Undergraduate Research and Scholarly Achievement Baylor University

presents

URSA Scholars Week

March 22 – March 26, 2010

Dear Colleagues:

Welcome to Baylor's Third Annual URSA Scholars' Week!

One of Baylor's documented core strengths is a vital, transformative undergraduate classroom experience. Undergraduate research is a wonderful extension of that experience, providing students the opportunity to explore real world research / scholarship in partnership with their teachers.

The presentations before you are the fruit of another core Baylor value – relationship. They represent a rare glimpse into the investment routinely made by Baylor faculty in their students, centered on individual mentoring and the sharing of research skills that can inform a lifetime of academic endeavor.

I am grateful for your presence at URSA Scholars' Day 2010. What has been said in previous years continues to be so: the best is yet to come.

Sincerely,

Truell W. Hyde, Ph.D.
Vice Provost for Research

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Board 1

Sarah Garza, Senior, Environmental Science
Jessi Carrothers, Senior, University Scholar/Pre-Medical
Austin Cook-Lindsay, Senior, Environmental Science
Faculty Mentor: Susan Bratton

Title: *Participation in Undergraduate Research a Key to Successful Applications for Fellowships, Research Assistantships and Graduate School Admissions*

Undergraduate research participation is a key component of medical school, graduate school and job applications. Senior authorship of publications is especially valuable for obtaining competitive graduate admissions, fellowships, and research assistantships. Research participation demonstrates competence in problem solving, ability to follow protocols and in professional writing and presentation. Faculty research mentors provide superior letters of reference as they are able to verify applicant characteristics, such as imagination, dependability, work ethic and academic integrity. Undergraduates can also obtain grants and scholarships to support their bachelor's degrees via research proposals. Research participation is progressive: beginning as a general assistant, then progressing to independent team participant and co-author, and ultimately project leader and senior author. This poster displays three examples of successful undergraduate use of research credentials. Jessi Carothers participated in both off-campus and on-campus projects on mercury levels in tissue and received multiple fellowship and assistantship offers. Austin Cook-Lindsay received an Environmental Protection Agency Undergraduate Fellowship, by incorporating a mini-research plan on water quality in his application. Sarah Garza participated in an NSF-REU (Research Experience for Undergraduates) in Alabama, worked with the whooping crane project at the San Antonio Zoo, and acted as lead investigator for a Baylor-based project on exotic species invasion. She received interviews at top ranked programs in conservation biology. Beginning research as sophomores or juniors has assisted these Baylor students in developing their curriculum vitas.

Board 2

Shannon Eichblatt, Senior, History
Sara Lemons, Senior, International Studies
Jenny Rowlands, Junior, Environmental Science
Faculty Mentor: Sara Alexander

Title: *Stressed Out Over Climate? How Vulnerability and Stress Levels Affect Coping Strategies*
(Department of Anthropology, Forensic Science and Archaeology)

Research indicates that the impact of stressful events is, to some degree, determined by one's perceptions of their stressfulness (Cohen et al.). Emotional responses to outside influences can cause significant cascading effects on a community-at-large, including societies where livelihoods are exclusively dependent on susceptible natural resources. The village of Placencia in Belize, located on a long and narrow peninsula in the Mesoamerican Barrier Reef System, has been particularly vulnerable to severe weather events, one of the most devastating being Hurricane Iris in 2001. Using data from vulnerable households in Placencia, this study explores relationships between awareness about weather and climate change, levels of perceived stress, and coping strategies to climate-related events. Our specific objectives are to: (1) identify vulnerable households and determine their perceptions about recent weather patterns; (2) determine household levels of perceived stress; and (3) explore influences the stress and perceptions about weather are having on climate-related coping strategies.

Board 3

Tricia Hamby, Senior, Anthropology
Kira Geslin, Senior, International Studies
Faculty Mentor: Sara Alexander

Title: *Sex, Society and Severe Weather: Does Social Connectedness Impact the Ability to Cope with Climate Events?*
(Department of Anthropology, Forensic Science and Archaeology)

The concept of household vulnerability revolves around the degree to which a household has the "capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard" (Blaikie et al. 2001). It involves a combination of factors that determine the degree to which someone's life and livelihood are put at risk by a discrete and identifiable event in nature or in society. While vulnerable households are usually put at higher risks during social, political or natural crises, a contributing factor to vulnerability is degree of social connectedness. Support from friends and family may be critical when coping with conditions in the aftermath of a severe weather event. Reliance on one's neighbor may be central to these coping strategies. Using data from a small coastal community in Belize, this study explores social connectedness and its influence on coping strategies in response to climate-related events, disaggregated by gender. Are women more involved than men in community activities? And if so, does their level of social cohesion affect their coping abilities? The specific objectives of this presentation are to evaluate household levels of social connectedness in Placencia, and to explore household-level associations between gender, social connectedness, and responses to climate-related events.

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Board 4

Anam Whyne, Senior, Neuroscience
Faculty Mentor: Joseph Ferraro
Title: *Undergraduate Mate Choice Preferences at Baylor University: Does 'Religious' Matter?*
(Department of Anthropology, Forensic Science and Archaeology)

In most contemporary societies, people freely choose their long-term mates. When making these choices, their preferences are influenced by both evolved biological and psychological predispositions, as well as by local cultural practices. A substantial literature details undergraduate mate choice preferences in a wide diversity of settings, both within the United States and abroad. The literature shows that when selecting a prospective mate, US undergraduates consistently rank the traits of 'religious' and 'religious similarity' low in importance.

In this study we examine undergraduate mate choice preferences at Baylor University. In contrast to studies from predominantly larger secular institutions (University of Michigan, etc.), Baylor students consistently rank 'religious' and 'religious similarity' as amongst their most important criteria when selecting a long-term mate. These results are explored from biological, psychological, and cultural perspectives.

Board 5

Arizona Reed, Senior, Anthropology
Kris Beach, Senior, Anthropology
Faculty Mentor: Carol Macaulay
Title: *From the Upper Sprague Site and Beyond*
Cooking Facilities and Food Resources at Late Prehistoric Sites in Central Texas
(Department of Anthropology, Forensic Science and Archaeology)

During excavations at the Upper Sprague site (41HM54) by the Baylor University 2007-2009 Archaeological Field Schools, two thermal features were uncovered: a basin-shaped hearth and a pit hearth. Hearths have many functions, but are primarily used to cook food. Just as modern kitchens are equipped with different cooking devices, so were prehistoric ones. Three questions are addressed in this poster: 1) Are these hearths similar to those found at other Late Prehistoric sites in central Texas? 2) What types of food were being processed in them? 3) How were these cooking devices designed and used? In order to answer the first question, a comparison of the morphology & context of the Upper Sprague site hearths with others in central Texas dating to the same period was conducted. To address the second question, known food resources processed at the Upper Sprague site as well as the available plant food resources of north-central Texas are presented in tables on the poster. To address the last question, Thoms (2008) criteria of hearth form and function were applied. The basin-shaped hearth may have functioned as three different cooking facilities: as a closed earth oven to bake geophytes & steam mussels; as an open oven to dry or roast meat; or as an open hearth to heat stones for stone boiling which would have been transferred to a non-ceramic vessels. The pit hearth may have functioned as an open surface hearth to smoke & dry meat, heat stones for stone boiling or steaming elsewhere.

Board 6

Jennifer Lauren Moon, Senior, Archaeology
Amanda Leigh Arrington, Senior, Anthropology
Kali Julaine James, Senior, Anthropology
Faculty Mentor: Carol Macaulay
Title: *Creating a Visual Database of Wood Charcoal Samples of Five Common Trees from Central Texas*
(Department of Anthropology, Forensic Science and Archaeology)

During the 2009 Baylor Archaeological Field School at the Upper Sprague site (41HM54) in Hamilton County, a small pit hearth, containing charcoal, measuring roughly 40 cm in diameter and 24 cm in depth was uncovered. This charcoal was collected for AMS radiocarbon dating & for wood identification. In an attempt to identify the wood, a charcoal reference collection was created from trees which grow near the site: Pecan (Carya illinoinensis), Net Leaf Hackberry (Celtis reticulate), Ashe Juniper (Juniperus ashei), Chinkapin Oak (Quercus muehlenbergii) & Cedar Elm (Ulmus crassifolia). Samples of the trees were burned in pits similar in size to the pit hearth at the site. Each piece of wood charcoal was snapped in half so that a fresh transverse section was exposed. The sections were then examined under an Olympus BX51 research microscope equipped with polarized, reflected & UV fluorescence light attachments. Photographs of the charcoal samples were taken with the microscope at various magnifications in normal light, yellow-green light & Texas Red UV light. For this study, 4x & 10x magnifications with normal light exposure were chosen. This poster presents the results of the study.

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Board 7

Sarah Saenz, Senior, Anthropology
Becki Shallenberger, Senior, Anthropology
Faculty Mentor: Carol Macaulay
Title: *An Analysis of Fractured Longbones Recovered at the Upper Sprague Site (41HM54), Hamilton County, Texas*
(Department of Anthropology, Forensic Science and Archaeology)

To gain a better understanding of the taphonomic agents responsible for the fractured bones in the faunal assemblage at the Upper Sprague site (41HM54), the attributes of longbones 2 cm or more in length were examined. These attributes include the presence/absence of burning, fracture outline and the diameter of the circumference. This information was compiled in Excel for statistical and spatial analyses. Frequencies of each dataset were calculated and are presented here. These datasets were also imported into ArcMap (ArcGIS9). Spatial relationships were identified between the distribution & density of longbone fragments based on their attributes & archaeological features such as hearths & middens. The results of the statistical and spatial analyses are presented in the poster.

Board 8

Courtney Coles, Senior, Biology
Faculty Mentor: Tamarah Adair
Title: *Potential of the Polyvalent Anti-Staphylococcus Bacteriophage K for Control of Antibiotic-Resistant Staphylococci from Healthy Carriers*
(Department of Biology)

Antibiotics, such as penicillin and methicillin, are widely used by physicians to combat bacterial infections. As a result of antibiotic dependence, many strains of bacteria have become resistant to antibiotics. Notably, strains of *Staphylococcus aureus* have become progressively more resistant to methicillin and have contributed to the prevalence of bacterial infections acquired in both hospital and community settings. Physicians and researchers have now begun to investigate phage therapy as an alternative to antibiotics. Phage therapy utilizes bacteriophages, viruses that infect bacteria, in order to inhibit bacterial growth. This new alternative could provide a potentially safer and more cost effective option to combating bacterial infections. In reference to antibiotic resistant *S. aureus*, a lytic bacteriophage, Bacteriophage K, has been found to effectively inhibit this infectious bacterium. This experimental study focuses on whether there is a correlation between increased resistance to antibiotics and resistance to Bacteriophage K.

Ten samples, 5 with high antibiotic resistance and 5 with low antibiotic resistance, have been tested for resistance to Bacteriophage K. Each strain of infectious bacterium was allowed to grow on a plate and serial dilutions of Bacteriophage K were added. Spot testing was executed in order to quantify and compare resistance to the bacteriophage. Preliminary results show that 6 out of 10 samples illustrate a correlation between increased resistance to antibiotics and Bacteriophage K. This is of importance to those who are in the process of pursuing phage therapy as an alternative to antibiotics because resistance to phage therapy could be harmful and/or costly.

Board 9

Salvator La Mastra, Senior, Biology
Faculty Mentor: Tamarah Adair
Title: *MRSA Colinization Rates in High Risk Individuals*
(Department of Biology)

Staphylococcus aureus is a common skin organism that is frequently found on the skin and nasal orifice. The carriage rate for *Staphylococcus aureus* in the United States is 30%, although carriage of the organism does not always mean infection, some studies have found that presence of the organism increases the risk of infection. An area that physicians and other health care professionals are particularly concerned with is methicillin resistant *S. aureus* (MRSA). MRSA initially described as a nosocomial pathogen. Recent reports have shown that the colonization rates are much higher among the homeless, prisoners, and injection drug users. Samples are collected by nasal swabs of the subject's nose then transported back the lab. In the laboratory, the nasal swabs are transferred to mannitol salt agar plates to select for lactose fermenters that grow in high salt. This is a selective medium for *Staphylococcus aureus*. The plates that appear to test positive for *Staphylococcus aureus* (have fermenting colonies) will be gram stained and subcultured to confirm the presence of *S. aureus*. The positive isolates are then tested for antibiotic sensitivity using 12 antibiotics and the Kirby Bauer disc diffusion assay. Positive MRSA samples are confirmed by performing polymerase chain reaction (PCR) to classify the MecA and ccr genes to determine the SCC mec genotype. Preliminary results show that 3 out of 36 high-risk individuals are positive for *Staphylococcus aureus* and 0 positive for MRSA, giving an 8.30% colonization rate.

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Board 10

Courtney Long, Senior, Biology
Faculty Mentor: Tamarah Adair
Title: *Detection of tst gene in Staphylococcus aureus Isolates from Healthy Carriers*
(Department of Biology)

Staphylococcus aureus is a type of bacteria that may normally be found living on the skin and mucous membranes, especially on the inside of the nose. In most cases, this commensal living does no harm to the human host, but if the organism enters the blood or the tissue, disease may occur. MRSA is a type of *S. aureus* that is resistant to methicillin and is often involved in hospital acquired infections and more recently, community-acquired infections. There are a variety of strains of *S. aureus*. Some contain genes for antibiotic resistance and several toxins, including the superantigen that causes toxic shock syndrome. This project is essentially a search for the tst gene (the gene that causes toxic shock syndrome) on the strains of *S. aureus* and MRSA, isolated from healthy carriers at Baylor University and in the Waco community. The project will determine the frequency of the tst gene from 100 *S. aureus* isolates. The potential significance of this project includes providing data to public health workers on the reservoir of tst positive *S. aureus* strains. Furthermore, knowledge of the frequency of this gene in *S. aureus* of healthy carriers is useful in studying the virulence of the disease. Future studies may investigate the mechanism of action of this toxin and treatment strategies. Using standard Polymerase Chain Reaction and gel electrophoresis, the various strains of *S. aureus* were examined for the tst gene. Preliminary results indicate that out of 25 individuals and 50 different isolates, 4 individuals (8 total isolates) tested positive for the tst gene.

Board 11

Jessie Liang, Senior, University Scholar
Faculty Mentor: Tamarah Adair
Title: *Expression of a 165 Amino Acid Derivative of Phage K Lysin, LysK, in Nicotiana benthamiana as a Novel Treatment of MRSA*
(Department of Biology)

Methicillin-resistant *Staphylococcus aureus* (MRSA) has generated increasing concern over the last few years as strains of MRSA resistant to other antibiotics have arisen. Although *S. aureus* usually thrives as a commensal organism in human nasal cavities, it can cause harm in compromised patients. Increasing antibiotic-resistance is worrying because loss of antibiotic efficacy will lead to a decrease in treatment options. One area of research has focused on overcoming this problem using bacteriophage therapy. Bacteriophages are bacterial viruses with high specificities for their hosts. A phage of particular interest with respect to MRSA is phage K, which uses holin and lysin proteins to escape from cells after replication. Studies have shown that a truncated version of the lysin protein - a 165 amino acid derivation of the CHAP domain - is sufficient for lysis. We proposed a study to clone and transiently express the truncated lysK in a model plant system, because plants are easily scalable and a transient system confines protein expression to inoculated leaves. Using a JunA3 signal sequence, we modified the 165 amino acid sequence to express in the apoplast. The sequence was spliced into a FECT plasmid and the resulting pLys/FECT introduced into *Agrobacterium tumifaciens* for agroinoculation into *Nicotiana benthamiana*. Preliminary results demonstrate the viability of expressing our construct in a plant system. Subsequent protein purification and lysis assays are being performed to test the efficiency of this method for the elimination of *S. aureus* while avoiding the problem of antibiotic-resistance.

Board 12

Kevin Farquhar, Junior, Biology
Faculty Mentor: Tamarah Adair
Title: *Verification of a Real-Time Polymerase Chain Reaction Assay for the Rapid Screening of MRSA Carriage*
(Department of Biology)

Researchers isolate the bacteria *Staphylococcus aureus* and the related Methicillin-resistant *Staphylococcus aureus* (MRSA) with traditional microbiological techniques, but successful identification takes at least 48 hours. A quicker protocol is needed for over-worked laboratories. This study evaluated a real-time PCR assay on DNA samples from the anterior nares of healthy college students using the Fang and Hedin guidelines. It requires amplification of the nuc gene specific to *S. aureus* & MRSA, and mecA for MRSA. Melting temperatures for the genes were quantified to distinguish the results. The primer concentrations were evaluated on a MRSA control, but with little success until altering the melting temperature increments from 1 °C/sec to 0.1 °C/sec. DNA obtained from students using AMIES agar gel swabs did not amplify. To troubleshoot, we evaluated three extraction methods and two PCR mixtures on our assay and a standard MRSA genomic typing method in various combinations. Gel results revealed a problem with the AMIES transport media, indicating possible PCR inhibitors or highly diluted DNA. Further testing with the duplex reaction revealed no mecA amplification in an MRSA control. Temperature-gradient PCR showed no differences in annealing temperatures. A successful mecA reaction occurred when amplifying mecA alone. The procedure was then evaluated on six *S. aureus* and two MRSA DNA samples extracted from pure colonies. Nuc amplified in every sample, which matched previously determined results. Four out of the eight samples gave the expected mecA results whereas the other four had questionable results. This project shows how troubleshooting can resolve experimental problems.

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Board 13

Balpreet Pamma, Junior, Biology
Faculty Mentor: Tamarah Adair
Title: *The Effect of Blue Light on Methicillin Resistant Staphylococcus aureus*
(Department of Biology)

This project tests the hypothesis that blue light can inhibit or kill *Staphylococcus aureus*. Using a blue light of 470 nm, light was shined directly on diluted cultures of *S. aureus* growing in BHI broth in a 24 well plate using either 1000 or 2000 milliwatts of power for 10 or 20 minutes. Cultures were plated on TSA plates and compared to no-light control plates. Preliminary experiments comparing these variables indicated that blue light decreases the growth of *S. aureus* using 10 minute exposures and completely eradicates growth after 20 minute exposures. Current experiments are measuring additional exposure times and intensity of exposure and will compare various growth phases and medium. Future studies will investigate the potential for using blue light therapy to prevent or treat respiratory infections acquired while on a ventilator.

