

# Celebrating Scholarship Day 2010

## ABSTRACTS

*Arranged alphabetically by first author's surname.*

### **Soccer as a vehicle for peace.**

OMAR A. ABDULLAHI (Janna LaFountaine, Physical Education).

In examining different phenomena that influence society, the most effective way to bring peace is through sports, in particular soccer. Soccer has the ability to facilitate social development and bring peace to a variety of politically and socially tense environments. However, other scholars believe soccer has tended to focus either on the game's capacity to inspire hooliganism among its followers or it has been exploited by politics for nationalistic purposes. Despite these controversies, soccer's efforts in making peace outweigh these negative aspects. Soccer can be used as a tool to promote peace and create unity among communities.

### **Synthesis of catalytically functionalized PAMAM dendrimers for tandem Suzuki cross-couplings/Diels-Alder one-pot synthesis.**

ANDREW AEBLY (Dr. T. Nicholas Jones, Chemistry).

Dendrimers are becoming an increasingly popular macromolecule in catalysis due to their highly ordered branches, recoverability and subsequent reuse in both homogeneous and heterogeneous processes. Two mono-functionalized G(4) PAMAM dendrimers were synthesized with a palladium catalyst and a MacMillan Diels-Alder organic catalyst with good percent recoveries. Optimization of the reaction conditions for each catalyst is ongoing. These procedures will be utilized to create a di-functionalized dendrimer to test a one-pot tandem Suzuki cross-coupling/Diels-Alder reaction for the synthesis of highly substituted stereospecific cyclohexenes.

### **Changes in human serum lipid profile with regular consumption of omega-3 fatty acid enriched eggs vs. regular consumption of standard hen eggs.**

JESSICA D. AGNEW HOEPPNER (Jayne Byrne, Nutrition).

In this double-blind crossover study, fourteen adults aged 19-22 years (6 male, 8 female) were asked to consume two standard or two omega-3 fatty acid enriched eggs a day for three weeks. A one week washout period followed, and then three weeks of the opposite egg. Participants were asked to keep two 3-day diet records during egg consumption and one 1-day diet record

during the washout period to analyze average fatty acid composition of the diet. Cholesterol and blood pressure were measured four times in this study using a Cholestech LDX System and an automatic blood pressure cuff. Lipid profile differences between groups were not significant, although subjects consuming omega-3 enriched eggs had a lower rise in triglycerides.

**Chinese New Year and its importance in Chinese culture.** GARRET BASSET, LINDSAY K. BRULL, HIBES GALENO and ADRIANNA L. RIVERA (Dr. Sophia Geng, Modern and Classical Languages).

Chinese New Year is the longest most important Chinese holiday. People spend days celebrating the New Year, as well as the new animal. All the animals (there are twelve) have a specific meaning and often will tell the fortune of the New Year. Along with this, there is an ancient story as to why the twelve animals that were picked are on the calendar. The dates of this Chinese holiday vary every year. The celebration follows the Lunar Calendar and usually occurs on the 2<sup>nd</sup> new moon of the New Year. There are several things the Chinese do to prepare for this holiday, such as decorating with traditional Chinese decorations that often times follow the themes of “happiness”, “wealth”, and “longevity”. The Chinese New Year is a time for people to forget their grudges and to wish true happiness upon everyone.

**Refactoring Trilinos' amesos direct sparse solver.**

ERIC T. BAVIER (Dr. Michael Heroux, Computer Science).

The Trilinos project is a collection of software packages that offers scientists powerful tools for mathematical applications, particularly for solving complex systems of linear equations. One such package, the Amesos package, allows users to solve sparse linear systems through a variety of direct methods. My project improves on the Amesos package by adding the ability to solve systems of arbitrary data types and by improving the design structure of the package source code. This is accomplished through extensive use of the C++ language's "template" functionality. The result is a more powerful and easy-to-use software package.

**Les personnages secondaires: les porte-paroles de Voltaire dans Candide.**

LAURA C. BEACH (Dr. Charles Villette, Modern and Classical Languages).

My French Senior Project, based on Voltaire's *Candide*, is a literary analysis of two secondary characters and their relationship to the hero through the perspective of religion. In my thesis I argue that the roles of these two secondary characters, Cacambo and La Vieille, are more important than the role of the hero himself. I assess their importance upon their ability to display, demonstrate and explain Voltaire's opinions pertaining to religion.

**Immigration and the German school system: a Freirean perspective.** MATTHEW T. BECK  
(Dr. Anna Lisa Ohm, Modern and Classical Languages).

During the economic boom of the 1950's, Germany welcomed guest workers from other countries to help rebuild its economy. Since then, the children of many of these immigrants have struggled to succeed in school. In order to improve their situation, I suggest that a combination of Paulo Freire's critical pedagogy, multicultural education, and collaborative dialog may help immigrant children acquire both the language skills and the cultural knowledge necessary for academic success. In this project I draw upon theories of second language acquisition; works by educational theorists from Germany, America, and Canada; and the experiences of German educators.

**Music as political tool: the role of music as propaganda in Nazi Germany (1933-1945).**  
CHRISTEN BECKSTRAND (Dr. Andreas Kiryakakis, Modern and Classical Languages).

The Third Reich (1933-1945) drew upon many aspects of German nationalism to solidify its control, including German musical culture, which played an important role in the regime's overall propaganda effort. Exploiting the Germanic musical culture, the Nazi party won "acceptance by creating the proper emotional atmosphere," wherein the acceptance of the Nazi party and Nazi ideals was simple and natural for the German public (Moller, 44). The Third Reich worked to promote the purity of German culture and the credibility of the Nazi Party by exalting the past Germanic (Aryan) musical greats, censoring new musical material, and excluding Jews from the musical scene. As a musical, emotional, and political movement, the Third Reich successfully infiltrated the German Volk through a popular vein: the love and appreciation for Germany's composers and the tradition of German dominance in the musical movement.

**The purification and characterization of lactate dehydrogenase.**  
DUSTIN BENTLEY (Dr. Dave Mitchell, Biology).

Lactate dehydrogenase was purified from three bovine tissues: heart, kidney, and liver. The enzyme was purified from each tissue using the same methods. Several experiments were run on the enzyme from the three sources to see if they would behave the same way. Activity assays, substrate vs. velocity graphs over multiple pHs, denaturation in urea, and activity assays in the presence of copper were run. The enzymes typically behaved similarly, but the kidney lactate dehydrogenase sometimes acted differently than the heart and liver enzymes.

**Los murales como un puente cultural en el District de Sol: A connection between the Chicano and American populations in St. Paul, Minnesota.**

HAYLEY BERRISFORD (Dr. Bruce Campbell, Hispanic Studies).

As the Chicano population in the United States continues to grow, so too does our need for intercultural knowledge. The west side of St. Paul offers the Twin Cities community the opportunity to learn more about Chicano culture through the District del Sol murals. The murals represent the traditions, customs, values, heroes and ideals of the Chicano population and these cultural markers are shared with the rest of the St. Paul population. The murals act as a bridge between the Spanish speaking and English speaking communities because often times, images speak louder than words. This project looks at the cultural bridge created by the murals through the study of mural representation, analysis of the stories and messages, and conversations with the muralists themselves.

