type and amount of adjunctive responses, and may be directly related to DA receptor functions. DA D1 receptors appear to be part of a feedback loop about reward. In contrast, DA D2 receptors may regulate perseveration of an operant response. The role of DA D3 receptors is less clear. Research from our lab examined these hypotheses: Changes in sensitivity to reward obtained during a series of 5 CONC VI VI schedules during DA D1, D2, and D3 agonist exposure were correlated with changes in behavioral topography produced during drug exposure. The D1 agonist SKF38393 elicited general “search” behaviors which detracted from operant responding and reduced sensitivity to reward. The D2 agonist Quinpirole produced perseveration on the response lever, or the rat remained close to the lever but still. The DA D3 agonist PD 128907 had little effect on either adjunctive or operant responding. These data further establish how specific DA receptor activity may modulate choice behavior by altering the topography of responding.

## **THE EFFECTS OF ONE TRIAL OF FEEDBACK ON PERCEPTUAL LEARNING**

By: Amanda Trefzger

Psychology

Faculty Mentor: Jeffrey Wagman

Perceptual learning is the improvement of perceptual skill with practice. Previous experiments have shown that accuracy of perception improves when perceivers are given feedback about their performance, but does not improve when they are not given feedback about their performance. This experiment investigated whether accuracy of perception would improve with just one trial of feedback. Participants attempted to perceive the length of occluded hand-held rods in a pre-test, practice trials, and a post-test. One group of participants received feedback on all 24 of the practice trials, a second group of participants received feedback on 1 of the 24 practice trials, and a third group of participants did not receive feedback on any of the practice trials. The results of the experiment show that accuracy of perception improved regardless of whether participants were given 1 trial of feedback or 24 trials of feedback in the practice session. However, these results also indicate that there was greater improvement when participants were given more feedback.

### **EXPANSION THROUGH EFFICIENCY: THE NUCLEAR POWER INDUSTRY IN AMERICA AFTER THREE MILE ISLAND**

By: Andrew Trzaskus

Geography-Geology

Faculty Mentor: Jill Freund Thomas

A common misconception among Americans is the incident at Three Mile Island Unit 2 (TMI-2) in 1979 spelled the end of the nuclear power industry in the United States. Nothing could be further from the truth. Although many reactor construction licenses were canceled after this incident, some reactors already under construction were finished, with the most recent coming online in 1996. Furthermore, as older reactors shutdown, generation of electricity by the remaining nuclear reactors continued to increase. This increase is due to faster refueling times, longer intervals between refueling, general increases in the generation capacity of the plants, and plants running closer to maximum capacity. The data being scrutinized in this poster are the percentage of electricity in each state generated by nuclear power; the numbers of nuclear reactors operating, opened, or closed since TMI-2; and net change in nuclear power generation in each state between 2002 and 2004. The number of operational reactors in the U.S. versus the amount of electricity generated in the U.S. by nuclear power will also be compared. After analysis, the data shows that since 1979, the nuclear power industry in the U.S. has expanded its overall capacity despite the number of reactors in operation peaking and then declining.

### **ASIAN-AMERICAN LESBIAN DEFINING THEIR IDENTITY WITHIN THE TWO CULTURES OF ASIAN AMERICAN AND HOMOSEXUALITY**

By: Hitomi Tsukioka

Sociology and Anthropology

Faculty Mentor: James Stanlaw, Becca Chase

In this paper I will argue Asian-American lesbians have a harder time defining one's identity living in predominantly Caucasian society within both heterosexual and homosexual population. Studies show that Asian-American lesbians have recently started to raise their voice within the GLBT communities. It has been hard for Asian-American lesbians to balance their traditional Asian background and the social expectations Asian-American society. In many Asian cultures, family ties are strong and considered to be one of the top priorities in life; therefore coming out to a family members creates many fears which results in questioning identity from two aspects of ethnicity and sexual preferences. I will show that for Asian-American lesbians, understanding and accepting one's sexual preferences will bring an easier time belonging to a community. I will demonstrate this through reading biographies of Asian-American lesbians, parents who have lesbian daughters and through interviews. As the population for GLBT is getting bigger and becoming more accepted in American culture, Asian-American lesbians are also increasing, and this paper will offer an understanding of being a minority in two cultures of heterosexual and homosexual communities.

### **ADVERSARIAL JUSTICE VS. INQUISITORIAL JUSTICE: COMPARING AMERICAN AND FRENCH JUDICIAL**

By: Adam Tucker

Politics and Government

Faculty Mentor: Robert Bradley

A major topic of interest for those interested in the law is the difference between adversarial and inquisitorial systems of justice. Adversarial and inquisitorial systems differ in the processes that they use to attain justice for parties involved dispute. This work presents those differences in the context of a comparison between criminal court proceedings in America, an adversarial system, and France, an inquisitorial system. These two countries are prime examples for their respective systems, with America being famous for its reliance on English Common Law practices and France for its Napoleonic Code. In particular focus are the differences in judges' involvement, jury use and selection, plea-bargaining, burden of proof, and defense cross-examination. The information for these topic points is found in scholarly articles, books about each nation's judicial system, and various online sources. An investigation into the advantages and disadvantages of both of these systems is also important to this research. For example, adversarial systems generally give more equal power/responsibilities to both parties in a legal dispute, with judges playing a mediator role; while inquisitorial systems tend to give the most power to the judges themselves, who play an active role in investigation of facts.