Board 14

Courtney Coles, Senior, Biology
Jessie Liang, Senior, University Scholar
Balpreet Pamma, Junior, Biology/Pre-healthcare
Grant McChesney, Freshman, Biology
Alexeis Baqui, Sophomore, Biology
Lauren Stinson, Senior, Nutrition Science
Sunny Shuler, Sophomore, University Scholar/Pre-Medical
Kevin Farquhar, Junior, Biology
Courtney Long, Senior, Biology
Salvator La Mastra, Senior, Biology
Brooklyn Sandvall, Senior, Biology
Bianca Guerrero, Junior, Biology
Amanda Bertuzzi, Senior, Nutrition Science
Faculty Mentor: Tamarah Adair and Diane Hartman
Title: *Nasal Carriage Rate of Staphylococcus aureus in a Healthy Undergraduate Population- Year Three*
(Department of Biology)

Reports of nosocomial Methicillin-resistant *Staphylococcus aureus* (MRSA) infections began in the 1960's, shortly after the introduction of methicillin. More recently, however, strains have emerged in communities, causing outbreaks whose source cannot be traced to a health care facility. The CDC estimates that 1-3% of Americans carry MRSA in their nasal passages. These individuals are capable of passing MRSA on to others. Many studies for MRSA prevalence have been conducted on populations after an outbreak has been reported, but very few have been conducted on healthy populations. The purpose of this study is to determine the carriage rate of MRSA among members of a healthy college population. This is a five-year longitudinal project, currently in year three.

Nasal swabs were taken from participants and cultured on MSA plates. Fermenting colonies were picked from each plate, and tested for catalase, coagulase, and gram staining. Isolates were then subjected to Kirby-Bauer antibiotic profiling. Sampling through Fall 2009 has resulted in over 1500 samples. The *S. aureus* carriage rate is 22% and the MRSA carriage rate is 0.9%. These carriage rates are on the lower end of the nationally reported range. Research continues to identify risk factors associated with being a carrier.

Board 15

Bianca Guerrero, Junior, Biology
Faculty Mentor: Diane Hartman
Title: *What is the Incidence of Salmonella in "Wild-Caught" Local Turtles?*
(Department of Biology)

In 1975, the Food and Drug Administration passed a law in the United States, prohibiting the sale of turtle eggs and turtles that had a shell under four inches across. The law was passed because children were getting infected with Salmonella, and the baby turtles were implicated as carriers for Salmonella. Salmonella organisms were found on the turtles' bodies and their habitat. Turtles are currently housed at the Lake Waco Wetlands for another project and visitors/staff could potentially be exposed to Salmonella organisms. If the turtles are infected with Salmonella, then Salmonella should be present in the water samples taken from the turtles' habitats. Water samples from seven different turtle habitats were filtered and tested for the presence of Salmonella. Filtered samples of 0.1 ml, 1 ml, and 2 ml were incubated at 35°C on Salmonella Shigella (SS) agar plates. The H2S production on the SS agar plates was evident on the 1ml and 2 ml distillation samples. Only a few organisms, including Salmonella, produce hydrogen sulfide on SS agar. To verify the presence of Salmonella, colonies were selected from the SS agar plates and transferred to Lysine Iron Agar slants. Results showed no Salmonella were found in these water samples, but other types of bacteria were present. Future studies will focus on testing not just the water in these habitats but also the turtles. This work is just the beginning to determine whether or not Salmonella organisms are present in "wild caught" turtles of different sizes and ages.

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Board 16

Amanda Bertuzzi, Senior, Nutrition Science
Lauren Stinson, Senior, Nutrition Science
Faculty Mentor: Diane Hartman
Title: *Antimicrobial Properties of Bamboo Cloth: Myth or Fact?*
(Department of Biology)

Manufacturers claim bamboo cloth has antimicrobial properties. Verifying the antimicrobial claim is important, especially in clothing used by medical personnel or patients at risk for skin infections. We chose to perform a viable plate count procedure using *Staphylococcus aureus* and bamboo cloth. Turbidity of a 16-hour *S. aureus* broth culture was adjusted to 0.105. A 200 µl aliquot of this sample was added to each of 6 experimental test tubes 1) nutrient broth 2) raw bamboo cloth in nutrient broth 3) autoclaved bamboo cloth in nutrient broth 4) sterile water 5) raw bamboo cloth in sterile water 6) autoclaved bamboo cloth in sterile water. These test tubes were incubated at 35°C for 6 hours. At this time the optical density of the *S. aureus* in nutrient broth was 0.290. Serial dilutions were performed on each of the experimental groups. The 10^{-5} – 10^{-7} dilutions of each experimental group were plated on tryptic soy agar. After 48 hours of incubation, the number of *S. aureus* isolates per ml from each experimental group was determined. Results showed that the *S. aureus* concentration in nutrient broth increased two fold. The bacteria in nutrient broth with both raw and autoclaved bamboo cloth increased in number. The number of bacteria in the experimental groups containing only water (no broth) decreased. The raw bamboo cloth in water decreased greatly from the control, suggesting that autoclaving could destroy some properties of bamboo cloth. Preliminary evidence suggests that raw bamboo cloth has some antimicrobial properties. This information could be useful in reducing nosocomial infections in patients.

Board 17

Alexeis Baqui, Sophomore, Biology
Faculty Mentor: Diane Hartman
Title: *Determining the Number and Types of Gram Positive Halophiles and Gram Negative Organisms Isolated from Turtle Habitats.*
(Department of Biology)

The normal flora of animals is widely varied in and on the host. Focusing specifically on a wetland environment, turtles have been selected as animal subjects for determining common bacterial isolates from their habitats in captivity. This study aims to identify the proportion of gram positive halophiles and gram negative organisms present in the turtle aquaria by testing the water samples. Each water sample was filtered at three different dilutions. Filters from each dilution were placed on mannitol salt agar and MacConkey's agar plates. Mannitol salt agar selects for gram positive halophiles. MacConkey's agar selects for gram-negative organisms. Plates were incubated at 35oC for 24-48 hours. Colonies on each plate were counted and recorded to determine the number of bacteria per milliliter. Isolates of each plate were transferred to library plates to be used for microscopic and biochemical testing. Preliminary results indicate that fewer than 25 gram positive halophiles were isolated per milliliter of water. No Staphylococcus aureus isolates were found. Gram negative isolates are more common and number over 390 per milliliter of water. Further biochemical assays will be conducted to identify the predominant strains of gram positive halophiles and gram negative isolates residing in normal turtle aquaria.

Board 18

Sunny Shuler, Sophomore, University Scholar/Pre-Medical
Faculty Mentor: Diane Hartman
Title: *"Determining the Number of Bacteria per ml of Water Obtained From Several Turtle Habitats"*
(Department of Biology)

In the Wetlands area of Waco, aquatic animals and plants are preserved, providing opportunities for the continuing education of numerous student and visitor groups. The safety and health of visitors and staff could potentially be impacted by interaction with animals kept on site. Water samples from several different turtle habitats were collected and analyzed to determine the number and predominant species of bacteria per ml of water. Turtles were captured for another research project and are being housed at the Wetlands. Water samples from turtle habitats were collected biweekly. Three different volumes of each water sample were filtered. Filter grids from each dilution were placed on plate count agar (PCA) and incubated at 35°C for 24-48 hours. Colonies were counted from each dilution to determine the approximate number of organisms per ml of water. Four morphologically distinct bacterial colonies were visible on the PCA plates: off-white, yellow-orange, dark pink, and green. The bacteria will undergo further biochemical testing to identify the predominant bacterial species. This project demonstrates the relationship of the bacteria to the turtles and their environment. This data will indicate if and to what extent the human interaction in the Wetlands affects the habitat, as well as the hazards posed to humans by contact with the Wetland habitat.

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Board 19

Orhue Odaro, Junior, Biochemistry
Jacques Mayeux, Junior, Biology
Shola Komolafe, Junior, Neuroscience
Faculty Mentor: Marty Harvill
Title: *Physiological Adaptations of Cattail (Typhus sp) in Water with Higher Nutrient Levels*
(Department of Biology)

The objective of this experiment was to observe any physiological changes in cattail (Typhus sp) in the four cells, or sections, of the Lake Waco Wetlands. In most wetlands, nitrate and phosphate levels decrease from one cell to the next as one moves farther away from the source. Knowledge gained from differences in the ability of cattail to absorb nutrients would allow for better wetland purification; programs could be set up to rotate cattail plants within the wetlands in order to maximize their nitrate-absorbing abilities.

The hypothesis presented was that cattail plants in a cell farther away from the North Bosque River would have less nitrate-reducing abilities than plants in the cell preceding it, because they are not exposed to as much nitrogen on a regular basis. This would indicate that a physiological change had occurred in cattail plants present in the Waco wetlands. To test this hypothesis, plants from cells two to four were collected and transplanted into mesocosms containing water from the in-flow cell, i.e. cell one.

The results we obtained supported our hypothesis. Nitrate and phosphate levels generally increased from cell two to cell four. We concluded that plants in cell two had better nitrogen-reducing abilities because they had adapted better to the high nitrogen levels in cell two than plants in cell four which contained water that had been filtered as it passed through the wetlands.

Board 20

Alexeis Baqui, Sophomore, Biology
Braden Wersonske, Senior, Neuroscience
Faculty Mentor: Marty Harvill
Title: *The Effect of Organic Decay on Algae*
(Department of Biology)

The water quality in the North Bosque River is a concern to the Waco Community. This experiment focuses on nitrate and phosphate release from different types of organic matter found in the North Bosque River and their effect on algae growth. It is hypothesized that manure will have the greatest positive effect on algae. To test this assumption, five mesocosms were set up. The Control container held water from the North Bosque River and the remaining four held manure, plant matter (leaves), animal matter (crayfish), and nitrates and phosphates. Each mesocosm was tested for chlorophyll amounts and nitrate/phosphate concentration. These results were then compared to the control to determine the effects of each substance. The data showed that the hypothesis was incorrect. The crayfish released the highest amounts of nutrients and had the most algae growth.

Board 21

Shaun Kuoni, Sophomore, University Scholar/Pre-Medical
Foster Lerner, Junior, Biology/Pre-Health Care
Faculty Mentor: Marty Harvill
Title: *The Effect of Flow Rates on the Absorption of Nutrients in Artificial Wetlands*
(Department of Biology)

The purpose of the experiment was to determine an optimal flow rate for the extraction of nutrients by an artificial wetland. The magnitude of nutrient extraction was determined by algal (Cladophora) growth (Tam and Wong, 1995). Three different flow rates of 200, 400, and 800 mL min-1 $\pm$ 50mL min-1 were selected based on previous experimental data (Stark et al., 1994). These flow rates were tested in three identical pairs of artificial tracks. Each pair consisted of two tracks with identical flow rates, one track containing the algae, and one track serving as a control, with no algae. Runoff water from the tracks was tested for total Nitrate/Nitrite and total Phosphorus levels to determine differences in nutrient absorption. The initial mass of the algae was recorded and the post-experimental mass was taken to measure total growth as an indicator of absorption. It was found that the highest flow rate allowed for the greatest absorption of nutrients within the range of flow rates that were tested. From these results it can be concluded that flow rate does have a significant effect on algal absorption of Nitrogen and Phosphorus. Therefore, the Optimal Nutrient Absorption Flow Rate (ONAFR) appears to be closer to 800mL min-1 and not less than 200mL min-1. Further investigations could narrow and determine the specific ONAFR of water through a wetland.

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Board 22

Donald Gray, Junior, Chemistry
Corbin Goelich, Sophomore, Business Fellows
Nikesh Patel, Sophomore, Biology
Faculty Mentor: Marty Harvill
Title: *Bioaccumulation of Heavy Metals in Schoenoplectus californicus of Lake Waco Wetlands*
(Department of Biology)

The purpose of this project was to detect the levels of heavy metal bioaccumulation in the Lake Waco Wetlands. The method in which we carried out this task was by dispersive sampling of an organism susceptible to heavy metal accumulation. The plant we utilized for this project was Schoenoplectus californicus (Bulrush) because of its prevalence and continuity in the wetlands and its tendency to accumulate heavy metals in its roots, over time, when heavy metals are prevalent in its water source (Arreghini et al. 2006). This research surveyed the efficiency of the wetlands in filtering out heavy metal pollutants from the water in the North Bosque River. After obtaining the S. californicus samples, they were dried and prepared for testing. In addition, water samples were taken in these areas for comparative data and computation of the concentration of heavy metals within North Bosque River's water. Moreover, this was done in order to find a probable source of heavy metals within the wetlands (Maiti et al. 2008). The hypothesis was that the results would reveal a high concentration of heavy metals from the North Bosque River within the rhizomes of S. californicus relative to the concentration of heavy metals within the water, indicating a presence of bioaccumulation of heavy metals within Lake Waco Wetlands' S. californicus. This preliminary study could lead to further studies in bioaccumulation and the feasibility of phytoremediation.

Board 23

Heather Trinh, Sophomore, Biology
Gayatri Ravi, Junior, Health Science Studies/Pre-Medical
Faculty Mentor: Marty Harvill
Title: *Does Water Quality Vary with the Depth of the Marshes and Its Filtration Capability?*
(Department of Biology)

Throughout this experimental procedure, we hope to determine whether depth of the water levels effect water filtration and quality in a series of marshes connected together in the wetlands. With a hypothetical evaluation, the shallow depths within the wetlands provide closer contact with the sediment and can absorb and decompose pollutants, thus providing an improvement in the water quality. To determine this, the experiment will be done with three trials for effectively, accurate results. Using eight mesocosms per trial and the wetland water from marsh one and marsh two, we will fill each mesocosm with a specific level of sediment using these four categories, marsh one and marsh two respectively: (1) deep-deep; (2) deep-shallow; (3) shallow-deep; (4) shallow-shallow.

Allowing the water to filtrate from one marsh to the next through tubing, such that is found in the actual wetlands, we will measure the nitrate-nitrogen (NO3-N) concentrations before and after to observe the differences. The EPA standard for quality drinking water is 10 milligrams of NO3-N per liter of water. In conclusion, we will see how close or far apart our Waco water is to standard drinking water

Board 24

Wemmy Audu, Junior, Neuroscience
Faculty Mentor: Marty Harvill
Title: *Effects of North Bosque Water on Animal Behavior*
(Department of Biology)

We are experimenting in the project, "Effects of North Bosque Water on Animal Behavior" to test whether North Bosque water affects animal behavior negatively. We have chosen to concentrate this project on snails, and watch their excretions in a mock environment (with filtered water and clean aquarium), and in an environment exactly like their environment in North Bosque (North Bosque water, soil, and food). The snails' behavior will determine the effects of North Bosque water on animal behavior. If the snails behave in a normal manner, and there are no observed changes in their behavior, then we can rightfully determine that there is no effect, negative or positive, of North Bosque water on animal behavior.

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Board 25

Caitlin Brewer, Senior, Biology
Selene Castillo, Senior, Biology
Mary Moreno, Junior, Biology
Rahul Chhana, Senior, Biology
Faculty Mentor: Owen Lind
Title: *Toxic Algae; Freshwater Environmental Consequences*
(Department of Biology)

Cylindrospermopsis raciborskii is a planktonic blue-green alga, also known as cyanobacteria. Cyanobacteria are highly adaptable prokaryotes capable of forming water blooms, particularly in freshwater lakes or ponds (Briand et al., 2002). Originally these cyanobacteria were reported in tropical areas; however because they can grow in an array of conditions, and perhaps linked to global warming, their occurrence is increasing in temperate latitudes (Briand et al., 2002). This is a concern because Cylindrospermopsis produces neuro- and hepatotoxins (cylindrospermopsin, saxitoxin and anatoxin-a) (Indiana Department of Natural Resources 2009). We asked: does the presence of Cylindrospermopsis affect other plankton populations?

To answer this question we determined the effects of a Cylindrospermopsis extract concentrate from Lake Catemaco, Mexico on Brachionus calyciflorus, Selenastrum capricornutum, Daphnia magna and Ceriodaphnia dubia. B. calyciflorus, D. magna and C. dubia were exposed to different concentrations of extracts. The S.capricornutum was exposed to the extract, a nutrient-enhanced culture solution, and a combination of the two solutions.

The experiment resulted in the Cylindrospermopsis extract having a variety of effects on the different plankton. We found a positive effect on the D. magna and C. dubia birth rate and no effect on survivorship. The B. calyciflorus suffered a decreased birth rate, but the effects on survivorship were inconclusive. When placed with only extract, Selenastrum's growth was less than in the nutrient solution, but when put in the mixed solution it grew better than when in extract alone or in nutrient solution.

Board 26

Rachel Rotondi, Senior, Biology
Faculty Mentor: Kenneth T. Wilkins
Title: *Insect Size as a Determining Factor in Prey Selection by Insectivorous Bats*
(Department of Biology)

The procurement of food is an important aspect of an organism's survival. In insectivorous bats, prey selection is well studied, with research focusing on taxonomic identification of prey species. However, there may be other factors that affect the type of prey that a particular bat species will hunt such as bat bite force, insect hardness and insect size. The purpose of this study is to determine if there is relationship between the prey size and relative hardness of prey and the size (weight) of bats. Insects with reinforced exoskeleton such as beetles (Coleoptera) would be considered hard, while insects without the exoskeletal reinforcements such as moths (Lepidoptera) would be considered soft. The study was conducted at Kelly's Pond, Sam Houston National Forest, Texas. We used a triple-high net to capture bats. Bats were then processed (identified to species and weighed) and released. Light traps (emptied every 1 hour) were used to capture insects, potential prey items, at Kelly's Pond. In lab, we separated the captured insects according to their capture date, time, and species. Insects were then measured and the average size of prey was correlated to the bat sizes hour by hour. We expect to see that smaller bats species as well as subadults of larger species are feeding on smaller insects than the adults of larger bat species.