**Electric field induced reversible pH microarrays.**

BETTENDORF, KEVIN (Dr. Edward McIntee, Biochemistry).

A microarray is often used to test a large number of different scenarios in biomedical, materials, and physical sciences without utilizing large quantities of sample or an extensive amount of time. Manipulating salt concentration, amount of reagent, types of reactants as well as other variables are all employed in microarray systems. Precise control over the pH in each well or spot is also an important and useful tool for microarray systems. In our project, instead of using different concentrations of buffer solutions to control pH in the wells, pH was controlled by hydrolyzing the water molecules. This was accomplished by controlling the polarity of the electrodes in the wells. The wells were fabricated by drilling pores of diameter ranging from 450  $\mu$ m to 1.5 mm into 3 mm wide Teflon sheets. A medium of 3% agarose gel in water was used to fill the pores. Agarose was used because of its strong bio-compatibility and its ability to retain large amounts of water. Hydrolysis in agarose was performed using electrodes consisting of both copper and platinum wires. The control over pH was easily attained by varying the average current and time of hydrolysis. The pH values (ranging from 2 to 11) can be reversed to a desired value through the control of polarity of the electrodes, salt concentration, and applied charge into the solution. By utilizing hydrolysis to create pH gradient, we were able to return the pH to the original value or create an entirely different pH in a single pore. The precise pH control gained by the use of this process may be implemented in various biological areas. It is hoped that the future work will include the use of this system for protein array to investigate binding affinities of receptor-ligand under varying pH values. Another potential use of this microarray system is to test the ability of different bacteria to survive in agarose at different pH.

### **Chinese Education.**

ZACHARY BOEVER, NICK PALMQUIST and KEVIN CHOW (Dr. Sophia Geng, Asian Studies).

This presentation is intended to compare the difference in education between China and the United States. We will analyze the different habits of studying and teaching methods. Why are there differences between the education systems in China and the United States? The presentation will include but is not limited to our own study habits, our experiences with our teachers, an average class day and the communities we have studied in. We have noticed that the traditional culture has determined the foundation of the educational system and Confucius' ideas embedded into the traditions have also been an impact. In conclusion with our experiences, we have determined the main differences in the two education systems.

### **Vitamin D intake and average serum level of 25(OH)D<sub>3</sub> in a monastic community compared to the national average and how these levels correlate with the community's rate of dementia/cognitive decline.**

MOLLY A. BRAY (Dr. Amy Olson PhD, RD, LD, Nutrition).

Vitamin D is a fat soluble sterol that is synthesized in the skin with sunlight exposure and is found in some food items but rarely occurs naturally. Few Americans actually achieve the recommended amount, with elderly individuals at the greatest risk of deficiency. In one study less than 10% of older adults (51 to 70 years old) and no more than 2% of the elderly (older than 70 years) met the requirements for their age groups. Vitamin D deficiency has been recently linked to cognitive impairment and dementia. Vitamin D receptors (VDR) are present on neurons and regulate neurotransmission and protect the brain from neurological damage. The purpose is to investigate the connection between vitamin D deficiency and cognitive decline. Consent was given by the monastery's Health Resource Team and Institutional Review Board. An announcement will be sent out in the monastery's weekly bulletin outlining the scope of the project. Dementia prevalence rates will be obtained, 50 vitamin D consumption surveys will be conducted, and 20 25(OH)D<sub>3</sub> serum levels will be collected.

### **Los cartoneros de Buenos Aires.**

EMILY E. BUGGY (Dr. Roy Ketchum, Hispanic Studies).

The economic collapse of 2001 left thousands of Argentineans without jobs and many turned to collecting recyclables in order to earn money. Interestingly los cartoneros (cardboard collectors) do not fit within the social and economic norms of Latin American society and neither does recycling. Nevertheless, it is recycling that provides a job and means of survival for thousands in Argentina. Out of society's trash, los cartoneros, who themselves are discarded by society, are able to take these rejected materials and achieve a better life. However, there is more to being a cartonero than just collecting and recycling materials. Through the formation of cooperatives, los cartoneros focus on other issues such as education, technical skills and the environment. Furthermore, with the increased prevalence of los cartoneros there has been increasing solidarity within the greater community as people realize that los cartoneros are a representation of the country's economic crisis and perseverance.

### **Green travel à la française: « Pour que les déplacements aujourd'hui alternatifs soient demain la norme ».**

LAURA BUGGY (Dr. Karen Erickson, Modern and Classical Languages).

The increasing CO<sub>2</sub> emissions have scientists worried about the future of the planet but the majority of people seem to ignore these worries and continue with daily life as before. In France, however, the écomobilité movement is pushing the French to rethink their modes of transportation and choose a greener way to get from point A to point B. The SNCF (the national rail system in France), already one of the cleanest transportation options in France, is implementing initiatives to have zero CO<sub>2</sub> emissions from their trains and is providing funds to promote the creation of new green transportation options. I will discuss whether the écomobilité options developing today in France offer the potential for real planetary change and what it means that the SNCF is emerging as a leader in the area of green travel.

### **Theory and application of building integrated photovoltaics.**

STEPHEN M. CAMPBELL (Dr. Brian Johnson, Chemistry).

Building integrated photovoltaics (BiPV) are included in the building during construction offering a viable option for solar power. It is a cleaner renewable source of energy that can help supplement our use of fossil fuels. This paper will explain the science behind how photovoltaics work and the different areas of possible improvement. The different materials used in the films of BiPV will be explored before explaining the ways that BiPV can be incorporated into architecture. Finally the feasibility of BiPV will be analyzed along with an explanation of how the solar farm at Saint John's fits into the overall picture.

### **Is it really an even playing field?**

ALEX K. CARLSON (Janna LaFountaine, Physical Education).

When females challenge males on the playing field, a debate ensues over whether they should be allowed to participate in male only activities. Researchers have found that females participating with males gain self-confidence. However, some physicians say that females participating on male only teams or activities are more likely to get injured. Currently, some females want to participate in male only activities. Evidence is clear that there are positive and negative aspects in regards to females participating on male athletic teams, but overall it favors females participating with males.

### **Knowledge of human papillomavirus (HPV) and social indicators affecting the level of awareness, barriers, and perspectives that influence cervical cancer screening among American Indian women.**

SUSAN CHHEN (Dr. Manuel Campos, Biology, and Dr. Nicole Sandhu, M.D./Ph.D., Internal Medicine, Mayo Clinic)

Within the past five years cervical cancer rates have drastically declined as a result of increased cytological screening by Pap smears and other interventional programs. As a result, in 2005, the incidence of cervical cancer in the U.S. was reduced by 80%. Despite the success, many women do not have access to these programs. The problem is more prevalent in disadvantaged minorities in developed nations, cultures that do not accept the screening process, and populations with inadequate resources, such as American Indian women. This study explored the prevalence of cervical cancer and HPV vaccination, and examined the lifestyle, social, educational, and environmental factors that explained the higher rates of cervical cancer in American Indian women.