### **SUPERLATTICE THERMOELECTRIC JUNCTIONS**

By: Brett Tweedt

Physics

Faculty Mentor: David Marx

The ultra high vacuum system consists of two electron beam evaporators and will be used to make superlattices out of silicon germanium and boron carbide. The two e-beam evaporators are able to make superlattice junctions on a thin nanoscale of first the silicon and germanium, then after those the boron carbide. The ideas behind these are they will perform to a higher standard as a semiconductor and can then be used as a source of power in high temperature areas. The system will produce the junctions on a nanoscale which will be able to prove that these can be made on a larger scale for commercial use.

### **WHAT CAN BE DONE TO PROVIDE STABILITY TO HAITI FOLLOWING THE VIOLENCE OF RECENT ELECTIONS**

By: Matthew Vella

Communication

Faculty Mentor: Megan Houge

Following the election of Rene Preval in early February, Haiti, the poorest country in the Western Hemisphere, saw a temporary reprieve in the violence that has wracked that country since 2002. His peaceful election signifies the catalyst that could finally raise the future of Haiti from the violent poverty it has suffered since the 1980's under a series of militant dictators. The varied factions exerting control over the Haitian populace now have been given a mandate to form a peaceful and democratic government to rebuild Haiti. This presentation seeks to establish the myriad solutions possible for the new Preval government to rebuild Haiti and the future

## **NUCLEAR WASTE RECYCLING**

By: Tina Vo

Communication

Faculty Mentor: Megan Houge, Michael Graupmann

As nuclear energy becomes and more and more realistic back up for soon depleted natural resources, it still has many stigmas to overcome. Fortunately fears of reactor accidents, highly destructive weapons, and long-lived radioactive waste, could be overcome by nuclear waste recycling. Because nuclear energy already provides more than 20 percent of America's electricity each year and this new method of recycling nuclear waste could potentially limit the major draw backs that hinder this industries growth, it is imperative that we first understand how this process work, its harms, and the benefits it will impact the world with.

## **AN INVESTIGATION OF THE EFFICACY OF AIDED LANGUAGE STIMULATION IN TEACHING VARIOUS AUGMENTATIVE COMMUNICATION TECHNIQUES TO ADULTS WITH DEVELOPMENTAL DISABILITIES**

By: Katherine VonMoser, Erin Piemonte, Bridget Murphy, Katie Stoddart, Jodi Hiltabrand,  
Janine Watt-Brennan

Speech Pathology and Audiology

Faculty Mentor: Ann Beck, Julia Stoner, Marcia Dennis

This research project is an ABAB experiment aimed at increasing socialization and interaction patterns among adults with disabilities. It was initiated in the fall of 2004 as a community service project in which participants at a sheltered day facility for adults with developmental disabilities were included in a music-communication group. Several different types of augmentative and alternative communication (AAC) devices were used to help participants select songs to listen to and engage in conversations with peers, students, and professors. This program was so successful that a more structured approach was initiated in the fall of 2005 utilizing an ABAB single-subject design. First, baseline data were collected, and then interventionists modeled the use of AAC and followed scripted interactions to increase the appropriate responses and initiations of participants. Participants were encouraged to express themselves using the mode that was most efficient and effective for them (e.g., vocalizations, AAC devices, verbalizations, gestures). The intervention was continued throughout the fall semester and was withdrawn over winter break. A second baseline was established at the beginning of the spring semester of 2006, and intervention has now been reinstated and will continue throughout the spring semester.

## **THE FIGHT FOR WHITE MONDAY: THE CITIZENS' COUNCIL OF MISSISSIPPI**

By: Scarlett Weibull

History

Faculty Mentor: Toure Reed

With all deliberate speed, segregationists in Mississippi created the Citizens' Council following Brown v. Board of Education, May 17, 1954. This day became known as Black Monday. Judge Tom P. Brady delivered a paper to the Sons of the American Revolution. Brady's address, "Black Monday," laid out what he believed to be the fundamental illogic of the Brown decision. He asserted: "It involved a reversal of half a century of legal precedent and it did not take into account the Negro's basic inferiority to the white race." Following this meeting, the Citizens' Council was founded in Indianola, Mississippi, and was comprised of middle and upper class white members of the community.