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Board 27

Christina Skrovanek, Senior, Biology
Faculty Mentor: Kenneth T. Wilkins
Title: *Effect of Prescribed Burns on Bat Community in Southeastern Piney Woods*
(Department of Biology)

Prescribed burns are a common form of management in forests. Controlled burns reduce the risk of wildfires by preventing the accumulation of hazardous fuels on forest floors. Burns also reduce mid-story and over-story vegetation, which in turn increases the amount of light reaching the forest floor. Increased sun exposure increases the plant life in the under-story and these changes affect the forest fauna, favoring species that prefer more-open environments. At Sam Houston National Forest (SHNF), Texas, U.S. Forest Service personnel utilize controlled burns to bolster the red-cockaded woodpecker population, an endangered species that prefers a cleared mid-story around tree cavities it uses as roosts. The purpose of our study was to determine how a different group of vertebrates, forest-dwelling bats, might be affected by burns. We netted bats over Kelly's Pond, a portion of SHNF managed by prescribed burns, from June through August 2009 to determine the community structure of bats. We caught 114 bats of eight species. Our results served as experimental data. For control and comparative experimental data we searched the scientific literature for information on bat communities of other managed and unmanaged pine forests in the southeastern United States. We predict that the bat community will be relatively unaffected by the prescribed burns. In some cases, the prescribed burns may actually encourage species to utilize a managed area by creating open habitats which could cause an increase in bat species numbers.

Board 28

Emily Fong, Senior, Biology
Kody Hernandez, Senior, Biology
Faculty Mentor: Jacquelyn Duke
Title: *Riparian Tree Growth Responses to River Flow Along the North Bosque River Upstream of Lake Waco*
(Department of Biology)

The dam height of Lake Waco was recently increased in 2003 by a height of 7 ft. As a result, trees along the upstream river were subjected to two major changes in their environment: an increase in stream level and an adjacent wetlands habitat. The purpose of this research is to examine long term effects of river flow on trees along the North Bosque River upstream of Lake Waco. Tree ring analysis was used first to examine the long term response of trees to changing river flows, and then to analyze whether trees are benefiting or being stressed, as compared to previous water levels. This particular research is challenging as cores of hardwood trees are difficult to obtain and tree growth in areas where consistent water is abundant is difficult to analyze.

From our data collection of Ulmus, Celtis, and Quercus, preliminary results reveal that all three species have been affected. However, Celtis and Quercus did not demonstrate as strong a relationship as did Ulmus trees; therefore we chose to focus on the Ulmus species. Our results indicate that Ulmus tree growth is positively correlated with stream levels. For example, tree ring width was as great as 5.8 mm when growing-season flows exceeded 65,000 cubic feet (cf); and when flow was as low as 500 cf, tree ring width was as little as 1.5 mm. This indicates that the rise in river and adjacent wetland storage may be providing trees with a beneficial water source, rather than stressing them.

Board 29

Mitra Salighedar, Sophomore, Biology
Kyle Throneberry, Sophomore, Biochemistry
Faculty Mentor: Bryan Gibbon
Title: *Suppression of opaque2 Phenotypes by Altered Starch Granule Structure.*
(Department of Biology)

We discovered that an important feature of the vitreous endosperm in Quality Protein Maize (QPM) was alteration of the fine structure of starch granules. Specifically, QPM starch had reduced amylopectin branch length and crystallinity. This results in inter-granule adhesions not observed in wild type or opaque2 endosperm, and these structures appear to restore kernel hardness in QPM. We want to understand the changes in starch biosynthetic activities in QPM that lead to altered starch granule structure; and to understand how the altered fine structure of the starch changes its association with endosperm proteins to promote vitreous endosperm formation. There are four starch synthesis genes that have unique alleles in isogenic lines of opaque2 maize that differ in endosperm modification, suggesting that these genes are involved in the suppression of the opaque phenotype. We have also discovered that cytosolic endosperm proteins are able to permeate the starch granules in QPM as the kernels mature. This property can be studied in vitro by incubating with fluorescently labeled dextrans, which shows that the QPM starch granules have a significantly larger size exclusion limit. In future work we will compare the proteins associated with wild type and QPM starch granules. These studies will enable us to understand what contribution granule-granule and granule-protein interactions play in formation of vitreous endosperm in QPM, and provide insight into future improvement of maize kernel quality.

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Board 30

Kimberly C. Mayes, Senior, Biochemistry
Faculty Mentor: Mary Lynn Trawick
Title: *Microplate Analysis of Thiosemicarbazone Inhibitors of Cruzain*
(Department of Chemistry and Biochemistry)

Co-Authors : Kimberly C. Mayes, Jacob A. Wiley, Gustavo E. Chavarria, Wara M. Arispe, Lauren J. Adamson, Lindsay M. Jones, Kevin G. Pinney, and Mary Lynn Trawick

Chagas' disease, caused by the protozoan Trypanosoma cruzi, affects millions of people in Latin America where it is a major cause of heart disease. Currently, there is no satisfactory treatment for the chronic stage of the disease and there is an urgent need for new therapeutic agents. Cruzipain, a potent Trypanosoma cruzi protease, and a member of the papain family of cysteine proteases, is a validated molecular target of the parasite. An analysis of a small library of thiosemicarbazones revealed that the 3, 3'-dibromobenzophenone thiosemicarbazone was an excellent enzyme inhibitor (Siles, R. et al., Bioorg. Med. Chem. Lettr., 2006, 16:4405-4409). The assay follows the release of the fluorescent product, aminomethylcoumarin, from the cruzain substrate, benzyloxycarbonyl-L-phenylalanine-L-arginine-aminomethylcoumarin. To increase the efficiency of the enzyme assay, it was modified to use a 96-well microplate with a fluorescence plate reader. To evaluate compounds with relatively low aqueous solubility, the enzyme assay was modified to incorporate a higher concentration of the organic solvent, dimethylsulfoxide (DMSO). Such modifications necessitated recalibration of the cruzain assay to determine the VMAX and KM of the uninhibited reaction as well as a new IC50 value for the lead inhibitor, 3, 3'-dibromobenzophenone thiosemicarbazone. These studies validated a high throughput assay for cruzain with enhanced stability of the enzyme and the ability to evaluate a broader range of chemical structures of potential inhibitors. (This study was supported in part by funds from the Baylor University Undergraduate Research and Scholarly Achievement Small Grant Program to M.L.T. and by a Welch Foundation Grant, AA1278, to K.G.P.)

Board 31

David Mizuta, Junior, Psychology
Faculty Mentor: Christopher Marsh
Title: *Peer Reaction to Psychological Illness for Young Adults*
(Department of Church and State)

A number of psychological disorders begin to show symptoms during the early adult years. The majority of schizophrenic cases are identified between the ages of 16 and 25. Ten percent of college students have reported suicidal thoughts which have been linked to depression. What this shows is that the university is the likely place where the symptoms of psychological illness are to be noticed. Peers can help identify individuals that may be at risk and help these individuals get treatment quickly. Yet little is known about the capabilities of university students in the identification of mental illness. For this experiment, a sample of Baylor's undergraduate student body will be surveyed. Participants will be surveyed to analyze their (1) capabilities of identification of a psychological illness, (2) their reaction to an intervention, and (3) a response to the peer after diagnosis. The first goal of this experiment is to see which psychological illnesses are easily recognized and reported by students, and which illnesses are not. The second goal is to see if certain courses or out of classroom experiences help students identify certain psychological illnesses.

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Board 32

Rebecca Brock, Senior, Communication Sciences and Disorders
Faculty Mentor: Jeanne Dodd Murphy
Title: *Functional Listening Evaluation Profiles of Children with Reading Difficulties*
(Department of Communication Sciences and Disorders)

The Functional Listening Evaluation (FLE) was used to assess the speech recognition of children with reading difficulties under various classroom listening conditions. Auditory deficits reportedly contribute to reading problems for some school-age children, and strategies based on increasing a child's auditory awareness of English phonemes are commonly used as part of reading intervention programs. The FLE protocol assesses how noise, distance and visual input affect children's ability to recognize speech in conditions simulating a typical classroom listening environment. The study involved children aged seven to ten who attended the Baylor University Language and Literacy Clinic's Camp Success in June 2009. Two Baylor undergraduate students conducted the FLE for 41 children with oral and/or written language disorders. Speech recognition scores were high overall for the entire group of children with reading difficulties. No child's score was below eighty percent for any condition. Children who were judged by parents to have listening difficulties showed slightly lower average scores than those who did not demonstrate listening problems based on parental responses to a standardized questionnaire. Neither the presence of background noise nor absence of visual cues showed an effect on speech recognition scores. There was slightly poorer average speech recognition in the distant condition. The FLE was originally developed for assessing children with hearing impairment, and all participants in this study passed hearing screenings. The FLE protocol demonstrated inadequate sensitivity to listening difficulties and may have limited usefulness, without modifications, for testing children with normal hearing.

Board 33

Timothy Bransford, Senior, Environmental Science
Faculty Mentor: Lynne Baker
Title: *Canopy Use in a Temporal Aspect by the Mantled Howler Monkey (Alouatta palliata) in Costa Rica*
(Department of Environmental Science)

Co-Author: Jennifer Hill, Sophomore, Biology (Trinity Christian College, Illinois)

This study looks at the mantled howler monkey's (*Alouatta palliata*) use of forest layers during different times of the day. We hypothesized that mantled howler monkeys will use the upper layers of the forest during the morning for thermoregulation, and that they will descend to the lower layers of the forest to feed during all times of the day because more abundant food sources are located there. We used scan sampling and instantaneous focal sampling to collect data on 61 scans. During the morning hours, the mantled howler monkeys rested in the upper layers of the forest over 50% of the time, supporting the hypothesis for thermoregulation. Also, for four out of five time periods, the mantled howler monkeys spent at least 70% of the time feeding at lower levels of the forest. Lack of competition between primate species at the study site could be the reason the lower canopy was utilized more often for feeding.

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Board 34

Cameron Balch, Senior, Environmental Science
Mark Bradley, Senior, Environmental Science
David Harris, Senior, Environmental Science/Pre-Medical
Jonathan Wise, Senior, Environmental Science
Schuyler Webb, Freshman, Environmental Science
Faculty Mentor: Susan Bratton
Title: *Personal, Environmental and Spiritual Outcomes from Three Styles of Hiking: Goal Oriented, Nature Oriented, and Contemplative*
(Department of Environmental Science)

In May 2009, five student-researcher hikers participated in three replicates of each of three styles of hiking in the Great Smoky Mountains National Park: goal oriented or directed toward a geographic feature, natural observation, and contemplative, with time for prayer or meditation. The hikers rated 30 statements reflecting their personal experience, experience with nature and the environment, and religious or spiritual experience on a Likert scale from 1-5; the response 1 being "Not true at All" and 5 being "Very True". The three types of hiking produced statistically significant differences in the personal outcomes of the hikes. Hikers gave higher ratings to a sense of accomplishment for goal-oriented or directed hiking, overall experience with the environment to nature-oriented, and reflection on relationships with others to meditative hiking. Hikers gave the highest scores for religious experience to meditative hiking, while nature walks exceeded directed hiking in this category. The results suggest the outcomes from nature walks may be more similar to those generated by meditative hiking, than those generated by directed hiking. We applied a Q-test to all the questionnaire responses to extract any correlation between ratings on the questionnaire versus time (the sequence of hikes). The results of this test showed time produced a decline in intensity of experience for some personal outcomes, a decline in experience for most outcomes, and no decline in experience for spiritual outcomes.

Board 35

Amanda Seybold, Senior, Child and Family Studies
Faculty Mentor: Janet Crow
Title: *The Relationship of Military Middle-School Youths' Perceptions of Family Functioning and Parent's Deployment History*
(Department of Family and Consumer Sciences)

Military families have experienced unprecedented deployment related separations during the last several years. Although recently becoming more common, little research has been done to understand how children in military families have responded to multiple deployments of a parent to Iraq and/or Afghanistan. This study sampled the perceptions of 91 middle-school children with parents serving in the U. S. Army to determine significant relationships between the parents' deployment histories (i.e., times deployed to Iraq or Afghanistan and combat experience) and children's perceptions of family functioning and available social support (as measured using scales from the Protective Factors Survey), self-reported concerns, and frequency of anger. Additionally, parents were asked to complete the same survey to examine links between parent and student perceptions. Results indicated that the number of fathers' deployments was significantly correlated with students' ratings on one item of the Family Functioning Scale (i.e., "My family is able to solve problems"). Higher ratings on this item were linked to greater number of deployments suggesting that students perceived their families' ability to solve problems increased with the challenges of multiple deployments. Students' reported frequency of anger was also positively correlated with the father's number of deployments suggesting that students' emotional states may be linked to deployment status. Regression analyses indicated that the number of father's deployments and the parent's Family Functioning Scale score combined to significantly predict the student's Family Functioning Scale score. These results suggest the critical role that parents play in influencing students' perceptions during deployment experiences.

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Board 36

Natasha (Tia) Barrington, Senior, Geophysics
Faculty Mentor: Jay Pulliam
Title: *Seismic Anisotropy of the Rio Grande Rift and Surrounding Regions*
(Department of Geology)

The evolution of distinct tectonic provinces in the southwestern United States since the Cretaceous period, including the Great Plains, the Colorado Plateau, and the Rio Grande Rift (RGR), has been linked to flat subduction of the Farallon plate (~80 Ma) and then its subsequent foundering (~40 Ma). However, there has been a resurgence in tectonic activity (magmatism, extension, and possibly uplift) much more recently (~10 Ma), so there is no clear connection between the Farallon plate's foundering and current tectonic activity. Small-scale, edge-driven convection is a possible explanation for this renewed activity.

Edge-driven convection, if it is occurring, should extend to the north and south along the margin of the Proterozoic Great Plains craton. Convective flow should have a signature in the upper mantle's seismic anisotropy and our goal is to determine whether patterns of anisotropy, as determined from SKS splitting, are consistent with small-scale convection.

SKS splitting measurements were made for 126 broadband stations located on the eastern flank of the Rio Grande Rift. Patterns conform both to surface physiographic features as well as to models of the subsurface produced independently.

Fast polarization directions near the RGR tend to be sub-parallel to the rift but then change, to the east, to angles that are consistent with North America's average plate motion. The Pecos Valley coincides with fast polarization directions that are aligned in a more northerly direction than their neighbors, whereas the topographic high to the east coincides with an easterly change of the fast axis.

Board 37

R. Hunter Harlow, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Paleosol Geochemistry and Terrestrial Sequence Stratigraphy: Using Molecular Weathering Ratios in the Sequence Stratigraphic Interpretation of the Middle Devonian (Givetian) Manorkill Formation, Catskill State Park, New York, USA*
(Department of Geology)

Stacking patterns of fluvial aggradational cycles (FACs) have been used to identify marine system tract equivalents. Paleosols, through morphologic characteristics such as maturity, soil saturation, time of pedogenic development, lateral extension, and architecture, can aid in the identification of fluvial sequence boundaries. The quantitative ability of geochemical weathering proxies of paleosols can help support and better define qualitative sequence stratigraphic interpretations. Molecular weathering ratios constructed from geochemistry of bulk soil material is a well-established method of quantifying the degree of soil weathering processes that have occurred in both soils and paleosols. Weathering ratios CIA – K (Al2O3/ (Al2O3+ CaO + Na2O)) and newly defined CALMAG (Al2O3/ (Al2O3 + CaO + MgO)) display strong correlation with mean annual precipitation (MAP) in modern soils. In soils and paleosols that have already formed on weathered alluviated sediment, CalMag is conceptually a better proxy for MAP. Where as CIA-K records the hydrolysis of weather able minerals that are common to many soil orders, such as feldspars, CALMAG takes into account other types of minerals are not necessarily captured by this index and better reflects the flux of calcium and magnesium from calcium carbonate, detrital clay, and exchangeable Ca2+ and Mg2+. The geochemical indication of the degree of weathering can aid in the definition of a sequence boundary by the identification of systematic variations in FAC stacking patterns and geochemical ratios of weathering. Here I will present sequence stratigraphic and geochemical results of Middle Devonian Upper Plattekill, Manorkill, and Lower Oneonta Formations of south-central New York State.

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Board 38

T. Colby Wright, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Estimating Middle Devonian Soil Ages Using Point-Counting of Pedogenic Clays in Paleosols*
(Department of Geology)

Determining the duration of soil formation of paleosols in deep time rock records is largely restricted to qualitative assessment of pedogenic development and likewise qualitative descriptions of relative durations of pedogenesis. We estimate soil ages (duration of pedogenesis) using point-counts of pedogenic clays and other pedogenic constituents in paleosols identified within the Manorkill Formation (Middle Devonian) of the Catskill succession. The Manorkill Fm., which crops out in the Catskill Mountains of south-central New York state, consists of fluvial aggradational cycles (FAC) that were produced by sediment delivered to the foreland basin from highlands created by the Acadian orogeny and associated eustatic sea-level fluctuations. Establishing the relative ages of the paleosols in the Manorkill Formation can be useful in constraining the chronology of sequence stratigraphic components for this fluvial-deltaic succession as well as providing valuable paleoclimatic information for a pivotal time in Earth's history. A method based upon relative dating of Holocene soil development that uses the percentages of illuviated clay as a function of time is applied to point-count estimates from thin sections from sub-surface B horizons of Middle Devonian paleosols. The hypothesis tested in this study is that duration of pedogenesis for stratigraphic intervals was influenced by cyclic changes in accommodation creation and that this estimate can help define system-tract equivalents in fluvial successions. The paleosols identified in this study interval are well-drained to poorly-drained Paleo-Inceptisols, Paleo-Vertisols, and Paleo-Entisols.

Board 39

Aaron Bryant, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Formation, Production, and Protection of the Edwards Aquifer*
(Department of Geology)

The Edwards Aquifer is one of the most prolific artesian aquifers in the world and is located in south central Texas. This study addresses the geological processes which formed this aquifer, and relates Edwards Aquifer water production capabilities to the protection of this valuable natural resource. Hydro geological processes responsible for recharge of this aquifer are described, and reveal why this valuable water resource is in danger of over-pumping as well as contamination.