### **Religion and sport being friends or foe.**

CHUHU A. CHA (Janna LaFountaine, Physical Education).

All over the world, religious practices have been associated with sports. In the United States, there is freedom of religion. Athletes have participated in religious practices during competition in a variety of ways. For example, athletes pray before and or during games. Sport psychologists say that praying is beneficial to athletes. Athletic teams at private institutions are allowed to pray at athletic contests, however at public institutions they are not permitted to pray. Therefore, religious practices should not be allowed at sporting events, due to the separation of church and state.

**Knowledge of human papillomavirus (HPV) and social indicators affecting the level of awareness, barriers, and perspectives that influence cervical cancer screening among American Indian women.**

SUSAN CHHEN (Dr. Manuel Campos, Biology and Dr. Nicole Sandhu, M.D., Ph.D., Internal Medicine, Mayo Clinic).

Within the past five years cervical cancer rates have drastically declined as a result of increased cytological screening by Pap smears and other interventional programs. As a result, in 2005, the incidence of cervical cancer in the U.S. was reduced by 80%. Despite the success, many women do not have access to these programs. The problem is more prevalent in disadvantaged minorities in developed nations, cultures that do not accept the screening process, and populations with inadequate resources, such as American Indian women. This study explored the prevalence of cervical cancer and HPV vaccination, and examined the lifestyle, social, educational, and environmental factors that explained the higher rates of cervical cancer in American Indian women.

**Can I have a piece?**

MICHAEL R. CHHOUN (Janna LaFountaine, Physical Education).

Several issues are involved in the heated debate regarding Division I athletes being exploited. Division I players have been generating millions of dollars through their athletic services. The money is distributed to the coaching staff and the institution, but none of it finds its way back to the players with the exception of "full ride" scholarship funds. However, the scholarship does not cover additional expenses incurred throughout the college years. In addition, there is no guarantee that an athletic scholarship will be renewed every year. Reform is needed to help Division I athletes cover additional expenses and graduate from college.

**Similar themes, different styles: the poetry of Walt Whitman and Pablo Neruda.**

MEGHAN CHIRPICH (Dr. Eleanora Bertranou, Hispanic Studies).

In 1972, the Nobel prize-winning Chilean poet Pablo Neruda traveled to the United States. During an interview, he said, "I, a poet who writes in Spanish, learned more from Walt Whitman than from Cervantes." Clearly Neruda recognized the great influence Whitman had upon his poetry. Stylistically the two writers are very different, some of which can be attributed to the use of two different languages and their varying life aesthetics. However, both poets utilize themes that tap into common human fears and desires, such as the cycle of life and death, war, and human sexuality, among others, and write about them in a way that is very accessible to the average reader and evokes emotions that few can put into words but which many people experience. The work of this thesis is to extrapolate on the influence of Walt Whitman upon the works of Pablo Neruda and to analyze, compare, and contrast their respective works.

**Bisphenol A and neurons: using immunoassay to determine estrogen receptor-alpha protein expression in rat hippocampal and striatal tissue.**

MEGAN L. CRAIN and KATHERINE J. DICKINSON (Dr. Danielle Grove-Strawser, Biology).

The objective of this research is to increase currently deficient knowledge about the effects of environmental estrogens on the mammalian brain, specifically neurons of the hippocampus. The first step in examining the effects of BPA on neurons of the hippocampus is to verify that any cells that are studied do express ER $\alpha$ . This required development of a system for assaying the expression of ER $\alpha$ . In the studies presented here, ER $\alpha$  protein levels were detected in protein extracts from rat brain tissue using an optimized immunoassay. Preliminary results indicate that both male and female pups expressed ER $\alpha$  in the hippocampus and striatum. Furthermore in the hippocampus, female pups appeared to express more ER $\alpha$  than both male pups and postpartum female adults. Among females, the striatum appeared to have more ER $\alpha$  than the hippocampus. This work was supported by funds from the Florence M. Rooney endowment at CSB/SJU, a CSB/SJU Professional Development grant (DGS), and the CSB/SJU Undergraduate Research Program.

**Family planning and birth control among the indigenous population of Guatemala.**

MARY M. CROSBY (Dr. Eleonora Bertranou, Hispanic Studies).

The high fertility rate and rapidly increasing population of Guatemala can be attributed in part to the underdeveloped use and lagging promotion of birth control and family planning. In particular the cultural divide between the indigenous and ladino populations pose different views on incorporating related health programs and modern medicine into their lifestyles. The heavy influence of religious tradition accounts for much controversy the country faces when dealing with the movement of family planning and birth control, as well as the other differing aspects of race, culture, and gender.

**Mayo Innovation Scholars Program.**

PATRICK CURRAN, HALLIE JACKSON, ELIZABETH JAQUA, and BREANNA PETERSON (Dr. Barbara May, Biology; Lisa Lindgren, Management and Julie Christle, Internships).

The Mayo Scholars Program offers an opportunity for selected undergraduate science and business students along with a small group of MBA students, to research specific projects submitted by Mayo Clinic professionals through the Mayo Ventures and Licensing activity. This year, our undergraduate team, along with an MBA candidate from the University of St. Thomas, conducted extensive research and market analysis of one proposed product. Over the last six months, the team collaborated in researching the biological background, the efficacy of the proposed treatment, and conducted a thorough market analysis. Our final project was presented to the Mayo Clinic and our licensing managers.

### **“Coining” black into white.**

MATT DALEY (Dr. Christina Tourino, English).

Ultimately, the passing narrator of James Weldon Johnson’s “The Autobiography of an Ex-Coloured Man” chooses to be white, both physically and psychologically. Why has he “chosen the lesser part” (“The Autobiography” 211)? Why has he “sold his birthright for a mess of pottage” (“The Autobiography” 211)? There are many applicable readings here. However, I believe there is a definitive Marxist reading conveying how, in the end, the passing narrator, in order to become the successful person he continually wishes to be, conforms to the racist regime of capitalism, the “vacuum” of the bourgeoisie. I believe Johnson, whether aware of it or not, has portrayed one of the most prevalent forces of racism then and now. And in doing so, has given the reader a critical lens. Using Karl Marx, I will convey the capitalistic constructs within the narrator and the society surrounding him throughout the novel, consequently revealing the critical lens of white (socially constructed view: bourgeoisie, educated, rich, etc...) hegemony therein.

### **“Goodbye Mother! I hope we get to see each other again”: the movement of children out of London during the blitz attacks of World War II.**

SARAH E. DAYTON (Dr. Gregory Schroeder, History).

During WWI, London was attacked for the first time by planes. This affected the British people enough that in 1931 the Imperial Defense Committee established an Evacuation Sub-Committee. So if there was ever another attack the British people would be able to evacuate key areas. As WWII approached the Committee changed and decided what evacuation would look like when the time came, however the execution was a bit different. On September 1, 1939 the first wave of evacuation occurred. Evacuation from London went splendidly, school children aged 5-15 years, pregnant women, handicapped, and mothers with children under 5 left London by train. There was one catch; no one knew where anyone was going. This meant that people didn’t always end up where the Committee had planned. Despite government efforts, not everyone was treated fairly, including the people that took the evacuees in. Yet another problem was that no bombs were dropped until nine months after the war began on September 3, 1939. Thus a wave of people moved back to London, causing the need for evacuation wave number two.