The Citizen's Council's upper class membership wrapped it in a patina of respectability that was absent from the Ku Klux Klan. Council members' gentility, however, did little to obscure their antagonism toward African-Americans. Indeed, the Council offered blacks two options: accept second-class citizenship or leave the state either by foot or by hearse. The class orientation of the Citizens Council did, nonetheless, distinguish it from the KKK in two crucial ways. First, the comparative wealth of the Council granted it influence over local media, allowing it to disseminate its appeals in the more palatable, seemingly race neutral, language of states rights. Second, the Council's efforts were part of a vision of political-economy that hinged on maintaining a pool of cheap labor, irrespective of race. Though the CC shared the Klan's commitment to maintaining the racial status quo, its efforts to buttress Jim Crow were ultimately wed to a broader goal of revitalizing the south's economy through the exploitation of both black and white labor. The Citizen's Council thus not only opposed civil rights legislation but consistently pursued policies intended to ensure a large supply of cheap, tractable labor. Although Council members no longer wield significant political power, government officials including Trent Lott continue to mask their policies in states rights. It is evident that although the Councils failed in preventing desegregation, they continue to influence the government decades after the Civil Rights Movement. Americans generally believe that all people are innately good. If these people are told that the current system is immoral, they will change it for the better. The story of the Citizens' Council refutes that concept and demonstrates that all people are not essentially good and that not everyone is willing to accept and implement change.

## **MOLECULAR WEIGHT AND GELATION DYNAMICS OF ZEIN PROTEIN DETERMINATION BY LIGHT SCATTERING**

By: Mark Wirtz

Chemistry

Faculty Mentor: David Cedeño

Research is in progress to determine the molecular weight and radius of gyration of a zein protein from corn supplied by the USDA. The measurement of radius of gyration was done by exposing a sample of the zein protein in 90% ethanol to laser light, with a moveable photon detector, at angles from 15-155 degrees. By plotting the number of photons scattered on a Zimm graph according to the angle measured, the slope of this graph represents the radius of gyration and extrapolation to zero scattering angle represents the molecular weight. The instruments and technique were calibrated using polystyrene standards dissolved in toluene with known molecular weights and radius of gyration. Ultimately gelation dynamics of the protein will be determined as a function of protein concentration and water content.

### **ALTERNATIVE METHOD OF APPLYING PACLOBUTRAZOL (BONZI) FOR GROWTH CONTROL OF IMPATIENS WALLERIANA ‘RASPBERRY SWIRL’**

By: Mike Wolf

Agriculture

Faculty Mentor: Gary Bachman

Paclobutrazol, more commonly known by the trade name Bonzi, is a plant growth regulator (PGR) used to control vegetative growth in production horticulture settings. It is a gibberellic acid inhibitor that effectively reduces plant cell elongation. Treatment with paclobutrazol has been demonstrated to reduce stem internode length, to be more compact in size, and display darker green foliage than that of non-treated plants. Paclobutrazol traditionally is applied either as a foliar spray or potting substrate drench. The purpose of this project was to determine if mixing paclobutrazol directly into the potting substrate prior to planting would be an effective application technique for reducing the growth of *Impatiens walleriana* ‘Raspberry Swirl’. Paclobutrazol treatments included rates of 0 (control), 4mg, 8mg, and 16mg per container with 7 replications per treatment. Twenty-eight days after treatment application height, width, and growth index were measured with the results being very consistent. Paclobutrazol treatment resulted in height reductions of 49%, 54%, and 61%, width reductions of 45%, 56%, and 62% and growth index reductions of 46%, 55%, and 62%, for the 4mg, 8mg, and 16mg treatments, respectively, compared to the controls. More research is required to determine wider species effectiveness and long term garden performance of treated plants.

### **GRADUATE STUDENT UNIONIZATION**

By: Katelyn Wood

Communication

Faculty Mentor: Megan Houge

On April 18, 2005 hundreds of workers gathered on America’s most prestigious academic institution to protest the lack of health care benefits, dental insurance, childcare for students with families, an ever decreasing salary, and recognition of their union. It was a busy week in New Haven, Connecticut, only made more dramatic when employees Columbia University took up the cause and took to the streets—creating a multi-campus strike. And just four days later, as the April 22, 2005 Associated Press reported Jesse Jackson joined employees at New York University who were fighting to keep their union.. In each case the strikers, graduate teaching assistants at these universities, banded together to fight for the basic rights granted to most workers outside the academe, but the most shocking aspect of their pleas is the fact that government agencies have ensured that none of these rights are guaranteed to graduate students. The prevalence of graduate student protests are reflect the absence of employee rights granted to those who, according to Dr. Gordon Lafer in his 2003 essay Graduate Student Unions—perform 50-70% of all teaching hours at American Universities. Both private and public universities are denying basic workers’ rights to millions of graduate teaching assistants, setting the precedent that it is acceptable to deny a group rights based solely on their job title. Because there are 1.9 million graduate teaching assistants in America who are not considered employees, it is imperative that we examine the causes and effects of the lack of our graduate assistant and adjunct worker’s rights, before looking at the solutions to help these migrant workers of the ivory tower