Board 40

William A. (Alex) Dornfeld, Senior, Geology
Faculty Mentor: Steven G. Driese and Bruce Byars
Title: *Differential Correction Analysis Using High-Precision GPS in Geologic Methods*
(Department of Geology)

Various technological developments in the application of the Global Positioning System (GPS) offer the prospect of rapidly mapping difficult terrain and quantifying temporal and spatial dynamics of tectonic activity, sedimentation, as well as exploration in the oil and gas industry. The differential correction method juxtaposes the information between two receivers, one stationary and one mobile. It is favorable for the collection of data in difficult terrains. These methods are not a complete alternative to existing methods, but have proven advantages and disadvantages which will be evaluated in the following. The data being used were collected with a Trimble GeoExplorer GPS unit and software provided by Center for Spatial Research (CSR) at Baylor University. Data collected will be uploaded and mapped in order to compare with available geologic records for accuracy. Local queries will serve as a course for mapping and the GIS Laboratory of the Baylor Science Building for an analysis station. Case studies of fluvial geomorphology and Mt. Augustine will be compared with the data collected here in order to demonstrate the trade-off between the advantage of speed and disadvantage of reduced accuracy afforded by GPS. Combining new data collection processes with traditional geologic methods can reduce error and provide higher-accountability information for analysis.

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Board 41

Andrew Gladney, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Paleogeography of the North American Continent during the Cretaceous Period*
(Department of Geology)

This study focuses on reconstructing the paleogeography of North America during the Cretaceous Period, which was 64 to 142 million years ago. Specific cycles of transgression (relative rise in sea-level, landward shift in the position of shorelines) and regression (relative fall in sea-level, seaward shift in the position of shoreline) of the Western Interior Seaway resulted in cyclic deposition of strata consisting of sandstone, siltstone, shale and limestone. Research especially focuses on the paleogeographic factors affecting the deposition of organic-rich black shales, which represent oceanic-anoxic events (OAEs) and constitute an important part of this stratigraphic succession. Because paleogeography is a major contributing factor for rock composition, deposition, and preservation, paleogeographic research may answer why these Cretaceous shales are more carbonate-rich, and thus differ markedly from the silica-rich shales of the Jurassic, Mississippian, and Devonian periods.

Board 42

Blake Greene, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Atacama Desert: Ancient History of the Driest Place in the World*
(Department of Geology)

The Atacama Desert in Chile is well-known as the driest place in the world, receiving annually less than 3-4 mm of precipitation. However, there is abundant evidence for a wetter climate existing in the past few millions of years ago. Evidence for water is indicated by gypsum deposits discovered in the middle of the desert, which caused researchers to conclude that this arid desert was once characterized by a wetter climate. Further examination of salt chemistry, isotope and trace element fractionation anomalies, and morphological evidence in ancient Atacama fossil soils (paleosols) is leading geoscientists to infer existence of a time when much more precipitation occurred in the desert. This dramatic decrease in precipitation is attributed to uplift of the Andes Mountain range approximately 15 million years ago, which created a profound orographic barrier (i.e., rain-shadow) that effectively reduced precipitation to near zero for the Atacama Desert.. This demonstrates the importance of tectonics in influencing climate. The arid and surreal landscape also provides a good landscape for practice and experiments on NASA-project "rovers" that will travel on extraterrestrial bodies in our solar system.

Board 43

Chris Breed, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *An Evaluation of the Probable Causes of Extinction Related to the Permian-Triassic "Great Death" Based on Survival Rates of Key Marine Invertebrates*
(Department of Geology)

The Permian-Triassic (P-T) extinction is widely regarded as the most important extinction event in the Earth's history, resulting in nearly 90% of marine species disappearing from the fossil record. The largest percentage of these disappearances are related to marine invertebrates, wiping out such a large number that some ecosystem niches were not re-filled until 1-2 million years after the extinction event. The rate of survival of some of these marine species is particularly informative. More specifically, orders such as Fusilinid Foraminifera, Tabulate and Rugose Corals, and Trilobitae disappeared completely. Others, such as Bivalvia, Gastropoda, and Ostracoda, were diminished to such small numbers that they hardly appeared in the fossil record at all, in some cases, for millions of years. Most intriguing, some species appeared to suffer little or no losses, despite living these same marine environments, such as Porifera and Conodonta (though the latter became extinct later in the Triassic). By evaluating the lifestyles, living environments, and food supply of these orders vis-à-vis their survival rate (or lack thereof), the possible cause (or causes) of the P-T extinction may be further narrowed to a few probable possibilities.

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Board 44

Clark Osterlund, Senior, Geology
Faculty Mentor: Steven G. Driese
Title: *Discrepancies Associated with Foraminifera $^{18}O/^{16}O$ Isotopic Values, and the Terrestrial Record*
(Department of Geology)

Oxygen isotope values obtained from benthic foraminifera play a pivotal role in paleoclimatology in allowing for temperature reconstructions of ancient oceans, however the isotope values may provide biased or false temperature estimates if certain conditions are unaccounted for. This paper will review pre- and post-depositional constraints that have the potential to alter $^{18}O/^{16}O$ ratios such as pH, habitat depth, and dissolution. The oxygen isotopic values tie into the terrestrial climate record, however there have been some discrepancies associated with habitat depth and dissolution. Finally, the effects of diagenesis can alter the oxygen isotope values of foraminifera after burial, and may thus produce erroneous isotopic values.

Board 45

John L McFadden Jr., Junior, Geology
Faculty Mentor: Steven G. Driese
Title: *Effect of Slope on Soil Quality and Slope-Soil Conservation Techniques*
(Department of Geology)

As the human population tops 9 billion, resources such as food and land are becoming increasingly scarce and important. Land on which food can be grown (agriculture) is dependent on soil quality. Without the proper combination of sand, silt, and clay, an area of land will not be fit to yield the necessary supply for a population. Soil quality is dependent upon several factors, one of which is slope. High-relief regions erode faster than those with low-relief. Soil on a steeper slope will erode faster than soil in an area with no slope. Unfortunately, life on Earth cannot be sustained only on the soil found in horizontally level regions. Countries like China rely on slope farmland to feed their growing populations. Therefore, it is imperative that we understand how slope soils form and how they can be properly maintained. This paper seeks to fully identify the role that slope plays in creating, maintaining and eroding soils suitable for sustainable agriculture. It also seeks to examine different slope-soil conservation techniques to find which best slows soil erosion on steeper slopes.

Board 46

Matt Bye, Senior, Geology
Faculty Mentor: Dr. Steven G. Driese
Title: *Evaluating the possible causes of the Cretaceous/Tertiary boundary extinction 65 million years ago*
(Department of Geology)

The Cretaceous/Tertiary extinction (K/T boundary) occurred 65 million years ago. Non-avian dinosaur fossils are found almost exclusively below the K/T boundary, suggesting they became extinct immediately before or during the extinction. Those that are found above the boundary are generally considered to have been reworked from older deposits, and are not regarded as evidence that any dinosaurs survived the extinction event. The main suspect for the extinction is a large-scale impact event, specifically one located at a site near Chicxulub, in the Yucatan region of Mexico, where there is a large crater buried by younger deposits. Tsunami deposits rimming the Gulf of Mexico record passage of a tsunami (aka "tidal wave") generated by the impact, including deposits at Reagan, TX along the Brazos River. Another possible mechanism contributing to extinction is a drastic increase in volcanic activity, as suggested by the Deccan traps (widespread basaltic lava flows) of India. These eruptions could have disrupted the climate by blocking sunlight, which would have limited photosynthesis, thereby starting a disruption in the food chain. In addition, CO2 released by the eruptions could have caused climate perturbations which affected survival of some organisms.

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Board 47

Will Torsch, Senior, Geology
Faculty Mentor: Steve Dworkin
Title: *Analysis of Carbon Systems of Buried Soils and Sediments at Owl Creek, Fort Hood, Texas*
(Department of Geology)

The goal of this project is to quantify and characterize the organic matter and inorganic carbon signatures in the soils and sediments at Red Bluff, along Owl Creek, Fort Hood, TX. Soils samples collected from the site during the summer of 2009 were analyzed in order to quantify and classify the soils and sediment at Red Bluff. The goals of the project are to: 1) analyze the soils and sediment to measure the total organic carbon (TOC) and inorganic carbon (IC); 2) to evaluate and determine the amount of carbon introduced and translocated through the soil systems; 3) and to infer soil taxonomic orders based on the TOC to assist in determination of episodes of environment stability through time.

Board 48

Charlie Ginn, Junior, History
Faculty Mentor: Gabrielle Sutherland
Title: *The Search For Sustainability Through Military Force*
(Department of History)

In the pursuit of a sustainable living environment I will be looking at the ways in which civilizations have stamped their version of a desired community through the use of military force and the scale of violence. Military forces often mirror the infrastructure of the society with who they are paired. Maintaining or enlarging a community through the use of military factions (such as the Greek Civilization's use of the Hoplites and the Polis) influences how social hierarchy is determined by the forces in power, how religion influences men, the family unit's functioning role as a building block for the military force, and the justification of violence in forming the community. In comparison to the Greek's hoplites will be the knights of Medieval Normandy. Normandy's knights use of force in regards to protecting the community is reflective of the community's values. There is no real separation between the military forces of each civilization and the desired community that they attempted to sustain. Each society lends itself through the means of violence to the completion of goals within the community. The completion of these goals shows the core values of the community, with the purpose of discovering how a community is sustained through the process of force reflective on the people. Contrasting these two civilizations will provide separate influences on their individual communities, each civilization's desired community maintained by force that could be sustained through time. Understanding the military force is essential to discovering community values.

Board 49

Erwin Gostomski, Senior, Mathematics
Faculty Mentor: Qin Sheng
Title: *Notes on the Fast Arc-length Partitioning for Adaptive Computations*
(Department of Mathematics)

Arc-length partitioning has been a key to many adaptive numerical methods for solving singular differential equations. In this discussion, we investigate the partitioning of the arc-length of an arbitrary curve given by a twice continuously differentiable function f(x) on some closed interval [a, b]. We attempt to find endpoints of the N subintervals of [a, b] so that the arc-length of the curve over each of the subintervals is equivalent. The efficiency of the strategies is studied. Newton's method is employed in our recursive process for determining locations of the endpoints. A rigorous numerical analysis is given to ensure the iterative procedure and its convergence. Computational experiments are presented to illustrate our conclusions. This is a preliminary report of an undergraduate research project.

Board 50

Myles Daniel Baker, Junior, Applied Mathematics
Faculty Mentor: Chad Westphal (Wabash College)
Title: *An Adaptively Weighted Least-Squares Finite Element Method for Convection-Dominated Diffusion PDEs*
(Department of Mathematics)

Convection-dominated partial differential equations give rise to error as a by-product of approximation, which is difficult to resolve using quantitative solution methods. We balance this error by developing a new adaptively weighted least-squares finite element method that works in conjunction with adaptive mesh refinement, allowing us to improve solutions in terms of accuracy and computational cost. This method also allows us to improve solutions in terms of both accuracy and computational cost. We extend this method by applying it to the Navier-Stokes equations.

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Board 51

Kristen DeLine, Sophomore, Astrophysics/Mathematics
Faculty Mentor: Lorin Matthews
Title: *N-body Simulations Model the Effects of Charge on the Coagulation of Fractal Aggregates*
(Department of Physics)

Charges on dust grains involved in the formation of planets and protoplanetary disks affect the structure and growth of aggregates during the coagulation process. The development of irregular structures caused by the charge on the colliding particles can affect the fractal dimension of the forming aggregate which then will influence the size of the resulting aggregate and the coagulation rate. A self-consistent numerical body code, box_tree, was used to model the interaction of dust particles within a plasma which applied the same parameters that exist one astronomical unit away from the center of a protostar. Data was collected for properties such as the time for each particle to collide, total number of monomers, and the mass of the largest particle. Another way to model the effect of charge on the aggregate is to enable or disable spinning for charged or uncharged incoming aggregate, respectively. An algorithm was used to calculate the fractal dimension and mass fraction for both types of particles, and it was found that spinning and not spinning aggregates have nearly the same fractal dimension for monomer sizes 0.5 μm – 10 μm. The difference in coagulation properties of fractal aggregates formed by charged and uncharged spherical monomers with dust densities similar to those in the stages protoplanetary disk formation are examined.

Board 52

David George, Junior, Physics
Foster Lerner, Junior, Biology/Pre-Health Care
Faculty Mentor: Lorin Matthews
Title: *Phase Transition Studies for Conducting Dust in a GEC Reference Cell*
(Department of Physics)

Dust particles immersed in plasma typically acquire a negative charge. The resulting Yukawa interaction between grains in a two-dimensional horizontal layer leads to the formation of disordered or ordered structures depending on whether short or long range ordering dominates, as determined by the ratio of the particle's inter-particle potential energy to its average kinetic energy. Various stable crystalline phases have been observed experimentally for dust particles residing within such two dimensionally extended lattice planes with system dynamics driven in large part by particle charge. Although the charging process for insulating materials has been examined in some detail, conducting materials have not yet been fully investigated. This work experimentally examines the phases and phase transitions for both conductive (gold coated) and non-conductive (melamine formaldehyde) particles. Phase maps for each type of particle are obtained using data from pair correlation functions and voronoi diagrams for dust structures formed over a range of pressures and powers within a GEC reference cell.

Board 53

Stephen Pickett, Senior, Physics/Biochemistry
Faculty Mentor: Lorin Matthews
Title: *Thermophoresis Experiments in Complex Plasma Containing Multiple Dust Crystals*
(Department of Physics)

Dust particles immersed in plasma typically become charged and interact with each other through screened Coulomb repulsions. In this experiment, a modified GEC (Gaseous Electronics Conference) cell is used to ignite an argon plasma; dust introduced into the plasma chamber becomes charged and levitates above the negative electrode in a horizontal layer. The variations in the kinetic dust temperature and vertical alignment between two crystal layers formed with 6.5 and 8.89 μm diameter melamine formaldehyde (MF) particles were analyzed by changing the levitation height of the crystal layers using thermophoresis. Moving the particles up in the plasma resulted in cooling of the dust, while at the same time the vertical alignment between particles in the different layers was observed to decrease. The latter could be attributed to the decrease in ion flow with increasing height above the electrode.

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Board 54

Jacob Jantzi, Senior, Physics
Faculty Mentor: Jeffrey Olafsen
Title: *Linear and Rotational Particle Tracking Using a Stereoscopic Camera Array*
(Department of Physics)

A stereoscopic camera array is used to track cylindrical particles within a rotating tumbler. The two camera array offers significant improvements over a single camera, including a larger field of view, less required lighting, and a variable frame rate. Despite being limited to 30 frames/second individually, offsetting the capture rate of the cameras allows virtually any frame rate to be obtained between them. Furthermore, the slower cameras allow us to visualize the entire flow at once because of their larger field of view. Image processing is used to allow the same particles to be tracked across the two different cameras to extract velocity information. This process includes corrections for stereoptic effects, such as parallax, spherical aberration and point-of-view differences. The cameras track both the rotational and translational motion of the particles, which are specifically designed for tracking the rotational motion. We are particularly interested in the influence of the boundary on the rotational motion of the particles. Of note is a lubrication layer that is characterized by a general lack in translational motion which separates the driven flow from the boundary and the return flow.

Board 55

Alex Sabey, Junior, Physics
Faculty Mentor: Jeffrey Olafsen
Title: *Experimental Investigation of Chaotic Regimes Utilizing Spheres of High Restitution*
(Department of Physics)

An experimental study of the dynamics of a system which is prone to highly chaotic motion was implemented via a shaking plate and two nearly elastic particles confined to move in the vertical direction. The motion of the two particles and the plate were obtained by frame grabbing images from a relatively high speed (~340 fps) CCD camera. Image analysis algorithms written in IDL were used to analyze the motion of both particles and the shaking plate. These algorithms obtained measurements of velocity, acceleration, and energy. Through further analysis, it was found that the two elastic particles had the same total energy as two completely virtual particles (which would pass through one another instead of impacting) and could be treated by symmetry. Thus, the experiment can be investigated in two regimes: the actual particles and the two virtual ones. A thorough investigation of phase space to describe the chaotic attractor in the low dimensional system as well as to examine the system for phase synchronization between the two chaotic particles is being pursued.

Board 56

Ian Reeves, Junior, Physics
Faculty Mentor: Linda Olafsen
Title: *Infrared Imaging and Semiconductor Analysis*
(Department of Physics)

We have been developing a method to accurately image both the spatial and temporal evolution of a Nd:YAG pumped OPO in the mid-infrared. The technique uses an Electro physics PV320L thermal camera operating at 30 Hz synchronized to the 10 Hz trigger signal of the Nd:YAG laser. The PV320L's higher frequency allows us to take three images for every firing of the beam thus helping to capture its temporal evolution. Each image directly corresponds to an intensity profile of the beam while sequences of frames allow us to view temporal effects. Traditional imaging techniques allow only spatial measurements and are often averaged over longer periods of time. This provides our technique with two significant advantages: Direct measurement of the beam at every time stop and the ability to view it in real time. With these features we plan to explore the nature of multi-modal beams and perform semiconductor analysis. We have also developed advanced measurement techniques using the IDL programming language which when used in conjunction with our camera allow us to characterize the beam in detail. We plan to use these innovations as a way to explore previously unknown characteristics of infrared lasers and aid in the industrial development of semiconductor materials.

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Board 57

Grant Sheehan, Senior, International Studies
Faculty Mentor: Ivy Hamerly
Title: *CATCHING THE BUTTERFLY: NATO and the European Union - Integration and Security*
(Department of Political Science)

This paper explores the interaction between NATO and the EU's European Security and Defense Policy (ESDP). How could these two institutions integrate and align their goals and capabilities cooperatively? What are factors encouraging integration? What obstacles are there? Is such integration or alignment likely?