### **Expression of annotated xylanase gene in *Cellulomonas flavigena* in different carbohydrate media.**

TYLER R. DEROUIN and DEVON D. WARREN (Dr. Barbara May, Biology).

With growing dependence and depletion of current energy resources, cellulose, a highly prevalent plant material, is being investigated as a usable biofuel. Enzymes have been extracted from various microbial resources that can break down cellulose into its valuable sugars for biofuel production. However, there is a need for alternative enzymes that can break down cellulose under different pH and temperature ranges. In a program sponsored by the Department of Energy’s Joint Genomic Institute entitled “Undergraduate Research in Microbial Genome Annotation”, we identified several putative cellulose degradation enzymes in the genome of

bacterium *Cellulomonas flavigena*. To identify these genes, we used various search engines to look for amino acid domain and protein similarities in large protein databases. We chose to examine genes 2500485580 and 2500486900, both potential xylanases. We have begun our functional analysis by examining *C. flavigena*'s gene expression (mRNA) of both gene 2500485580 and 2500486900 in cellulose, xylan, and glucose media. Using a reverse transcriptase polymerase chain reaction (RT-PCR) to amplify our specific gene, we can verify the gene is expressed in these culture conditions. We hope with this information and future protein expression and knockout analysis to better elucidate the important pathways for polysaccharide breakdown.

#### **Mexican immigration in Green Bay, Wisconsin.**

KATHRYN E. EBBEN (Dr. Gladys M. White, Hispanic Studies and Dr. Ron Pagnucco, Peace Studies).

For the past nineteen years, the population of Green Bay, Wisconsin has seen a substantial influx of Hispanic immigrants, with the majority of the population arriving from a four-state area in Mexico. This growth in Green Bay's population has lead to some tensions between the immigrant and non-immigrant communities caused by a lack of understanding regarding Mexican immigration and Hispanic culture. In order to bridge the gap between the immigrant and non-immigrant communities, I am writing a short book that contains information regarding Mexican immigration in Green Bay and making it accessible to the public through various nonprofit organizations. The book consists of three parts: an introduction to Mexico and Mexican immigration, interviews with Mexican immigrants in Green Bay, and a conclusion that draws connections between the preceding two parts. In making this book accessible to the public, I hope to promote understanding between the immigrant and non-immigrant communities, enable these immigrants to have the chance to tell their stories, and work to build a positive peace in the community.

#### **Haute trahison? : Pétain et le régime Vichy.**

MICHELLE R. EBERHARD (Dr. Chuck Villette, French).

During World War II, Germany annexed the northern portion of France while installing a puppet government known as the Vichy regime in the southern section of the country. Headed by the Marechal Pétain, France's war hero from the *Première guerre mondiale*, Vichy remained the powerful authority of *L'Etat Français* for over four years. During this time, Pétain changed France's motto from « *liberté, égalité, fraternité* » to « *travail, famille, patrie* », a stark resemblance to the Germans' creed, and also pursued « *la révolution nationale* », wherein he attempted to regenerate a nation destroyed by its current economic and social situations. Unfortunately, Pétain also created one of the darkest moments in France's history, as he allowed for France's collaboration with the Nazis and helped them pursue their Final Solution. Why Vichy? Why Pétain? Why collaboration? And why do Pétain's actions still ruminate in the memories of the French today?

**Purification and characterization of swine lactate dehydrogenase.**

JUSTIN EKLUND (Dr. David Mitchell, Biology).

Lactate dehydrogenase (LDH) is an essential enzyme involved in the generation of energy in the form of ATP for use by the body during anaerobic respiration. LDH catalyzes the conversion of pyruvate, the end product of glucose metabolism to lactate when oxygen is in short supply with the concomitant conversion of NADH to NAD<sup>+</sup>. LDH was extracted and isolated from samples of pig heart, kidney and muscle tissue using several chromatography techniques. Bradford and Activity assays were then used on each of the respective samples to quantify a purity and observe differences among tissue samples.

**La agricultura Andina: la tradicional contra la moderna.**

KATELYN ENGEL (Dr. Bruce Campbell, Hispanic Studies).

One of the foremost consequences of the Spanish colonization of the Andes was a loss of traditional crops and agricultural practices which had shaped and defined the life of indigenous people for centuries. Today, the Andean regions of Bolivia and Peru still feel the effects of colonization; crops such as quinoa, corn and tubers have experienced a metamorphosis in their cultural significance. In the highland regions, loss of cultural traditions to “modern” practices is commonplace, while poverty and malnutrition are rampant. However, there is a call for the renewal of traditional agricultural practices and customs to improve nutrition status, poverty level, environmental impact, and cultural pride of indigenous people in the Andean countries of Bolivia and Peru.

**Historical memory in Spain.**

AARON S. FELIX (Dr. Gladys White, Hispanic Studies).

Under President José Luis Zapatero, Spain faces one of its most challenging issues in its recent history: The unveiling of the crimes committed during the Spanish Civil War. Zapatero’s administration urges to press forward with a Historical Memory Law that addresses the atrocities committed under the dictatorship of Francisco Franco that plagued Spain in the mid-twentieth century following a civil war. With a closer examination of Spain under Franco, the many factors that the law addresses regarding modern-day Spain, and the political opposition to the law, we will note the necessity for the law to give closure to the victims and their families and to prevent history to repeat itself. The new Historical memory law also addresses the political and cultural divide in Spanish society. In order to promote future growth, the past must first be recognized.

**The effects of 8 grams soluble, viscous fiber, provided as one serving of oatmeal, on blood lipid levels in 28 college staff.**

EMILY C. FIELD, SHANNON K. MOORE and MOLLY A. BRAY (Dr. Amy Olson PhD, RD, LD, Nutrition).

The purpose of this study was to determine the effects of 8 grams viscous, soluble fiber on adult blood lipids provided in the form of Quaker Oats High Fiber Oatmeal. Participants consumed one packet of Quaker Oats High Fiber Oatmeal four times per week for five weeks in replacement of their typical breakfast carbohydrate. Complete lipid profiles (Total cholesterol [TC], HDL, LDL, and Triglycerides [TG]) were measured and 24-hour diet recalls were obtained before and after oatmeal supplementation. HDL levels increased in 90% of the participants (n=25) and TG decreased in 60% (n=16). Average daily fiber intake increased from 26 to 32 grams in males and from 20 to 27 grams in females. Recommended daily dietary fiber intake for males is 38 grams and 25 grams for females. Average dietary cholesterol intake decreased from 255 mg to 167 mg. There were no significant changes in blood lipids but there was a trend of increased HDL cholesterol levels. The lipid levels of this population were not enhanced by soluble, viscous fiber supplementation perhaps due to optimal lipid profile averages at baseline. Despite increases in average TC and LDL levels, participants remained well within optimal TC ranges and near-optimal LDL ranges post oatmeal supplementation.