I argue that NATO-EU integration is achievable in terms of goals and military capabilities, but current geopolitical considerations make it unlikely. Long-term, geopolitical and security developments will foster increasing NATO-EU collaboration, making integration more likely. I used scholarly articles and US congressional reports to analyze NATO-EU relations through case studies and organizational interactions, applying both functional and institutional theories.

I found that NATO and EU member states' common values, security goals, and military capabilities are encouraging integration, but current structural differences and geopolitical concerns are prohibiting integration in the short run. Yet, converging NATO-EU membership, deepening EU internal integration, and mounting security challenges are pressuring these two institutions to cooperate and integrate more closely. Thus, NATO and the EU may integrate down the road.

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March 23, 2010 • 12:30 – 1:30

Paige Myers, Senior, Spanish
Faculty Mentor: Paul E. Larson
Title: *Christian Ethics in El Conde Lucanor: Ejemplo XLV or the Man Who Became the Devil's Vassal*
(Department of Modern Foreign Languages - Spanish & Portuguese)

This paper is about the implicit Christian instructions given by Don Juan Manuel in one of his stories from El Conde Lucanor. The stories of Conde Lucanor and his advisor, Patronio, written during the fourteenth century by Don Juan Manuel are didactic and "deal with practical issues, and are designed to help the reader achieve success in this life" (England 15). All of the stories in the collection begin with Conde Lucanor asking Patronio about some problem he has or that one of his friends has. Patronio often "suggests solutions through stories" which teach Count Lucanor about the problem and what might entail possible solutions (Gaddy 16). This is the case with Ejemplo XLV, "De lo que contesçió a un omne que se fizo amigo et vasallo del diablo," in which don Juan Manuel "offer[s] advice on how best to ensure the salvation of the soul," focusing his discourse on the superiority of Christianity over the other religions on the peninsula that may adulate the figure of the Devil. (England 15). Don Juan Manuel uses a historical context, combined with his religious beliefs and Christian rhetoric to promote Christianity in the story. Manuel uses this example as a way of instructing others in how to lead a Christian life, showing the fatal consequences of disobeying God, and that believing in God is the only way to assure one's salvation.

Michelle Borckardt, Senior, Spanish
Faculty Mentor: Paul E. Larson
Title: *The Example and Humility in Don Juan Manuel's Count Lucanor*
(Department of Modern Foreign Languages - Spanish & Portuguese)

During Spain's fourteenth century, a very important writer entered upon the literary scene, creating works of great philosophical and religious value. His name was Don Juan Manuel, the nephew of the Spanish king Alfonso the Tenth, the Wise. One of Don Manuel's masterpieces of prose is called Count Lucanor. It is a collection of short stories, each one containing an example. In each chapter, the Count faces a problem, so he goes to his advisor for a solution. Then this advisor narrates an example of how to overcome and resolve said problem. Upon deeper examination, one can see that this work as a whole deals with an even greater problem, which is pride, and Don Manuel offers many tests that support the need for humility. For example, even though the Count has a position of power, he still understands that he needs an advisor. Then his vassal encourages the Count to continue learning for himself by letting him figure out the meaning of the examples, instead of simply telling him what to do. Both men treat each other with respect. Finally, Don Manuel ends his work with a couplet that seems quite similar to a scriptural reference, and so, upon completing his creation, he implies that his own wisdom has run its course, but that there is another much richer source of wisdom, which is the Bible. Just as every story from Don Manuel's work gives an example of how to resolve a particular problem, the collection itself can be seen as an example of how the resolve the human problem of pride.

Emily Erickstad, Senior, Economics/Business Spanish
Faculty Mentor: Guillermo Garcia-Corales
Title: *Conjugal Dysfunction in Quiroga's "The Feather Pillow"*
(Department of Modern Foreign Languages - Spanish & Portuguese)

Written by Horacio Quiroga in 1907, "Almohadón de plumas" is a chilling tale of sickness, conflict and death. Jordan and Alicia, recently married, are going through a rough spot in their relationship. He tends to hide his emotions behind a cold, unfeeling exterior and therefore prohibits Alicia from connecting with him on a more intimate level. Due to the particular cultural beliefs of his society, in order to be seen as a strong, important man, he must separate himself from his wife. Even the setting of the story demonstrates the lifeless, loveless relationship between Jordan and Alicia and, through these actions, Jordan is emptying Alicia of her life. Due to his inability to display his feelings, Alicia cannot live life as she would have pictured as a child and is repressed in a hopeless situation. The story is a combination of realism, naturalism, as well as determinism, providing the reader with a realistic, daily occurrence with respect to the lives of the women in this society. Jordan demonstrates elements of his chauvinistic personality through his ability to be a strong male, which results in the emotional oppression, and eventually the death of his wife Alicia.

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Melanie Crowson, Senior, Journalism/Spanish
Faculty Mentor: Frieda Blackwell
Title: *José de Espronceda: la vida romántica es dulce-amarga y llena del luchar*
(Department of Modern Foreign Languages - Spanish & Portuguese)

This essay is an examination of the Spanish romantic poetry of José de Espronceda, focusing on three of his poems, "Canción del pirata," (Song of the Pirate) "El reo de muerte," (The Accused of Death) and "El verdugo"(The Hangman). The common theme of these three poems is the foundation of what the essay seeks to uncover – the portrayal of death by the most famous of the Spanish romantic poets; and how the lives of the marginalized people view death. A brief summary of the Spanish romantic aesthetic will also be defined. Because death is inevitable, life should be more precious or sweet, but the romantic life according to Espronceda is something like a fight with the bitterness that represents death and the marginalized life, as seen in "Song of the Pirate," "The Accused of Death" and "The Hangman."

Travis Jones, Senior, Biology
Faculty Mentor: Frieda Blackwell and Paul E. Larson
Title: *Intolerance and Destruction in Galdós' Doña Perfecta*
(Department of Modern Foreign Languages - Spanish & Portuguese)

One of the great works of nineteenth-century Spanish realist Benito Pérez Galdós is his novel Doña Perfect, published in 1876. Galdós lived during the tumultuous Carlist Wars, a series of struggles essentially between liberals and conservatives. These wars were filled with intolerance and bloodshed on both sides. In Doña Perfecta, Galdós gives the reader a glimpse of the destruction caused by such narrow-mindedness. One primarily views such bigotry through Galdós' characters. The plot essentially revolves around a young educated liberal named Pepe Rey and his conflict with his aunt Doña Perfecta, an older conservative women who holds a prominent position in a small town. Their complete intolerance for each other ultimately leads to Pepe's death. In addition, the narrator employs several contrasts throughout the novel to further illustrate the conflict between the two sides. Finally, Galdós' masterful use of irony is yet another tool he uses to highlight the injustices and atrocities of intolerance. Doña Perfecta was poignant and cautionary tale to his nineteenth-century readers about the dangers of intolerance, messages still applicable to the modern world.

Araceli Martinez, Senior, Spanish
Faculty Mentor: Frieda Blackwell
Title: *Oneiric Imagery in Rosalia de Castro's "On the banks of the river Sar"*
(Department of Modern Foreign Languages - Spanish & Portuguese)

The poetic works of Rosalía de Castro, from the second period of Spain's Romantic Movement, utilize memories, and oneiric imagery to communicate images of the beauty of nature, youth, and life. In her poem, "On the banks of the river Sar,"(1884) de Castro uses the image of the river Sar and nature's springtime to share her philosophy of the art of dreaming tied to her need to connect with nature. These images present themselves as elements within her dreams that reveal conflicting approaches to appreciating life versus living life. De Castro, thus, uses the art of dreaming as a metaphor to parallel the beauty of youth and springtime while confronting the reality of old age and winter. She explores the use of dreams as an escape from old age, as a connection with nature and youth, and as a necessity that ultimately gives her life, and allows her to continue living.

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March 23, 2010 • 2:30 – 3:30

Kelsey Howen, Senior, Spanish
Faculty Mentor: Frieda Blackwell and Paul E. Larson
Title: *Larra's "El Castellano Viejo" and the Critique of Spain's Middle Class"*
(Department of Modern Foreign Languages - Spanish & Portuguese)

Mariano José de Larra, an influential Spanish writer belonging to the first romantic movement of the 19th century, is famous for his biting critique of Spanish society presented in his famous essays or "cuadros de costumbre." Larra's works include various literary genres but he is most famous for his essays, which critics often divide into four categories (Varela 25). "El castellano Viejo," written just after the death of Fernando VII in 1835 and narrated by Larra's alter ego, Figaro, recounts a disastrous dinner party at the home of his acquaintance Braulio. Larra utilizes his critical narrator and a central, humorous anecdote, related with sarcasm, irony, and exaggeration, to criticize a stagnate Spanish middle class society who, typified by Braulio believed that everything traditionally Spanish was intrinsically superior. "El castellano viejo" offers reader a humorous tale of calamities befalling the hapless Fígaro, such as spilled soup, boring conversation and flying olive pits, all the while underscoring the ignorance and insularity of Spain's bourgeoisie even as Larra subtly presents the need for a shift to an educated, liberal, and progressive middle class to move the country forward.

Valerie Bunselmeyer, Senior, Psychology/Spanish
Faculty Mentor: Frieda Blackwell and Paul E. Larson
Title: *Psychological Development in Two Short Stories by Clarín*
(Department of Modern Foreign Languages - Spanish & Portuguese)

Clarín (pseudonym of Leopoldo Alas), one of the premier writers of Spain's naturalistic movement at the end of the nineteenth century, had a keen interest in portraying not only the exterior of his characters, but also their inner thoughts and psychological development to create robust and gripping works. He seemed to possess the astute ability to create a character by placing more emphasis on the psychological make-up than on any physical characteristics. By presenting such in-depth descriptions of the characters' mental processes, he provides a basis for their action. Clarín's short stories "Duo de la tos" and "Dos sabios," make use of the presentations of the characters mental processes to explain their actions, emphasize the emotional aspect of the environment that surrounds his characters, and give certain key objects a psychological system, allowing them to become characters in their own right. The combination of these psychological elements allows Clarín's readers to come to know his characters the way they know other individuals, with a strong sense of presence and aware of "what makes them tick."

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March 23, 2010 • 3:30 – 5:00

"Readings of Hispanic Prose and Poetry in Spanish and in English Translations"

Ben Roshto, Senior, Spanish
Jessica Green, Senior, International Studies
Flavio Salinas, Senior, Biology/Pre-Health Care/Pre-Medical
Faculty Mentor: Michael Thomas
Prose: *"The Red Stockings"*
(Department of Modern Foreign Languages - Spanish & Portuguese)

Translation of "Las medias rojas," by Doña Emilia Pardo Bazán by Dr. Michael Thomas

José Antonio Serrano, Senior, Biology
Spencer Davis, Senior, Spanish
Faculty Mentor: Michael Thomas
Poetry: *Ramón López Velarde (México)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Ella"	"Her"
"A un imposible"	"Impossible"
"Nuestras vidas son péndulos"	"Our lives are pendulums"

Melanie Crowson, Senior, Journalism
Emmy Jo Grose, Senior, International Studies/Intensive – International Studies
Faculty Mentor: Michael Thomas
Poetry: *Rubén Darío (Nicaragua)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Los Tres Reyes Magos"	"The Three Wise Kings"
"Melancolía"	"Melancholy"

Sally Ann Martínez, Senior, Spanish
Alex Bufton, Senior, Spanish
Faculty Mentor: Michael Thomas
Poetry: *Rosalía de Castro (España)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"En el alma llevaba un pensamiento"	"In her soul she carried one thought"
"Dicen que no hablan las plantas."	"They say that plants do not speak."

Ashley Hester, Senior, Spanish
Alyssa Massingill, Senior, Journalism
Faculty Mentor: Michael Thomas
Poetry: *Gustavo Adolfo Bécquer (España)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Rimas"	"Verse"

Valerie O'Brien, Junior, International Studies/Spanish
Ben Roshto, Senior, Spanish
Faculty Mentor: Michael Thomas
Poetry: *Federico García Lorca (España)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"La guitarra"	"The guitar"
"Canción de jinete"	"The Horseman's song"
"Galán"	"Handsome man"

Kaila Fagerstrom, Senior, Community Health
Katy Evans, Senior, Spanish
Faculty Mentor: Michael Thomas
Poetry: *Pablo Neruda (Chile)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Las muchachas"	"The women"
"Ausencia"	"Absence"

Rebekah Trimble, Senior, Spanish
Hana Manal, Senior, Psychology
Faculty Mentor: Michael Thomas
Poetry: *Luis Garcia Montero (España)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Me persiguen"	"They pursue me"
"Life Vest Under Your Seat"	"Life Vest Under Your Seat"

Daisy Marchena, Senior, International Studies/Intensive – International Studies
Erika Pedroza, Senior, Journalism/News - Editorial
Faculty Mentor: Michael Thomas
Poetry: *Santa Teresa de Ávila (España)*
(Department of Modern Foreign Languages - Spanish & Portuguese)

"Nada te turbe"	"Let nothing disturb you"
"¡Oh hermosura que excedéis!"	"Oh, exceeding beauty!"

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Fentress
March 23, 2010 • 11:00 – 12:00

Ben Smith, Senior, Environmental Science
Faculty Mentor: Julie King
Title: *The impact of a toxic tort: Anderson et al. v. Cryovac, Inc.; W.R. Grace Company, Inc.; John J. Riley Company, Inc.; Beatrice Foods, Inc.; and XYZ Company(ies)*
(Department of Environmental Science)

Anderson et al. v Cryovac, Inc is a landmark case in the field of environmental law, and more specifically toxic torts. The book, *A Civil Action*, by Jonathan Harr and the motion picture under the same title popularized this battle for compensation for illnesses caused by residential exposure to hazardous waste. This research investigates the environmental law concepts and strategies employed by the Plaintiffs that made the case so monumental. The crux of the Plantiffs' argument was providing the link between the contamination of municipal water in Woburn, Massachusetts, several large corporations, and a high incidence of childhood leukemia in several neighborhoods within Woburn. I evaluated all of the complaints, motions, and judgments that were filed throughout the duration of the case, in terms of their efficacy, and ultimate success. Additionally, the Plaintiffs' attorney utilized expert testimony from some of the leading scientists in their respective fields to fulfill the scientific issues of the case. The case did not end well for the Plaintiffs, with several companies dismissed from the suit and two settling outside of court. The settlement and results of the case for the Plantiffs in financial terms, may have been viewed as a loss, but the court preparation used by the Plaintiffs set the trend for a new means of handling toxic tort cases.

Scott Delgado, Senior, Environmental Science
Faculty Mentor: Julie King
Title: *An Account of how the Department of the Navy's sonar exercises became exempt from the National Environmental Policy Act through Winter v. Natural Resource Defense Council*
(Department of Environmental Science)

In late 2008, the Department of the Navy survived lengthy litigation on the subject of sonar use off the coast of Southern California. The Natural Resource Defense Council (NRDC) took the Department of the Navy through all three tiers of the judicial system for training exercises that were alleged violations of the Coastal Zone Management Act, Administrative Procedure Act, Marine Mammal Protection Act, and Endangered Species Act. The NRDC felt that a scientifically, justifiable injury had occurred against marine mammals in the area, while the Navy argued that the training exercises were necessary for national security. The case, *Winter v. Natural Resource Defense Council* (129 S. Ct. 365), language from federal Acts and Codes, and several reviews and analysis of the case were the backbone of the research used to interpret the implications of the case. After two years of legal battles, the Navy won the case with a 5 majority, 4 minority (2 concur/dissent, and 2 dissenting). The majority of the court, led by Justice Roberts, believed that the balance of equities and the public interest tipped in the favor of the Navy because of national security. The overall need to conduct live tests with mid-frequency active sonar was more important than the well-being and potential harm to marine mammals. There are additional questions left unanswered by the Supreme Court's decision. The Supreme Court never discussed the actual harm that sonar can have on marine mammals. Also, the Navy's use of the White House's Council on Environmental Quality's for an advisory opinion and whether that was a valid exercise of power by the executive branch was never debated.

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March 23, 2010 • 12:00 – 12:30

Joel Weinert, Senior, Electrical and Computer Engineering
Faculty Mentor: Randall Jean
Title: *Low-Cost High Frequency Pulse Generation*
(Department of Electrical and Computer Engineering)

A low cost pulse transceiver has been developed for measuring the electrical properties of materials. The transceiver generates an ultra-wide band pulse as well as samples the received pulse using extended time sampling methods. Pulse rise times of less than 100 ps allow for frequency content of up to 3.5 GHz. Using different timing signals, the effective sampling rate of the system can be extended to more than 6 GHz with A/D conversion rate as low as 100 KHz. The transceiver has been designed to provide the functions of a scalar network analyzer without the five figure cost. An immediate application would be for use as the measurement system for a non-invasive blood glucose meter. The reduced cost will now allow for many other consumer and industrial devices that previously were not economically viable.

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March 23, 2010 • 12:30 – 1:00

Drew Stevens, Junior, Sociology
Faculty Mentor: Kevin Dougherty
Title: *The Effects of Mass Imprisonment on Racial Inequality*
(Department of Sociology)

Black males exceed white males in penal confinement at an astonishing rate of 8 to 1. The dramatic increase in the incarcerated population over the last 30 years has only compounded the racial gap. In this paper I describe the ways in which the incarceration system in the U.S. has assumed the role of an extremely efficient institution of devastating and perpetual racial inequality. Socially the prison system deepens racial inequality by drastically reducing the likelihood of black incarcerated males to marry and form constructive family units. Economically, time in prison results in significantly less lifetime earnings and employment opportunities. In conclusion I survey the reforms available to our current system and recommend courses of action to remedy the racial inequality of mass incarceration.

Bill Daniel Student Center
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March 23, 2010 • 1:00 – 2:00

Heather N. Shanks, Senior, Management Information Systems
Faculty Mentor: Hope Koch
Title: *Attracting Women and Minorities to Technology-Related Fields*
(Department of Information Systems)

This study investigates why women and minorities choose technology-related majors, like information systems and computer science, and how to attract these students to technology fields. This research will help address an important national problem: not enough students choose technical careers even though the U.S. Bureau of Labor Statistics projects high job growth in this area through 2018 [Lacey and Wright, 2009, Strieber, 2010].

Based on a literature reviews and interviews of nearly thirty management information systems and computer science majors, this study identifies why women and minorities choose technical majors. Findings from this research can help universities and businesses design programs to attract these students.

Courtney Smith, Senior, Marketing/Management
Faculty Mentor: Jeff Tanner
Title: *Lasting Effect of Parent Style*
(Department of Marketing)

This research study and paper will use parental style theory to determine the lasting effect parents have on children in regard to children's sexual activity by analyzing the parental roles, style type and dimension, and attitude as perceived by their child. Parental style is an extensively studied topic used to help determine the effects parenting has on human development. The lifestyle a child may choose to follow is undoubtedly influenced by the lifestyle of the parent.

The number of teens that are sexually active has increased from 25% to 50% in the last 60 years. Recent statistics from the Centers of Disease Control (CDC) reveal that nearly 53% of high school students in the United States have engaged in sexual activity, and over 16% of the 53% constitute for having four or more sexual partners. Consequently, due to the increase in teens involved in this behavior, a current study determined that approximately 1 million teens become pregnant and 3 million contract STDs each year.

The purpose of this paper is to analyze the effect that parental style, sexual education, and personality traits have on the sexual behavior of individuals. Ultimately, the conclusions of this study will provide parents better insight on how to effectively influence children to make positive lifestyle choices in relation to sexual behavior.

Bill Daniel Student Center
Fentress
March 23, 2010 • 2:00 – 2:30

Andrew D. Rose, Senior, International Business/Management
Faculty Mentor: Christopher Marsh
Title: *Does Weber's Thesis Hold True for Chinese Economic Development: An Analysis of Christianization and the Rise of Capitalism in China*
(Institute of Church-State Studies – Arts and Sciences)

China is a country that has seen rapid economic growth in the last four decades. From 1978-2005 China's GDP saw an average increase of 9.6%. Max Weber states that, throughout its history, China has not been a country that is conducive to capitalistic institutions such as of the West. He maintains that, "compared to the Occident, the varied conditions which externally favored the origin of capitalism in China did not suffice to create it" (Weber 248). Weber's most well-known theory is that capitalism exists because of a "Protestant ethic" to work to glorify the Christian God rather than use work as an expedient to gain wealth for its own sake. Although many of Weber's theories are outdated, there is still validity in his primary assumption that the Protestant "calling" to worship God through work simply as a means to glorify God is the root cause for the existence of capitalism. Weber presents a convincing argument for why capitalism prevailed in the West, but China's economy is growing now, as well as its Christian population; does Weber's argument that Protestantism influenced capitalism hold true in China? The purpose of my thesis is to test this hypothesis and determine if there is a direct relationship between the Christianization of China and its subsequent economic development through the expansion in capitalism.

Bill Daniel Student Center
Fentress
March 23, 2010 • 2:30 – 3:30

Anne Langhorne, Senior, University Scholar
Faculty Mentor: Thomas Hibbs
Title: *Inadequate Agents and the Problem of Paralysis: A Response to Christine Korsgaard's Account of Human Value*
(Department of Philosophy)

In her book *The Sources of Normativity*, Christine Korsgaard offers an alternative to Kant's categorical imperative that adequately addresses common critiques of Kant's moral philosophy. She explains that our obligations are sensitive to the particulars of our individual identities and circumstances. Korsgaard grounds our obligations both in our particular identities and our identities as humans, beings who have the ability to deliberate about our actions. She argues that the human capacity to reflect about our actions is intrinsically valuable because we cannot help but exercise it.

This paper is both an analysis and critique of Korsgaard's theory. I begin by explaining the way it improves upon traditional Kantian ethics by introducing the idea of the "practical identity." The latter half of the paper engages one of her interlocutors, J.B. Schneewind, who has called into question a particular part of Korsgaard's argument having to do with the value of humanity. Schneewind contends that Korsgaard's move from inescapable use to unconditional value is a leap. Korsgaard has resources to rebut Schneewind's criticism, which I will briefly address in this paper. Central to my paper, however, are two more objections I raise that bolster his critique. First, I will make the case that our autonomy can be defective, giving us a reason to mistrust our own authority in reflection. Then I introduce what I have called the "Hamlet problem," the problem of the person paralyzed by reflection who then misses the moment of action. I argue that the paralysis sometimes generated by our reflection could undermine the "intrinsic worth" Korsgaard attributes to our reflective consciousness. Thus, while Korsgaard's normative ethics improve upon Kant's significantly, her argument for the intrinsic value of human nature raises serious questions.

Jonathan Rutledge, Senior, Philosophy
Faculty Mentor: Todd Buras
Title: *Immutability, Promises, and an Uncertain God*
(Department of Philosophy)

"Immutability, Promises, and an Uncertain God": In this essay, I will argue that given his views, van Inwagen commits himself to one of two conclusions: i) either God makes promises and there is no Libertarian Free Will, or ii) God does not make promises but there is Libertarian Free Will. After presenting this argument, I will defend three of its controversial premises against possible objections. Finally, I will show why van Inwagen should avoid accepting either conclusion and reconstruct a more tasteful conception of omniscience.

Bill Daniel Student Center
Beckham
March 23, 2010 • 11:00 – 12:00

Rachel A. Taylor, Sophomore, University Scholar
Faculty Mentor: Gabrielle Sutherland
Title: *Bismarck's Development of the German Volk: The Manipulation of the German People during Bismarck's Chancellorship*
(Department of History)

Upon Bismarck's unification of Germany in 1871, the German people seemed to be in need of a national identity. Bismarck saw this void and filled it with the idea of the German Volk. This idea planted the seeds of nationalism and, over time, led to authoritarian rule during his reign as chancellor. Research reveals that Bismarck's development of the German Volk had as much to do with his own goals as it had to do with the nature of the German people, even though Bismarck's identification of the Volk became national rhetoric for the following eighty years. By examining the formation of the ideological character of the Volk, the implementation and acceptance of a culture of violence epitomized by "Iron and Blood," and Bismarck's Realpolitik, the national identity of Germany can be better understood, especially upon consideration of economic and social policy, specifically protectionism, Kulturkamp and the identification of Reichsfeinde. The pathway to the failure of parliamentary democracy and the lack of resistance to seemingly absolute rule are explained by Bismarck's manipulation of parties by his inconsistent and often contradictory policies, which may have prevented a much-needed liberal revolution like those seen in England and France during the previous centuries. Ultimately, the ideology of the Volk continued to grow until it reached its pinnacle of glorification during the Third Reich.

David Matthew, Senior, Political Science
Faculty Mentor: Jeff Hunt
Title: *The Catiline Conspiracy to 9/11: A Consideration of Executive Power in Two Republics*
(Department of Classics)

In this paper, I discuss Cicero's role in ending the Catiline Conspiracy in terms of a comparison of the Roman Republic's consulship and the American Presidency. This is, to some degree, an exploration of emergency powers in American history and the lessons that might have been drawn (and which are still relevant) from the earlier Roman model of republican government. As these are two of history's great republics, and one remains influential for world events, it would be useful to learn from our greatest analogue in the past to help answer our contemporary questions.

The focus of the paper is mostly on Cicero's circumstances and motivations, his senatus consultum de re publica defendenda, and the subsequent fallout caused by his actions. Following this original focus, parallels with four different US presidents are drawn to show how our own republic responds to the extraordinary display of power by one man in concurrence with national and international crises. What results is a mixed message, but a message that indicates an acceptance of greater executive power if it is 1) narrowly confined; and 2) deemed proportional in response to the crisis.

Lastly, the paper examines the question that emerges as to why the example of the consulship of Cicero, as well as his subsequent exile, has not been one that presidents consider more carefully when requesting (or simply taking) greater power from Congress and the Judiciary.

Bill Daniel Student Center
Beckham
March 23, 2010 • 12:00 – 1:00

Trenton Smith, Junior, Great Texts/History
Faculty Mentor: Gabrielle Sutherland
Title: *Rethinking the Birth of the Renaissance: Modena and King Arthur as the Foundations of Tuscany*
(Department of History)

There is no greater legend, in terms of sheer popularity and universal appeal in medieval and early Renaissance Europe, than the tale of King Arthur and his Knights of the Round Table. This story is the penultimate example of the concept of the champions, or the "Twelve Peers," but instead of being confined to one nation, the legend of Arthur encompasses the entire European Consciousness. As the tale spread from fair to fair, it took on the local elements from each locale in which it was told. King Arthur arrived in Modena right around the turn of the thirteenth century. Modena would become the epicenter of the Arthurian legend in Italy; in fact one of the legends of Excalibur was developed at the Gothic Abbey of Saint Galgano at Montesiepi. The arrival of this legend as well as the involvement of Michael the Archangel in Arezzo coincided with the rise of Tuscany (with Florence as its mainstay) as the home of cultural power in Renaissance Italy. The narrative of the Aurthurian legend came to be a key aspect of the securing of the Tuscan Leauge. Utilizing a manuscript from the Biblioteca Estense, this paper argues that Modena played a pivotal role in the ideas leading up to the germination of the Italian Renaissance because of its central importance in the trade routes between Italy and Northern Europe; its interpretation of humanistic thought, and the stability it provided the Tuscan League as a whole.

Katelin Dixon, Junior, History
Faculty Mentor: Gabrielle Sutherland
Title: *The Development of the Goddess Figure and the Use of Feminine Language to Explain Creation in the Work of Bernard Silvestris*
(Department of History)

In his twelfth century Latin poem titled *The Cosmographia*, Bernard Silvestris attempted to explain the creation of the universe by using goddess figures to account for the various aspects of creation. These aspects included not only the creation of the cosmos but also the creation of man's soul, the formation of his physical body, and most importantly, the unity between the two. The tasks were granted to the goddesses Urania, Physis, and Natura who in turn were governed by the goddess Noys whom Bernard describes as "the supreme image of unfailing life." Bernard's use of gender specific language as evidenced by the goddess figures is key to understanding the role of the feminine in relation to God in the poem. Unlike the philosophical treatises of this time period that discussed creation, Bernard used poetry to say what philosophy could not. In this sense, the goddess figures served as a literary guise that enabled Bernard to discuss creation in a way that would prevent him from being deemed heretical. My research will discuss Bernard's need for goddess figures in explaining creation and also his major sources of influence in writing his work. Furthermore, I will focus on the gender specific language present in the poem and why it was necessary.

David Moore, Junior, History/Latin
Faculty Mentor: Gabrielle Sutherland
Title: *Tracing the Emergence of the Virgin Mary from the Archetypal Lady within Romance Verse and Literature*
(Department of History)

Many changes in the Christian structure, theology, and story originated in Thirteenth Century Italy. Mendicants were beginning to lay the foundations of their respective orders, particularly the Franciscans who answered Francis of Assisi's call to serve as joculatores Dei, "Minstrels of God". Lay devotion also increased as newly founded confraternities in the communes embraced a life of piety. Concurrently with these trends, recognition of Marian doctrine and reverence to Mary as intercessor and Queen of Heaven became popular in literature, verse. However, amidst the integration of Marian themes into all forms of literature, the traditions of the troubadour enterprise still remained influential within literature and verse. Works such as Matthew of Vendôme's Ars Versificatoria governed the artistry and craftsmanship linked with the composition of poetry and literature. Francis of Assisi shined as a master of versification and is credited with the invention of the lauda, primarily through the composition of his famous Laudes Creatarum. The emergent Marian themes of literature met and combined with the long established traditions of versification in Thirteenth Century Italy by means of such works as Francis' Canticle. However, the link between the themes of the established Romantic tradition and those of the emergent lauda tradition has never been explored, particularly in regards to the transformation of the archetypical "Lady" of Romantic verse into the Virgin Mary of the lauda corpus. In this study the link between "The Lady" and the Virgin Mary will be examined as it transformed within the literature of Thirteenth Century Italy.

Bill Daniel Student Center
Beckham
March 23, 2010 • 1:00 – 2:00

Cassie Stokes, Senior, History
Faculty Mentor: Keith Francis
Title: *My Experience with the British Pulpit Online Project*
(Department of History)

I will be discussing my involvement with the British Pulpit Online Project as a researcher and outline the basics of the project. In addition, I will talk about the impact the research has had on me and my studies as a history major. Through this paper, I would like to explain how it is extremely beneficial to give an undergraduate student an opportunity to participate in a program that closely mirrors what a career in their field of study might entail.

Sara Kincaid, Junior, History
Faculty Mentor: Keith Francis
Title: *Finding Charles Spurgeon: Rewriting Victorian History through Popular Culture*
(Department of History)

Examines the importance of a major literary source little investigated by historians: the impact of sermons, sermon publication, and preaching on Victorian culture.

Rosalie Lopez, Sophomore, History
Faculty Mentor: Gabrielle Sutherland
Title: *Realization of Identity in Literature*
(Department of History)

Looking back into literature enables us to understand ourselves both as individuals and as humans, regardless of differences from past to present. Literature does this by showing that an individual is part of many different circles, each of which he must play a role in, based on the values and virtues of his society. Often in literature, we celebrate surprising changes in characters such as Chares Dickens' Ebenezer Scrooge and Victor Hugo's Jean Valjean, where the character ultimately fulfills a new role through an emotional transformation. The story of a transformed character is so popular because it reveals a fundamental truth about ourselves: We, as humans, need change, even though many current-day adages suggest that change and humans are incompatible. This new negative connotation of change has lately made us lower the standards for those around us and ourselves. Once our standards are lowered, our actions lose their meaning in that they no longer propel us forward. We need to stop believing the modern lie that change is neither possible nor desirable and look back into literature to teach us why and how to change. A comparison of Dickens and Hugo's characters will show that change is possible and that change is what gives us hope for the future. The way a society will move forward in their future is always demonstrated in its literature.

Bill Daniel Student Center
Beckham
March 23, 2010 • 2:00 – 3:00

Melissa Borckardt, Senior, English
Faculty Mentor: Gabrielle Sutherland
Title: *The Poet-Prophets of Today*
(Department of History)

Literature has had a direct impact on the development of human history throughout time, so much so that men like Sir Philip Sidney and Percy B. Shelley consider the poet a kind of prophet. He or she is someone capable of effecting change in society, hopefully in a beneficial way. Shelley describes the ideal poet in his lyrical drama, "Prometheus Unbound." The human imagination, Prometheus, when coupled with human love, Asia, can produce poetry capable of leading the world to a new millennium. For Shelley, love is essential. Without it, the only future the imagination can produce is one dictated by Jupiter, as demonstrated in Mary Shelley's *Frankenstein*. Since Shelley's day, poets and authors like Alfred, Lord Tennyson have grown more skeptical of their influence, doubting that society understands, or even cares, about their visions. Nevertheless, they continue writing, and their audience continues listening. America today, and the world at large, suffers from negligence, both environmentally and socially. Poet-Prophets, as Romantics like Shelley would say, are needed more than ever to remind readers what it means to be human. John Steinbeck in particular foresees human perfection during one of the greatest economic catastrophes in American history. As long as people continue identifying themselves with both Prometheus and Asia, Steinbeck's dream can still be realized.

Bill Daniel Student Center
Beckham
March 23, 2010 • 3:00 – 4:00

Diane Elaine Nelson, Senior, University Scholar/Art History
Faculty Mentor: Katie Robinson Edwards
Title: *Walter De Maria and Photographic Vision*
(Department of Art)

American artist Walter De Maria's renowned earth artwork, *Lightning Field* (1977), requires viewers to make a pilgrimage to the high desert of western New Mexico, and thus has been seen by very few. However, most viewers know the work through eight specific photographs. My paper will focus on these eight official commissioned and copyrighted images of Lightning Field; both the images and site are managed by the Dia Foundation. This strict management by the Dia Foundation controls the way outside viewers approach the work, much in the same way that the foundation forms the way the visitors approach the artwork. The controls on the viewing experience, whether in person or through photography, emphasize particular qualities. The formal qualities of the released images have essentially altered the shape and reception of the work itself. This dissemination through photography raises issues of the viewer's perspective, temporality, artistic documentation and proprietary relationship between Dia Foundation and Lightning Field. My investigation into the relationship between photography and Lightning Field is relevant for the study of many transitory, or more long-term earth art objects, which rely on photography as an artistic means of contact with these works.

Bill Daniel Student Center
Beckham
March 23, 2010 • 4:00 – 5:00

Caroline Barta, Senior, Great Texts/Classics
Faculty Mentor: Daniel Hanchey
Title: *"Memoria" and the Immortal Soul in Cicero's "Tusculan Disputation 1"*
(Department of Classics)

Often interwoven with Cicero's most treasured convictions, the word "memoria" undergirds many of his philosophical works, particularly the "Tusculan Disputation 1." With "memoria" serving as an integral part of his philosophical argument, Cicero, through the character known simply as M, wrestles with the nature of the soul, its existence after death and the concept of immortality, concluding by reasoning the soul is immortal.

For Cicero, the significance of "memoria" emerges from his symbolically charged, deeply personal, and multifaceted understanding of the word. Thus, a proper understanding of Cicero's "memoria" will lead the reader to conclude: 1) the possession of "memoria" of the past and present is essential for the immortality of the human soul, 2) the possession of "memoria" properly maintained may in and of itself indicate the presence of an immortal soul, and 3) an entity like the Roman Republic, insofar as it possesses "memoria," has itself a kind of collective, immortal soul.

Twisting together the various threads of his argument, Cicero's concept of "memoria" and the immortal soul in "Tusculan Disputation 1" holds important and complex implications for both the individual and the Republic. "Memoria," vital for both history and legacy, becomes the cord holding fast much of what Cicero considers dear. Most importantly, however, "memoria" properly cultivated endows the soul, both individual and collective, with a kind of divine immortality. Ending with the same key thread of "memoria" as he began, Cicero will remember and record his remembrances to cultivate both his own personal immortality and the immortality of his beloved Roman Republic.