**A nanoscience approach to drug delivery systems.**

DARYL FIELDS (Dr. Edward McIntee, Biochemistry).

Synthetic nano zeolite, commercial zeolite Y and meso porous silica were tested for their ability to encapsulate and release drugs from their crystalline cage structure. Ibuprofen, aspirin and fluorouracil were loaded onto these structures individually and analyzed with thermo gravimetric analysis as well as infrared spectroscopy to measure percent by mass drug composition within the complex. The drugs were released from the cage structures within a fluid that mimicked body salt concentrations to measure the theoretical release rate of the drug. The release rate was measured through ultra violet spectroscopy. The data gathered showed that these three nano structures are a valid choice for the adsorption and release of all three drug molecules within body simulated conditions. This is validated through their ability to act as carriers for the drug molecules while maintaining their structure's integrity throughout the simulated release.

**Male antagonists and wasted allies: how the demonization of men in feminist films hinders gender equality.**

BRENNNA FINLEY (Dr. Shane Miller, Communication and Gender and Women' Studies).

Modern impressions of the Women's Movement are tainted by film depictions of men as tyrants and the enemy of feminism. These films create gender stereotypes depicting men to be less important than women and actively interfering with the fight for gender equality. The ensuing messages not only distort the important role male allies played in historical feminist struggles, but encourage women to look past men as potential allies.

**Chicano Theater monologue presentation.**

AMANDA FORSTROM (Dr. Gladys White, Hispanic Studies).

After researching the Chicano Theatre movement of the 1960's, I will present a monologue in *spanglish*, a language phenomenon of the mixing of Spanish and English by Latinos after immigrating to the United States in the 1960's. In order to have a successful presentation of the piece, I will need to research the unique linguistic characteristics of *spanglish* and the social, political, and cultural aspects of the Chicano Theatre movement. The presentation of this piece will portray the unique bilingualism of the 1960's Chicano immigrants and their descendants in the United States today, as well as the sentiments of these people.

**Directing and acting in a two-person show: *Dutchman*.**

AMANDA FORSTROM and MASON MAHONEY (Dr. Kaarin S. Johnston, Theater).

The discourse will cover the production process of the play *Dutchman* by Amiri Baraka and a brief overview of the Black Theatre Movement, lead by the two senior Theatre majors, Amanda Forstrom and Mason Mahoney. The discourse will be organized by Power Point presentation, and will cover the processes of directing, acting, lighting and sound, costuming, and casting extras and the music design. The conclusion of the presentation will be about the response of the play by the student body as a part of the Martin Luther King, Jr. Celebration on the CSB/SJU campus, and its impact on students as well as the actors.

**Radon emanation from building materials including granite flooring tiles, concrete and wallboard.**

DANIEL FRANTA (Dr. Daniel Steck, Physics).

Radon (Rn) is a naturally occurring radioactive gas that is produced from radium during the uranium decay process. It has no color or odor thus making it difficult to detect unless testing specifically for it. Radon levels in homes in Minnesota are, in many cases, putting the occupants

at risks they are not aware of. Although most radon comes from the soil beneath the house, objects, such as granite tiles, concrete and other building materials can also be contributing sources. Radon is the second leading cause of lung cancer in the United States today and the leading cause of cancer in non-smokers.

### **Drug resistant tuberculosis in South America: how new cures breed molecular epidemics and threatens human rights.**

MELISSA FUJAN (Dr. Corey Shouse Tourino, English).

Tuberculosis (TB) is a contagious airborne disease that burdens many countries worldwide. Latin America, one of five epidemiological sub-regions shares this burden, especially developing countries such as Bolivia. TB interventions are challenging to plan, finance and implement on a global scale. Despite the efforts of health organizations such as WHO and USAID to establish programs like the Directly Observed Treatment, Short-Course (DOTS) strategy, the fight against TB has led to the emergence of multi-drug resistant TB (MDR-TB) and more recently, extensively drug resistant TB (XDR-TB). While MDR-TB and XDR-TB pose a serious, demonstrable threat to the public health, concerns regarding the legitimacy of compulsory measures for underdeveloped Latin America introduce a whole host of human rights concerns. Further revision of international health policy must take into account the legitimacy of these options case by case in order to come to a viable treatment program.

### **The simultaneous determination of the acid dissociation constant and the partition coefficient of a solution of benzoic acid in heptane and water.**

GAGNON, NICOLE (Dr. Richard White, Chemistry).

A solution of benzoic acid in heptane and water can be analyzed using gas chromatography and by varying pH to determine the acid-dissociation constant and the partition coefficient simultaneously. The benzoic acid will partition between the two layers and the layers will be run in the GC instrument to create a calibration curve of peak area vs. concentration. The conditional  $K_D$  and  $K_a$  can be found using this curve and by testing the pH of the solution to calculation  $[H^+]$ .

### **Vitamin D status in division III male cross country runners: a follow-up study.**

ALI J. GALZKI and KELSEY L. REHWALDT (Dr. Amy Olson PhD, RD, LD, Nutrition and Dr. Manuel Campos, Biology).

The serum vitamin D (25-hydroxyvitamin D<sub>3</sub> [25(OH) D<sub>3</sub>]) levels of Saint John's cross country runners were tested twice during the season. Serum 25(OH) D<sub>3</sub> levels decreased in 24 athletes (77.4%) from September to December, but the difference was not significant. Serum Vitamin D<sub>3</sub> levels decreased among runners overall, but only one athlete had a level less than the optimal 75nmol/L in December. Last year 38% (14/37) of athletes had lower than optimal serum 25(OH) D<sub>3</sub> levels despite adequate dietary intake of vitamin D on average. The improved vitamin D

status this year is likely due to milder temperatures which permitted athletes to run outside all season and changes in diet and supplement use in response to feedback given last year. There was little correlation between vitamin D intake and serum 25(OH) D<sub>3</sub> levels, but diet plays a slightly more important role in maintaining serum levels in December when exposure from UVB light is decreased than it does in September.

### **The future of the book**

KIRA GARRETT (Dr. Cindy Malone, English).

The introduction of electronic readers and an alleged looming take over by the e-book has engulfed media coverage of the publishing world. Authors, publishers and readers have shifted focus from other issues to argue for and against the death of the printed book. However, the more important debate for the publishing industry lies not in the difference between electronic literature and printed literature, but instead over the proper definition of “the book.” The definition of “the book” must be broadened. We can no longer easily distinguish a printed book from a digital book because of the inevitable digitalization of the printing process, among other things.

### **Analysis and classification of potentially variable stars.**

ADAM M. GENTNER (Dr. Sarah Yost, Physics).

A star can be classified as variable if its apparent brightness from earth changes over time. These variable stars are quite common in our universe, but often go unclassified because of the sheer quantity of observation needed to positively classify a star as variable or not. The ROTSE (Robotic Optical Transient Search Experiment) Northern Sky Variability Survey information database was used to create a list of potentially variable, though not yet classified, stars. The stars from this list were observed multiple times at the Saint John’s University observatory to determine whether or not they were indeed variable.

### **Cicero’s theory of ethos and its use in judicial speech.**

KELSEY E. GERMAN (Dr. Richard Ice, Communication).