Anna Sitz, Senior, University Scholar
Faculty Mentor: Alden Smith
Title: *Propertius 3.9: Ut Pictor, Poeta*
(Department of Classics)

In poem 3.9.9-16, Propertius mentions eight artists: Lysippus, Calamis, Apelles, Parrhasius, Mentor, Mys, Phidias, and Praxiteles. Commentators generally make only biographical notes on these artists without examining their significance. Why has Propertius used these artists in particular to make his point that "each one follows the seeds of his own nature?" (20) Propertius' list of artists affirms his position as a philhellene poet of refined tastes and suggests that his patron should esteem him highly.

All the artists in the list are Classical or Hellenistic Greeks, a selectiveness to be expected due to upper class Rome's preference for Greek art. The poet characterizes himself as an art connoisseur in this catalogue of artists, even making personal critiques. This fits with his overall persona as a "poet of love and leisure" (Keith 2008). Thus, Propertius' list of artists maintains his image as a Greek-loving poet of refined tastes.

The catalogue of artists hints at the approbation Propertius desires from his patron Augustus. Three of the artists are associated with important leaders: Phidias/Pericles, Lysippus/Alexander, and Apelles/Alexander. For Romans, Alexander was a symbol for any exceptional leader, and Augustus identified himself with the conqueror. The implication is that Augustus, like Pericles and Alexander, should honor his artist in the same way.

Propertius' list provides more information than simply that each one should pursue his own talent. The list affirms Propertius' poetic persona and tastes while also suggesting that he should receive praise from his patrons.

Bill Daniel Student Center
White
March 23, 2010 • 11:30 – 12:00

Stephanie McCall, Senior, Journalism
Faculty Mentor: Mia Moody
Title: *A Textual Analysis of the Framing of African-American Males in the Media*
(Department of Journalism)

The purpose of this study is to analyze how African-American males are framed by the media through news articles and the accompanying (if any) visual images. The media focused on in particular is the *Houston Chronicle* and the *Waco Tribune-Herald* with a time frame of six months, within the six months, six weeks were chosen at random to focus on. A textual analysis was used to examine 50 articles/images from the *Chronicle* and 50 articles/images from the *Tribune-Herald*; articles were taken from the following sections: national, local and metro news. The coverage of black males was studied to see what messages are being communicated about the black community

Bill Daniel Student Center
White
March 23, 2010 • 12:00 – 1:00

Kristen Daly, Senior, Journalism
Faculty Mentor: Mikeal Parsons
Title: "*Matthew 5:17-48: The Not-So-Antithetical Antitheses*"
(Department of Religion)

In Matt. 5:17-20, Jesus says he came to fulfill the Law and the prophets. He proceeds to do so in verses 21-48, affirming the original intent of the commandments using an antithetical structure to address the areas of murder, adultery, divorce, oaths, retaliation, and love. Mosaic Law has already addressed these subjects, and it could be assumed that most of Matthew's audience knew how they were supposed to deal with each one. However, Jesus calls his followers to a higher standard of righteousness than that of the scribes and Pharisees and makes it possible for them to meet that standard by fulfilling all righteousness himself. He presents the Law as it has been misinterpreted and then clarifies its true intent, providing practical applications in order to deliver his followers from the cycles of legalism. These teachings are not to be taken as absolute and immovable truths, but rather are superseded by the greatest commandment, love. His words, when interpreted through the lens of love, reveal that he is not only concerned with the actions of his disciples, but also their hearts. When combined with the effective use of a structure that serves to distinguish between Jesus' interpretation and the traditional view, it becomes clear that the antitheses are not antithetical at all. Rather, they serve to intensify the Law as a means of maintaining relationships with those who we are called to love: God and others.

Derek Sanders, Senior, Religion
Faculty Mentor: Mikeal Parsons
Title: *Divine Trajactory in the Second Gospel: Towards Establishing a High Christology in Mark*
(Department of Religion)

From the beginning of Mark's Gospel, the reader begins to search for the author's answer to the question of Jesus' identity, which is a major theme throughout the narrative (1:27; 4:41; 6:2-3; 8:27, 29; 14:61). The frequent resurfacing of this theme leads the reader to expect a resolution, but such an expectation of the text itself would be in vain. The abrupt ending of Mark leaves the question of Jesus' identity unanswered, which undoubtedly adds to the confusion already felt by the reader – we never explicitly learn who exactly Jesus is from Mark. This, however, is part of Mark's rhetorical strategy; the absence of an explicit answer thrusts the reader into the story and forces him or her to draw conclusions based on what Mark has presented. Thus the identity of Jesus is fully established post-text as the reader begins to make sense of the various images that Mark uses of Jesus throughout his Gospel. While Mark uses many different images to portray Jesus, the most striking is the apparent God-language that seems to confuse God and Jesus at times. These divine images set the reader on a particular path, a trajectory, so that the answer the reader formulates must attribute God-like divinity to Jesus. Therefore, Mark's christology is intimately tied with his theocentricity in such a way that it is for him impossible to talk about Jesus without also discussing God.

Emily Watters, Senior, University Scholar
Faculty Mentor: Mikeal Parsons
Title: *Exploring the use of Spittle as seen in Mark 8:22-26 in Light of First Century Greco-Roman Culture*
(Department of Religion)

Throughout the Gospels, Jesus performs miraculous healings. For the majority of the healings, Jesus has only to speak a word or touch the sick; however, in three healings Jesus uses his own spittle to heal. This paper seeks to explore the reasons behind Jesus' use of spittle in healings, specifically in the healing of the blind man at Bethsaida in Mark 8:22-26. Various sources of evidence show that the use of spittle in this miraculous healing of the blind man is not accidental and not without significance. By viewing this story through the lens of a first century Gentile or Jew, one can fully understand the significance of Jesus' use of spittle in relation to the surrounding culture.

Bill Daniel Student Center
White
March 23, 2010 • 1:00 – 2:00

Joseph F. Hawkins, Junior, English/Philosophy/Political Science
Faculty Mentor: Joe Fulton
Title: *The Individualist Emphasis in the Speeches of Frederick Douglass*
(Department of English)

Following the publication of his autobiography, The Narrative of the Life of Frederick Douglass in 1845, Douglass went on the speaking circuit with the ardent abolitionist, William Lloyd Garrison. After gaining considerable notoriety in this way, Douglass eventually split with Garrison over constitutional interpretation. Douglass thought it to be a document of freedom while Garrison thought it to be a document of enslavement. This act, in many ways, symbolizes the new life Douglass was to embark on for the rest of his years. Throughout his next fifty years, Douglass stressed the moral wrongs of slavery and the necessity for freedom, but he stressed these principles for particular reasons. He wanted blacks to be free in order to express their individuality, in order to become self-made men. Numerous unpublished speeches exist of Douglass speaking at universities urging young people to throw off the shackles of dependency and embrace the virtues of hard work and sacrifice. This way of living was all Douglass knew, but it was not an uncommon outlook. Emerson and Thoreau also wrote and spoke of the importance of the individual. It was this idea of individualism that drove Douglass to work to abolish slavery. In his view, to be an individual is to fully partake in the endeavor that is life.

Amy Harvey, Senior, English
Faculty Mentor: Thomas Hanks
Title: *The Magic of Language*
(Department of English)

The Gawain poet displays impressive poetic style in his piece, "Sir Gawain and the Green Knight." His prosodic elements allow him to control the flow and rhythm without placing a limit on the content and imagery. In this article, I address the structure and diction of the poem by discussing multiple prosodic elements within the work. In the structure of the poem, the variable lengths of each stanza give the Gawain-poet freedom to add further detail to the most important scenes of the narrative, while the rhyme scheme, explicitly the bob-and-wheel found at the end of each stanza, provide the poem with shape and form. The diction of the work also provides an important aspect of the prosody by alliteration and imagery. The alliteration provides another layer of rhythm within the poem, and the imagery is crafted to create climatic rises and falls within the text. These prosodic elements combine together to create a unique cinematic poem.

Bill Daniel Student Center
White
March 23, 2010 • 2:00 – 3:00

Amanda Swenson, Junior, Language and Linguistics
Faculty Mentor: Lydia Grebenyova
Title: *Long-Distance Binding: Unraveling the Mystery of the Syntax*
(Department of English)

This paper examines the relationship between anaphors and their antecedents across ten diverse languages. According to Principle A of Chomsky's Government and Binding Theory, anaphors must be bound in their governing categories. For example, in the sentence, "John said that Bill blamed himself," the anaphor "himself" must refer to Bill; it cannot refer to John because, in agreement with Principle A, the reflexive and its antecedent are in the same governing category, which is limited to the embedded clause by the word "that." One point of contention with Principle A, however, is that in some languages the antecedent of the reflexive can be located outside of its governing category. In languages such as Chinese, Malayalam, and Japanese, the antecedent for the anaphor "himself" in the above sentence could be either Bill or John. This phenomena is called long-distance binding. This paper provides original data and discusses the impact of the complex or simplex nature and agreement features of the anaphor on its relationship with its antecedent. In this way, it contributes towards the goal of finding a long- distance parameter that would explain the occurrence and absence of long-distance binding across languages.

Annemarie Campbell, Junior, Professional Writing
Faculty Mentor: Lydia Grebenyova
Title: *Null Subjects and Verb Morphology*
(Department of English)

A null subject language is a language whose grammar allows an independent clause to be deficient in a written subject, as in Spanish "Estudio" (I study). Typically, null subject languages reflect person, number, and gender agreement with some sort of variation with the verb. Surprisingly, of the thousands of languages in the world, a considerable number are null subject languages. I have conducted some my own studies to demonstrate this idea of null subjects and also to question if there is some connection in these languages that possess the same qualities or if it is just merely fact. I picked "study" as the verb to demonstrate this across 22 languages and will conjugate it with different pronouns in each language. The most recent findings refer to the "Null Subject Parameter." Most work relies on the idea that language variation can be explained by this existence of parameters which are a set of specific rules expressed as postulates that come into play with universal principles (UG) to form the grammar of languages. These parameters generally thought of as yes/no options made available by universal grammar, are presumed to be preset in one direction. I believe there must be more of an explanation to this besides arbitrary rules. Maybe all languages started out as null-subject languages and then English, French, and Russian strayed in some way. Perhaps there was some need for the use of subjects and there were in fact specific endings that dropped with language variation. But we are still left ideally with the same question. If this is the case, then what caused these three languages to evolve to require subjects?

Carroll Crowder, Sophomore, University Scholar
Faculty Mentor: Lydia Grebenyova
Title: *Roles of Theta-Roles*
(Department of English)

In syntax, there are rules and theories that explain how sentences work. One such theory is Theta Theory. It exists to help explain why certain sentences are acceptable to native language speakers and others are not. The sentence •*She broke*, for example, is considered unacceptable by English speakers, as is •*broke the vase*. However, the sentence *She broke the vase* is acceptable. Theta Theory explains the reasoning behind this.

In Theta Theory, theta-roles (θ-roles) are assigned to arguments by predicates. The use of θ-roles is further defined in the Theta Criterion, which says that every argument must receive a θ-role from a predicate, and every θ-role must be assigned by a predicate to one and only one argument. An argument may be a noun phrase (NP), adverb phrase (AdvP), or prepositional phrase (PP). In this paper, I will look specifically at the θ-roles assigned to NPs from verbs (Vs). I argue that the basis of this θ-role assignment is not exclusively the relationship between a V and its dependents (V government). It also has to do with the qualities of the arguments themselves and the amount of information the speaker decides to include in his or her sentence.

Bill Daniel Student Center
White
March 23, 2010 • 3:00 – 4:30

Shayan Makani, Junior, Political Science/Philosophy
Faculty Mentor: John Ferguson and Jonathan Tran (Religion)
Title: *Deciphering Nonidentitarianism: A Criticism of Giorgio Agamben's Notion of Community as Whatever*
(Department of Political Science)

Humans are inherently social creatures. Our linguistic relationships at the micro- and macropolitical levels, with others, and ourselves, historically ground our being. It is within this grounding of being, founded in the commonality of humanity and its language, in which a space is present for communal relations, a void longing for societal connectedness and fulfillment. This essay focuses on the political nature of "whatever being", a means of filling that emptiness present in the human condition. Specifically, I argue that the ideas of Giorgio Agamben, an Italian philosopher and political theorist, regarding "whatever singularities" as explicated in The Coming Community cannot act as a foundation for a political response to the growing biopolitical paradigm of our era.

My criticism of Agamben's notion of community analyzes multiple arguments presented in the literature, including those related to conceptual absolutism, identity politics, transitions of communal relationships, the instability of Cartesian dualism within the coming community, and the re-appropriation of power as a reformed nihilism within the confines of traditional biopolitics. I conclude that "whatever being" cannot counteract the State's mounting control over life, a strategy of power relations that has increasingly become the norm for relations among a State and its citizens. "Whatever being" does not permit humanity to live such that it always matters. Alternatively, I suggest that we must embrace the grounded particularities of identity politics in the context of Statist relations to create avenues for incremental change.

Amabely Alderete, Senior, Political Science
Luisa Muskus, Senior, Economics, Political Science
Ben Dille, Junior, International Studies
Faculty Mentor: John Ferguson
Title: *God at Work. The Dilemma of the Workplace Spirituality Movement*
(Department of Political Science)

Since the early 1990s, the workplace spirituality movement (WPS) has become popular among companies throughout the United States. While definitions of WPS vary, the concept is characterized by "employee experiences of meaningful work, community, and transcendence" (Pawar, 2009: 245). The WPS movement is based on the idea that employees are increasingly discontent with their work environment, resulting in failure of employees to show interest in their daily tasks. Thus, companies seek to increase employee happiness, and thus productivity, by embracing spirituality. Extant research demonstrates that WPS has beneficial effects on attitudes including job involvement, organizational identification, and work rewards satisfaction as well as on work unit performance. WPS aims to provide the workplace with a sense of spiritual unity by allowing workers to profess and live out their faith at work, thus creating a sense of companionship with fellow workers.

Companies are utilizing the WPS movement to enhance productivity and address issues related to workplace unhappiness. However, few scholars have explored the legal precedents and implications related to spirituality in the workplace. Thus, we will discuss the historical statutes related to workplace spirituality and analyze the legal and organizational implications of the WPS movement. Specifically, our research will take an actor approach and address the outcomes of WPS from the perspective of both managers, subordinates, and the stakeholders with whom they interact.

REFERENCES
Pawar, B. S. 2009. Some of the recent organizational behavior concepts as precursors to workplace spirituality. Journal of Business Ethics, 88, 245-261.

Tiffany Gallegos, Sophomore, International Studies
Shayan Makani, Junior, Philosophy/Political Science
Thuy Nguyen, Senior, Political Science
Faculty Mentor: John Ferguson
Title: *Facebook and Freedom: Student Internet Speech Rights and Cyberbullying*
(Department of Political Science)

As a relatively new subfield in constitutional law, student Internet speech is a topic that has rarely been examined, especially in regards to how past precedent applies to the jurisdictional capabilities and regulation of school officials. Regulating speech on the Internet provides a monitoring mechanism for schools that was previously private, often handled at the familial level. As cyber-bullying becomes a common issue that public and private school officials confront on a regular basis, a sound legal justification for intervention in off-campus student speech is necessary.

This article concentrates on how technological innovations are affecting student speech rights. Specifically, it considers how popular personal social networking websites like MySpace, Facebook, and Twitter are used as tools by students to convey threats, or the general intention or determination to conflict harm on another. Though the judiciary has heard relatively few cases regarding student Internet speech rights, the precedent established by previous landmark decisions in the field of student speech have frequently been cited in a more modern context.
This article examines the scope of public school authority to regulate threatening off-campus cyber-bullying by considering the validity of the second of the two-prong test applied by the Supreme Court in *Tinker v. Des Moines* – the restriction of student speech that "[collides] with the rights of others." While several federal courts have interpreted the first prong of *Tinker* – the "substantial disruption" test – broadly to apply to recent instances of cyber-bullying – the second prong remains largely overlooked.

Caitlin Karraker, Junior, Political Science/Pre-Law
Faculty Mentor: Ivy Hamerly
Title: *The Fatal Flaws of Regional Organizations*
(Department of Political Science)

The objective of my paper is to prove that regional organizations, although they have desirable goals, often fail to achieve those goals because: 1. their structure makes them weak and ineffective, and 2. their insistence upon pursuing their own self interest above the interest of the organization makes them counterproductive. I examined three regional organizations with very diverse memberships and very different purposes. APEC, the African Union, and the Organisation Internationale de la Francophonie were all researched to prove the thesis. By analyzing the structure of each organization, I use historical examples to show that when the foundation of an organization is weak from the beginning, it causes ineffectiveness problems when crisis emerges in later years. I also recount the goals of each organization and use past examples to illustrate how self interested decisions have hindered each organization from fulfilling those goals. Ultimately, the paper outlines two different factors that contribute to the ineffectiveness of regional organizations.

The School of Engineering & Computer Science
Scholars' Day
Friday, February 19, 2010

Room 207

Gilberto Narvaez, III, Senior, Mechanical Engineering
Mentor: Dr. Stephen T. McClain
"Experimental & Computational Study on Flow Control Using Obliquely Aligned Elements"

Ryan Vano, Senior, Mechanical Engineering
Mentor: Dr. Walter Bradley
"Interfacial Shear Strength of Natural Fiber Composites: Influence of Fiber Surface Modification & Polymer Modification"

Room 210

Jason Head, Senior, Electrical and Computer Engineering
Mentor: Dr. Kwang Y. Lee
"Developing a Multi-Agent System for Optimized Multi-objective Power Plant Control"

Joel Weinert, Senior, Electrical and Computer Engineering
Mentor: Dr. B. Randall Jean
"A Pulse Transceiver for Broadband Microwave Measurements"

J. Harry and Anna Jeanes Academic Honors Week

Alexander 115 and Morrison Hall 205
April 12 – 16, 2010

Each spring during J. Harry and Anna Jeanes Academic Honors Week, Baylor Honors Program seniors present their thesis research in assemblies of students and faculty. This year, presentations will be split between **Alexander Hall 115** and **Morrison Hall 205**.