Cicero’s use of ethos in his written oration of *Pro Milone* was successful at promoting the gentle, positive emotions toward Milo and Cicero and the gentle, negative emotions toward Clodius that are necessary in order to open the audience up to strong persuasion by other rhetorical means. The speech that is analyzed in the write oration, which Cicero composed after the original oration did not succeed in the courtroom. The written *Pro Milone* is constructed in the way that Cicero believes would have won the case. My paper examines Cicero’s theory of ethos and how he believes it should be used for judicial purposes. The paper then analyzes Cicero’s judicial speech *Pro Milone* for a better understanding of how Cicero uses ethos in his speeches.

**Emotional intelligence development in children through play.**  
ALISON M. GRESBACK (Dr. Stephen P. Stelzner, Psychology).

Over the past few decades, the concept of emotional intelligence (EI) has highlighted the importance of being in tune with our emotions and the emotions of others to aid in successful social communication, both verbal and non-verbal. Historically, psychology has given a great deal of attention to the most traditional notion of intelligence and looked for influences in children's development that enhance intellectual capacity. Would it not be logical to look for the same influences in emotional intelligence? Children's social play would seem to hold great promise for investigating these influences. This presentation will outline the current literature around EI and draw connections between Parten's Stages of Play (1932) and Mayer and Salovey's (1997) elements of EI.

**The *Don't Abandon Me* collaboration.**

MEGHAN GUNDERSON, KURT OOSTRA and EVAN SCHUMACHER (Dr. Kaarin S. Johnston and Dr. Mark Hennings, Theater).

Three CSB|SJU senior theatre majors will talk about the process of taking a student-written play, *Don't Abandon Me*, from page to stage. Evan Schumacher will discuss his writing process for the script and the music, as well as the role he played in the production. Meghan Gunderson will speak of her directing experience as she helped to bring a story to life for the first time. Kurt Oostra will take us through his set and light designs, and the ways in which he helped bring the setting to life.

**Women and power in Balzac and Maupassant.**  
NATALIE HAMILTON (Dr. Camilla Krone, French).

This project examines the representation of women and power in Balzac's *Le Colonel Chabert* and Maupassant's *La Parure*. The characters of the countess in Balzac's novel and Mathilde in Maupassant's short story both suffer from the fact that women of their period had only extremely limited access to social power and ascendency. The obvious characterization of these dissatisfied women is a stereotype of women who would manipulate men to gain social advantage. My reading explores underlying indications that these female characters were more capable than the men in their lives, and that the authors imply, deliberately or not, that there is an inherent injustice in a social system that only allows women indirect access to power through men.

**Slang and its importance in culture.**

TAYLOR HAMILTON (Dr. Ozzie Mayers, English).

When most people think of what makes up a culture, they think of music, fashion, food, values, art, etc. One component that is usually left out is slang. In reality, slang is just as much a part of one's culture than any of the items listed above. To illustrate what slang is, and how it is connected to one's culture, I will look at the different definitions of slang, how it can change with cultural movements, and an example of cultural slang in a thriving community.

**Phenomenology as the basis for music-theoretical claims.**

BENJAMIN K. HANSBERRY (Dr. Brian Campbell, Music and Dr. Emily Esch, Philosophy).

My starting premise is that music is an experiential phenomenon. That is, in order for music to be present, there must be a listener whose mind organizes the sound in such a way that the experience is presented as music. The goal of musical analysis is to gain an understanding of music without appealing to factors outside of the music itself (historical documents, cultural origin, etc.). Because music is essentially an experienced phenomenon, music-theoretical claims must have a foundation in the musical experience. Therefore, phenomenology (the study of experienced things) serves as the foundation for music-theoretical claims. In this paper, I examine three specific music-theoretical methodologies (Schenkerian analysis, Eugene Narmour's version of the implication-realization model, and Robert Hatten's correlation-based theory of musical meaning) as well as the phenomenology of musical experience. I argue that substantive theoretical claims in all three theories are based on the musical experience. In particular, I defend claims about high-level syntactic structures as a result of feelings within the musical experience.

**Language in contact: Spanish, Quechua, and Aymara.**

DAVID C. HARRISON (Dr. Tania Gomez, Hispanic Studies).

Spanish is the first language of less than two-thirds of the Bolivian population, but it has been the language of power there for centuries. Many Andean Bolivian communities are bilingual in Spanish and either Quechua or Aymara, which are the two most widely spoken indigenous languages in Bolivia. Being in constant contact, these languages have had a profound impact on each other, which explains the unique characteristics of the Spanish spoken in the Andes. Both the mechanisms by which mutual influences occur and the defining characteristics of Andean Bolivian Spanish will be explored through a detailed analysis of published linguistic studies on the region.

**Modeling radiation exposure from decorative granite.**

DAVID C. HARRISON (Dr. Daniel J. Steck, Physics).

Granite contains  $^{238}\text{U}$ ,  $^{232}\text{Th}$ ,  $^{226}\text{Ra}$ , radioactive elements found in the earth's crust. Decorative granite in the form of countertops and surface tiles emit gamma radiation and radon. This study models the potential gamma dose received by a human near various applications of granite: a granite table, a kitchen with an L-shaped countertop and island, and rooms with granite floors and/or walls. A second model was used to estimate exposure from the radon generated by decorative granite. In the model, the radon from a localized source within the house is distributed by a central air handling system that exchanges indoor air with outdoor (ambient) air and air from one interior zone with air from another. Thus, granite in one room can provide exposure to occupants of other rooms as well.

**Revitalization of Mayan languages in Guatemala.**

MATTHEW J. HEITKAMP (Dr. Nelsy Echavez-Solano, Hispanic Studies).

Since the arrival of Spanish conquistadors in the 16<sup>th</sup> century, the Mayan people in Guatemala have faced the continuous threat of the extinction of their cultures and languages. Events such as the conquest of Mesoamerica, the nationalistic independence of Guatemala, and the brutal civil war have brought the 22 recognized Mayan languages close to extermination. The Mayans still face many obstacles today; however, revitalization efforts such as the standardization of the Mayan alphabet offer hope for the future. A study of the small community of Sipacapa suggests that young Mayans, more so than older generations, are actively pursuing the preservation of their language by conserving uniquely Mayan grammatical structures in everyday speech.

**The aerobic capacity of division III female soccer players.**

AARON HELLEM and MARIE BOO (Dr. Don Fischer, Physical Education).

The data collected on the CSB soccer team in the fall of 2008 indicated that the aerobic capacity of many of the soccer players was higher than norms for Division I and elite female soccer players and comparable to norms for cross-country runners. The purpose of this study was to examine the measured aerobic capacities of the 2009 CSB soccer players compared to the norms for Division I and elite female soccer players and to the measured aerobic capacities of CSB cross-country runners. This study is significant because it could have implications in designing future conditioning programs for the soccer team.

### **Testing the merits of parallel computing.**

ALEXANDER HELWIG ( Dr. Michael Heroux, Computer Science).