Alexander 115
Monday, April 12, 2010 • 11:00 - 12:00

Michelle Harp, Biology
Dr. James Marcum, mentor
Title: *Breast Cancer: The Human Experience*

Jonathan Cigainero, History
Dr. Kimberly Kellison, mentor
Title: *Relationships of Sam Rayburn*

Alexander 115
Monday, April 12, 2010 • 12:05 - 1:00

Christina Skrovanek, Biology
Dr. Kenneth T. Wilkins, mentor
Title: *Effect of Prescribed Burns on the Bat Community in Southeastern Piney Woods*

Rachel Rotondi (with Anica Debelica), Biology
Dr. Kenneth T. Wilkins, mentor
Title: *Insect Size as a Determining Factor in Prey Selection by Insectivorous Bats*

Alexander 115
Monday, April 12, 2010 • 2:30 - 3:30

Avery Erratt, University Scholar
Dr. D. Thomas Hanks, mentor
Title: *Challenging Change: On the Novels of Margaret Mahy*

Robert Pechacek, University Scholar
Dr. Jeannette M. Denton, mentor
Title: *Violent Words: A Pragmatic Analysis of the Conflict between Agamemnon and Achilles in the "Iliad"*

Hana Manal, Psychology and Spanish
Dr. Wade Rowatt, mentor
Title: *The Effect of Communion and Agency on the Selection of Male and Female Leaders*

Alexander 115
Monday, April 12, 2010 • 3:35 - 4:30

Peter Robinson, University Scholar
Dr. Kevin Pinney, mentor
Title: *Synthesis of Bioreductively Activated Prodrugs of Nitrogen-Substituted Combretastatins*

Rachel Bruce, Forensic Science and Biology
Dr. Joseph Ferraro, mentor
Title: *Cut Mark Morphologies Vary by Post-mortem Interval: A Study in Forensic Taphonomy*

Matthew McPheeters, Health Science Studies
Darryn Willoughby, mentor
Title: *The Effects of Creatine Supplementation and Resistance Training on Serum Testosterone and IGF-1 Levels in Older Males*

Alexander 115
Monday, April 12, 2010 • 4:35 - 5:30

Kevin Georgas, Great Texts
Dr. Barry Harvey, mentor
Title: *Different but Not Divided: Bringing the Doctrine of the Trinity to Bear on N.T. Wright and John Piper's Quarrel Over Justification*

Randi Dube, English
Dr. Lynne Hinojosa, mentor
Title: *Moments of Being: Virginia Woolf and the Modernist Concerns of Consciousness and the Self, Reality, and Experience*

Emily Ivy, History
Dr. Jerold Waltman, mentor
Title: *The Fairness of Workfare in Regards to Mothers*

Alexander 115
Monday, April 12, 2010 • 5:35 - 7:00

Matthew Berry, University Scholar
Dr. David Corey, mentor
Title: *War and Tragedy: Insights from Homer and Aeschylus*

Holly Murphy, University Scholar
Dr. R. Alden Smith, mentor
Title: *A Man of Letters: A Comparison of Cicero's Gubernatorial with his Exilic Epistles*

Kaitlin Fogelsong, University Scholar
Dr. Cristian Bratu, mentor
Title: *An Introduction to Marc Boulet's Oeuvre*

Heather Owen, Baylor Business Fellows
Dr. Charles North, mentor
Title: *The Role of Economic Theory in Poverty Alleviation Organizations*

Morrison 205
Tuesday, April 13, 2010 • 8:30 - 9:30

Martha Ayewah, Biology
Dr. William Hillis, mentor
Title: *Comparing the Effects of Western Medicine and Chinese Traditional Medicine on the Production of Aldosterone in Cultured Rat Adrenal Cells*

Rebecca Gottstein, History and German
Dr. Jennifer Good, mentor
Title: *Do These Rebels Have a Cause? Blaming America in 1950s German Culture*

Rachel Huntsman, University Scholar
Dr. Victor Hinojosa, mentor
Title: *Memory, Isolation, and Apathy: Political Themes in One Hundred Years of Solitude*

Morrison 205
Tuesday, April 13, 2010 • 9:35 - 10:30

Anam Whyne, Neuroscience
Joe Ferraro, mentor
Title: *Undergraduate mate choice preferences at Baylor University: does 'similar religious background' matter?*

Rachel Sherhart, Biology
Dr. James Marcum, mentor
Title: *Deadly Mistakes: Understanding Medical Error and Possible Solutions*

Jacob Jantzi, Physics
Dr. Jeffrey Olafsen, mentor
Title: *Rotational Granular Kinetics in a Rotating Tumbler*

Morrison 205
Tuesday, April 13, 2010 • 3:45 - 5:00

Audrey Campbell, Medical Humanities
Dr. Troy Abell, mentor
Title: *The Effects of Concomitant Pelvic Organ Prolapse Repair and Anti-incontinence Procedure on Patient Quality of Life – A Decision*

Christa Leotti, Medical Humanities
Dr. Troy Abell, mentor
Title: *Mesh - Augmented Anterior Colporrhaphy vs. Standard of Care: A Decision Analysis Evaluating Quality of Life*

Megan Presley, Economics
Dr. Joan Supplee, mentor
Title: *Neoliberalism and its Impact on Chilean Women under Dictatorship and Democracy*

Cynthia Perez, International Studies
Dr. Jarold Waltman, mentor
Title: *The Development of Dual Citizenship in an Increasingly Globalized Society*

Morrison 205
Tuesday, April 13, 2010 • 5:05 - 6:15

Nathan Hays, Religion
Dr. Kenneth Jones, mentor
Title: *The Beginning and the End: Reconfiguration of the Adam Legend in 4 Ezra and 2 Baruch*

Sarah Casey, University Scholar
Dr. Richard Russell, mentor
Title: *Heaney's Sacramental Poetics*

Gideon Jeffrey, University Scholar
Dr. Todd Buras, mentor
Title: *The Centrality of the Cosmological Argument*

Abby Worland, History
Dr. Robert Miner, mentor
Title: *"The prize is glorious and the hope great;" A Study of the Interrelationship Between Myth, Death, and the Afterlife*

Morrison 205
Tuesday, April 13, 2010 • 6:20 - 7:45

Tak - Chien Chiam, Computer Science
Dr. Greg Hamerly, mentor
Title: *Adaptive - K Nearest Neighbor Methods for Regression*

Sheevam Shah, Biology and Biochemistry
Dr. Bryan Brooks, mentor

Harry Smith, University Scholar
Dr. Dan Hanchey, mentor
Title: *Taking a Look Back: Cicero's Dramatic Influence on the Augustinian Idea of Providence*

Barrett Doran, Philosophy
Dr. Todd Buras, mentor

Jessica Reynolds, Journalism: News Editorial
Professor Carol Perry, mentor
Title: *"My Life": An inspirational magazine for teenage girls*

Morrison 205
Wednesday, April 14, 2010 • 9:00 - 10:45

Andrew Rose, Management and International Business
Dr. Christopher Marsh, mentor
Title: *Does Weber's Thesis Hold True for Chinese Economic Development: An Analysis of Christianization and the Rise of Capitalism in China*

Diane Nelson, University Scholar
Dr. David L. Jeffrey, mentor
Title: *Caspar David Friedrich's Theological Influences and Later Influence*

Julie Hamilton, Great Texts
Dr. David L. Jeffrey, mentor
Title: *"Everything beautiful in it's time": The theological aesthetics of form, color and harmony in the oeuvres of Georges Rouault (1871 - 1958)*

Andrew Pottkotter, Philosophy and Studio Art
Dr. Stuart Rosenbaum, mentor
Title: *Museum Anesthetic: The Incompatibility of John Dewey's Philosophy of Art with Museum Theory and Practice*

Andrej Pogribny, Biochemistry
Dr. Michael Foley, mentor
Title: *An Examination of Pope Benedict's Writings as a Challenge to Contemporary Secularism*

Morrison 205
Wednesday, April 14, 2010 • 10:50 - 12:30

Sarah Skipper, Psychology
Dr. Helen Benedict, mentor
Title: *Effects of Personality Traits on Parents' Treatment Decisions for Autistic Children*

Patricia Martinez, Biology
Dr. Rizalia Klausmeyer, mentor
Title: *Furanocembranoids and Their Related Compounds: A Literature Review*

Cecilia Benz, Biology
Dr. Troy Abell and Dr. Robert Wordinger, mentors
Title: *Effect of TGF - b2 on BMP Antagonists in Glaucomatous and Non - Glaucomatous*

Melissa Tsiu, Medical Humanities
Dr. Jonathan Tran, mentor

Manasa Reddy, University Scholar
Dr. Gary Elkins, mentor
Title: *The Effect of Temperature on Concordance Between Objective and Subjective Hot Flash Measures: Sternal Skin Conductance and Electronic Event Marking*

Alexander 115
Wednesday, April 14, 2010 • 4:00 - 5:30

Jessie Kuykendall, International Studies
Dr. Bradley Thayer, mentor
Title: *Winning Quiet Support in the Middle East, Soft Power Style: An examination of How the United States Can Use Specific Soft Power Methods to Lessen the*

Tyler Talbert, International Studies
Dr. Joan Supplee, mentor
Title: *Juan Domingo Perón and Hugo Chávez Frías: The Evolution of the Latin American Authoritarian and the Longevity of the Populist*

Erica Gibbs, International Studies and French
Dr. Jarold Waltman, mentor
Title: *Executive - Legislative Relations in France and Great Britain*

Jordan Tracy, Economics
Dr. Charles North, mentor
Title: *Circuit City Unplugged: An Economic Analysis of the Rise and Fall of Circuit City*

Alexa'jayne Carter, History
Dr. Jeffrey Hamilton, mentor
Title: *The Importance of Legitimacy in Shakespeare's Richard II and Richard III*

Alexander 115
Wednesday, April 14, 2010 • 5:35 - 7:00

Sara Sommers, Speech Communication
Dr. Beth Lanning, mentor
Title: *Battle of the Bulge: Why childhood obesity is one of the most challenging issues facing next generation and what must be done its spread*

Samantha Sirignano, Mathematics
Dr. Manfred Dugas, mentor
Title: *The Spirals of a Sunflower*

Jessie Liang, University Scholar
Dr. Tamarah Adair, mentor
Title: *Expression of a 165 amino acid derivative of phage K lysin, lysK, in Nicotiana benthamiana as a novel treatment of MRSA*

Jessica Carrothers, University Scholar
Dr. Sascha Usenko, mentor

Alyssa Munkres, Neuroscience
Dr. Jaime Diaz-Granados, mentor

Morrison 205
Thursday, April 15, 2010 • 8:30 – 9:30

Katie Linman, University Scholar
Dr. Susan Colon, mentor
Title: *George Eliot's Daniel Deronda and the Role of the Arts in Shaping Morality*

Natalie Rodgers, Studio Art
Dr. Julia Hitchcock, mentor
Title: *An Investigation*

Noelle Jacot, Classics
Dr. Greg Garrett, mentor
Title: *The Aeneid: Dawn of the Empire: a Screenplay Adaptation of Virgil's Aeneid*

Morrison 205
Thursday, April 15, 2010 • 9:35 - 10:30

Rachel Kressin, Neuroscience
Dr. N. Bradley Keele, mentor
Title: *The Role of Prenatal Stress in Rat Social and Emotional Behavior*

Cameron Howard, Medical Humanities
Dr. Scott Garner, mentor
Title: *Corporation Plan: A Medical Management Company - Business / Conceptual Plan*

Kayla Allen, French and English
Dr Heidi Bostic, mentor
Title: *Language of Female Empowerment in Selected Proverbes of Madame de Maintenon: A Translation and Exposition*

Alexander 115
Thursday, April 15, 2010 • 3:45 - 5:30

Luke Gerrard, Economics
Dr. David Hendon, mentor
Title: *Germany's Social Market Economy: Concept and Implementation*

Christina Jeffrey, Psychology
Dr. Helen Benedict, mentor
Title: *Using Narratives to Assess Resiliency in High - Risk Children*

Laura Parker, University Scholar
Dr. Wade Rowatt, mentor
Title: *The Effects of Religious Priming on Implicit Racial Prejudice*

Nicole Evans, Psychology
Dr. Sara Dolan, mentor
Title: *Religiosity and Behavior under the Influence*

Katherine Johns, Neuroscience
Dr. N. Bradley Keele, mentor
Title: *Intra - Amygdala Phenytoin Improves Behavioral Performance Under DRL - 72 Schedule of Reinforcement in Rats with 5,7 - DHT Lesions of the*

Alexander 115
Friday, April 16, 2010 • 10:30 - 11:45

Erik Baumann, Philosophy and Political Science
Dr. Linda Adams, mentor
Title: *US Foreign Policy in Iran from 1953 - 2010: What it Was, Where it Went Wrong, and What can be done to make it better. A Policy*

Kathryn Musick, University Scholar
Dr. Patricia A. Sharp, mentor
Title: *Chiaroscuro: Shedding Light on Shadows in Children's Literature*

Lauren Bailey, Psychology
Dr. Janet Crow, mentor
Title: *Effects of an Induced Abortion: A Case Study*

Alexander 115
Friday, April 16, 2010 • 11:50 - 1:00

William Peery, Philosophy and Chemistry
Dr. Paul Primirose, mentor
Title: *Groundwork for introducing ATRP in undergraduate lab: synthesis of ligand TPMA*

Kyle Throneberry, Biochemistry

Stephanie Frazon, Neuroscience
Dr. Charles Weaver, mentor
Title: *Exploring the Connection Between Working Memory and Creativity*

Alexander 115
Friday, April 16, 2010 • 2:30 - 4:00

Anna Marie Sitz, University Scholar
Dr. R. Alden Smith, mentor
Title: *The Image of Aeneas in Ancient and Late Antique Art*

Heather Outland, University Scholar
Dr. Kenneth Jones, mentor
Title: *Constantine: Convert or Opportunist?*

Faith Wardlaw, University Scholar
Dr. David L. Jeffrey, mentor
Title: *The Pearl as a Mirror for the Soul*

Raymond Stewart, University Scholar
Dr. Alexander Pruss, mentor
Title: *The Probabilistic Argument from Evil*

Alexander 115
Friday, April 16, 2010 • 4:05 - 5:00

Jessica Foster, Biology
Dr. James Marcum, mentor
Title: *The Social, Political, and Public Health Implications Surrounding Gardasil*

Meaghan McNeill, Mathematics and Biology
Dr. Brian Garner, mentor
Title: *Evaluating the Equine Treadmill for Use in Hippotherapy Research*

Elizabeth Conner, University Scholar
Dr. Kevin Pinney mentor
Title: *Novel Thiosemicarbazone Derivatives and Their Inhibition of Cathepsins L, K, and B*

Alexander 115
Friday, April 16, 2010 • 5:05 - 6:10

Zach Reece, Mathematics
Dr. James Garven, mentor
Title: *The Use of Catastrophe Bonds to Finance Large Scale Disasters*

Nathan Patterson, Biology
Dr. James Marcum, mentor

Stephen Li, University Scholar
Dr. William Hillis, mentor

Alexander 115
Friday, April 16, 2010 • 6:15 - 7:30

Kym MacNeal, University Scholar
Dr. Adams, PSC, mentor
Title: *Chemical and Biological Weapons and Their Affect on the Stability of the Middle East*

Joe Muller, University Scholar
Dr. David D. Corey, mentor
Title: *The Jus in Bello of Homer's "Illiad"*

Rebecca Daniel, University Scholar
Dr. Julia Hejduk, mentor

Laura Oliver, History
Dr Beth Barr, mentor
Title: *Eleanor of Aquitaine and Anne Boleyn: Female Political Power in England*

2010 Black Glasses Film Festival
Hippodrome Theater
April 23, 2010 • 7:00 p.m.

The Black Glasses Film Festival is an annual event held at the end of each spring semester that showcases the best student filmmaking and screenwriting from the previous year. The festival was created 11 years ago to give students an outlet to showcase their films and enable them to reach an audience. Awards are given for Best Film, Best Director, Best Actor, Best Actress, Best Editing, Best Cinematography, and an Audience Choice award. Winners are announced at the festival and will receive Best Buy gift cards ranging from $50-$100. While the festival is usually held on campus, this year it will play at the historic Waco Hippodrome theater downtown. Members of both the Baylor and Waco communities are invited to enjoy the films as a means of promoting the arts in the greater Waco community.

Will Bakke, Senior, Film and Digital Media
Title: *Beware of Christians* trailer

Will Bakke, Senior, Film and Digital Media
Title: *Beware of Christians* excerpt

Jordan Bellamy, Senior, Film and Digital Media
Title: *David Crowder Band* Rockumentary: Twitter Will Kill You*

Lindley Atkinson, Senior, Film and Digital Media
Title: *Defending History: Resurrecting the Hippodrome*

Courtney Whitehead, Senior, Film and Digital Media
Title: *Dino Chase*

Jordan Bellamy, Senior, Film and Digital Media
Title: *Exercise*

Jordan Bellamy, Senior, Film and Digital Media
Kelly McTavish, Junior, Studio Art/Painting
Title: *Feed the Dog*

Bryce Hagan, Junior, Film and Digital Media
Title: *Mortamorphosis*

Jordan Bellamy, Senior, Film and Digital Media
Title: *On Spiritual Apathy*

Philip Heinrich, Sophomore, University Scholar
Title: *The Oven*

Jordan Bellamy, Senior, Film and Digital Media
Title: *Playhouse*

Chris Bloodgood, Master's Candidate, Communication Studies
Title: *Ugly Lion, "Worriers" music video*

James Cole, Senior, Film and Digital Media/Economics
Title: *White Cat*

Brady Johnson, Senior, Film and Digital Media
Title: *Yours,*

Index

Special thanks to the URSA Scholars Week Committee:

Dr. Frieda Blackwell, Co-Chair

Prof. Elizabeth Vardaman, Co-Chair

Dr. Sara Alexander

Dr. Greg Benesh

Dr. Rena Bonem

Dr. Jann Cosart

Dr. Mark Dunn

Dr. Brian Garner

Prof. Margaret Thomson

Dr. Kathy Whipple

Cover Photograph of Pat Neff Hall
Courtesy of Baylor Photography

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