Parallel computing is a form of computation where calculations are carried out simultaneously, allowing large problems to be divided into smaller ones, which are then solved concurrently. Due to restraints in processor speed, parallel computing has become an important field in the Computer Science discipline. With parallel implementations and theories in mind, I produced examples of popular computer science algorithms which test the merits of parallel computing. In addition, I created parallel implementations of popular algorithms in the new and upcoming field of Data Mining, where parallel computing is new and relatively unexplored. In the future, the examples will be used to help students understand the importance of parallel computing and how they can apply parallel implementations to their programs.

### **The conflict over the Tambogrande mine in Peru: cross-cultural differences in perceptions of wealth.**

TOM HICKEY (Dr. Roy Ketchum, Hispanic Studies).

Tambogrande is located in the fertile valley of San Lorenzo in northern Peru. The region produces 40 percent of Peru's mangoes and limes, but what lies beneath is the cause of great debate. Under this farming town is an untapped reservoir of gold ready to be unearthed. In the 1990's, the Canadian Mining company, *Manhattan Minerals*, was granted a mining concession from the Peruvian government and proposed building a mine to access the gold. Many argued that the region would benefit from foreign investment and jobs created by the mine, but the local residents turned out in force in opposition to the proposed mine. Looking through the lens of local residents and officials of Tambogrande, this project explores how wealth may carry a different meaning in different cultures.

### **A new victory: how the Russian Federation remembers the Great Patriotic War**

NICOLE HOCHSPRUNG (Dr. Gregory Schroeder, History)

No nation paid a greater cost to defeat Nazi Germany than the Soviet Union. Those years, known in the Soviet Union as the Great Patriotic War, were bleak and bloody. The victory became a cult, beautifully described by Nina Tumarkin in her landmark book *The Living and the Dead: The Rise and Fall of the Cult of World War II in Russia*. This cult was used by the Soviet system for political ends – to validate the superiority of the Soviet system, to instill feelings of guilt and obligation in subsequent generations, and even to justify acts of violence. When the Soviet system was in its twilight the cult of the Great Patriotic War seemed to be diminishing as well, and when the Soviet Union dissolved the fate of the cult seemed even more uncertain. The collapse of the Soviet Union allowed the discussion of many previously taboo topics, including some less than admirable facets of the Great Patriotic War victory. This cacophony of discovery, much of it unpleasant, and the general instability of the time led to a near halt in government mythmaking. By 1995 the new nation had claimed the Great Patriotic War as a Russian victory. The cult was revived with some new features that reflected the post-Cold War era. A greater

emphasis was placed on the role of the allies, although Russians maintained primary victimhood. Recognition of Russian sacrifice in the Great Patriotic War (increasingly called World War II) is now used as a shibboleth in Russian foreign policy. Those that denigrate Russia's experience, or that downplay the role of WWII in their country's history do so at their peril. Perhaps it is merely the run-up to the 65<sup>th</sup> anniversary approaching this May, or perhaps it is a resurgent Russia, flush with oil wealth, trying to reassert itself as a world power, but the cult of the Great Patriotic War is as strong as ever.

### **Mother Theresa and San Manuel Bueno, mártir: holiness, doubt, and sacrifice.**

ALYSSA R. HOFF (Dr. Christina Hennessy, Hispanic Studies).

In Miguel de Unamuno's *San Manuel Bueno, mártir*, the narrator examines the life and teachings of her village priest, Don Manuel, and the importance of his most intimate secret: he does not believe. Despite this lack of belief he continues to preach the Word of God until his final breath, but throughout his life it is cause of great suffering. However, this is a sacrifice he is willing to make for the purpose of devoting himself to his village and to teach them to believe and have faith. His life is comparable to that of Mother Teresa's, as can be seen through her private writings published by Brian Kolodiejchuk in *Mother Teresa: Come Be My Light*. This essay examines the darkness and sacrifice involved in the lives of Unamuno's character and Mother Teresa, and whether their doubt and uncertainty is a natural aspect of a life devoted to Christ.

### **Determination of the fatty acid composition of egg yolks.**

AMY L. HOGERTON and HADLEY A. MCINTOSH (Dr. T. Nicholas Jones and Dr. Kate Graham, Chemistry; Jayne Byrne, Nutrition).

The fatty acid composition of egg yolks obtained from a variety of sources were compared to discern the effect of the chickens' feed and living conditions on the levels of omega-3 fatty acid levels. Five varieties of eggs were obtained: conventional eggs (E1); organic eggs (E2); omega-3 enriched commercial eggs (E3); farm eggs-free ranged (E4); and farm eggs-caged indoor (E5). The yolks of three eggs from within the same treatment group were separated from the albumen and homogenized. Lipids were then extracted using a diethyl ether - water extraction and subjected to a methyl-esterification process to prepare the fatty acids for separation and quantitative determination using gas chromatography (GC). GC analysis of the fatty acid methyl-esters showed that there was no significant difference in amounts of Omega-3 fatty acids between treatments of farm eggs ( $p>0.05$ ) or egg sources ( $p>0.05$ ).

**Etiology, pathogenesis, and treatment of type II diabetes mellitus in low-income African Americans and East African immigrants.**

KATHRYN A. HOLT (Dr. Manuel Campos, Biology).

Type II diabetes mellitus (T2DM) is a growing health concern across America, with prevalence rates estimated at 8% for the whole population. Minority populations have even higher observed rates- African Americans have an estimated 13% prevalence rate and East African immigrants a 10 to 15% prevalence rate. This study explored the etiology, pathogenesis, and treatment of T2DM and examined the genetic, lifestyle, and environmental differences that explain the higher rates of T2DM and many T2DM complications in low-income African Americans and East African immigrants. The study also offers suggestions on how to best treat T2DM in these two populations.

**¿Ayudaron las políticas económicas de la dictadura de Augusto Pinochet a la gente de Chile? Un análisis de los impactos económicos de la implantación del neoliberalismo en Chile.**

TED HOOLEY (Dr. Corey Shouse Torino, Hispanic Studies).

From 1973 to 1990 Chile was ruled by the military dictator, Augusto Pinochet. During his reign countless human rights violations and crimes against humanity were perpetrated under his command. During the same period, Pinochet's economists, Los Chicago Boys, applied a neoliberal shock treatment to the Chilean economy that drastically altered it to fit the model prescribed by Milton Friedman. Setting aside momentarily the horrific crimes of the era, were the Chilean people better off economically after the seventeen years of Pinochet rule? This investigation is an economic case study of the Chilean economy during the era of neoliberal reforms that took place from 1973 to 1990. To answer the question posed, I have obtained and analyzed key economic data that will serve as unbiased evidence in the case for or against the Pinochet regime.

**Lewis acid promoted cyclization of 5-Hexynoic acid.**

ANNE T. HYLDEN (Dr. T. Nicholas Jones, Chemistry).

In 1957 Ferrier and Tedder reported the cyclization of 5-hexynoic acid using trifluoroacetic acid to produce a 1,3-dione. Recently, we have shown that 5-hexynoic acid can be converted to its acid chloride and cyclized using the Lewis acid  $\text{InCl}_3$ . Addition of alcohol after cyclization yields 3-alkoxycyclohex-2-enones. Our research involved development of one-pot reaction conditions for this new synthetic method using a variety of alcohol nucleophiles for the final step, as well as characterization of all products with  $^1\text{H-NMR}$ ,  $^{13}\text{C-NMR}$ , GC-MS, and IR spectroscopy.

**Using metrics to quantify similarity in source code: an empirical study using VOCS.**

JEREMY IVERSON (Dr. James Schnepf, Computer Science).

The limits on current source code plagiarism detection systems are due to dependence on time inefficient pair-wise comparisons, implemented by comparing each submission to every other submission. We present an improvement to a pair-wise comparison algorithm called N-grams. We will show empirically that using distance/similarity metrics improves the accuracy of the N-gram comparison algorithm. This research is the basis for the comparison algorithm being implemented in a new plagiarism detection system being designed at the College of Saint Benedict's / Saint John's University called VOCS. VOCS will introduce an approach to detecting source code plagiarism that incorporates pair-wise comparisons, but uses a data-mining technique called classification to reduce the number of comparisons.

**Effects of glucose concentration on macrophage phagocytosis of *Candida albicans*.**

MICHAEL D. JAEGER (Dr. Ellen Jensen, Biology).

Peritoneal macrophages were isolated from mice. They were allowed to adhere to a sterilized slide. Next, *Candida albicans* and glucose were added. The glucose was added at two concentrations, a control concentration of glucose (90 mg/dL) and experimental concentration of glucose (900mg/dL). After incubation for 30 minutes the slides were stained, visualized and photographed for analysis. The study is comparing the effects the varying levels of glucose had on the phagocytosis of the *C. albicans*.

**The relationship between service-learning beliefs about leadership and morality.**

CHELSEA E. JENSON (Dr. Richard Wielkiewicz, Dr. Stephen Stelzner, and Dr. Laura Sinville, Psychology).

CSB/SJU encourages their students to take leadership positions. I am interested in what students believe are good leadership practices and if they are likely to lead with a well defined sense of morality. I believe that service-learning is an experience that helps students develop attitudes and beliefs about leadership and morality. I designed and administered a survey to 401 CSB/SJU students to assess how leadership and morality are related to service-learning and other service related experiences.

**Scream quietly or the neighbors will hear...domestic violence.**

ALYSSA JOHNSON (Jean Keller, Gender and Women's Studies).

Domestic violence is a problem that is all too often swept under the rug—overlooked and ignored. However, statistics reveal to us the shocking reality of the severity and commonality of domestic abuse experienced today. Understanding the problem is essential for creating a

solution to curb the ever increasing amount of battered women. Addressing the problem and admitting that it exists will enable women to seek out the resources that are available to them. Domestic violence is a serious and heinous crime and it very well should be treated as such.

**Are we on the same page?**

DAVID A. JOHNSON (Dr. Elena Sanchez-Mora, Hispanic Studies).

Communication is an expression of self identity and identification with others, and it takes on many diverse forms. Some examples include speaking, singing, creating music and art, reading and writing. What creates more complexity in verbal and written communication is language, cultural diversity and how it can function as a barrier or as a means to establish connections. My presentation explores my passion of communicating through art, writing, music, and language. In particular, I will share my education and experiences with Spanish language and culture, which have played an important part in shaping my identity.

**How to effectively and accurately measure judicial activism: an examination of current empirical approaches.**

MICHAEL R. JOHNSON (Dr. Philip Kronebusch, Political Science).

In this paper, I am investigating and analyzing the systems used by academics and legal scholars alike to evaluate and measure judicial activism. In my analysis I aim to present a comprehensive picture of how, exactly, judicial activism is measured, why scholars choose the variables they do to measure judicial activism, how they operationalize those variables, and what differences exist between alternate systems. After presenting this information via non-biased, empirical analysis, rather than employing a normative approach, I shall make my own determinations as to which systems, and which particular elements of those systems, are most effective and appropriate for measuring judicial activism. Finally, based on those conclusions I will construct my own system for measuring judicial activism, one which I believe best quantifies a complex and controversial question facing American jurisprudence and public policymaking.

**Time, space, and mood: transporting the audience of Macbeth.**

PHILLIP M. JORGENSEN and KEVIN T. SPRINGER (Dr. Mark Hennigs, Theater).

Lighting and sound design are used to bring the Appalachian Mountains to the stage for the production of Macbeth. Many considerations go into lighting a theater production that bring together color, form, and function. The sound design recreates the forested atmosphere through a combination of environmental sounds and supernatural noises. Come learn about the process and effort involved, from first draft to final product.

**The promotion and marketing of advanced oral health technology in China.**  
MEGAN A. KACK (Dr. Sanford Moskowitz, Management).

In China, dentistry is evolving from an informal streetside practice to a field that serves the community with licensed practitioners. Oral health technologies have already been promoted and put into practice, but only to a limited population. The development of additional hospitals and increasing volume of procedures will enable advanced oral health technology market growth over the next few decades. This presentation will examine the socio-cultural forces that hinder the integration of advanced oral health technology and methods in developing countries. Market entrance techniques and strategies will be discussed as I draw from the experiences, interviews, and resources I encountered while in China.

**Technology and sports.**

SOPHIE C. KEM (Janna LaFountaine, Physical Education).

Does technology have a positive or negative impact on the world of sports? This debate has recently intensified. Technology can be positive for sports because it can be an economic stimulus, create safer sporting equipment and help improve the health of athletes. On the other hand, technology can have a negative impact by making it more dangerous for some athletes with the creation of sports equipment that is too strong or too fast. Technology can also harm athletes who choose to partake in dangerous practices such as genetic doping. The research clearly indicates that technology can have a very positive impact in sports.

**Language immersion education; the path to a multilingual world.**  
LAURA KINOWSKI (Dr. Ozzie Mayers, English).

In an increasingly multicultural world, many foreign language educators argue that language immersion programs are the most effective way to teach young children another language. As language immersion programs continue to emerge, it is important for parents and educators alike to analyze the academic and linguistic benefits the programs provide. Although only forty years of research supports this natural language model, this project examines the history of immersion education, analyzes how it is successful, and suggests why similar models will benefit children in the future.

**Amnesia and identity suppression: postwar memory of the occupation of Alsace, 1944-1953.**

KLEINENDORST, ANDREW (Dr. Gregory Schroeder, History).

The region of Alsace, which currently is a part of France, has been a long contested borderland, vacillating between France and Germany four times since 1871. Alsatians themselves have been described as possessing a Germanic culture and a French political culture, in addition to the fact that they have their own dialect. The second-to-last annexation of Alsace to Germany at the start of World War II involved attempts by the Nazis to bring the Alsatians over to their cause—including indoctrination, purges, removal of dissidents, forced conscription, and removal of French elements. After the German defeat and expulsion from Alsace at the end of the War, the French sought to re-annex Alsace. My focus has been on collective memory in the region during this re-annexation phase from 1944 till 1953. In analyzing government documents, memoirs, trial dossiers, and historical texts, I have argued that Alsatians collectively experienced amnesia and an identity crisis in light of the German occupation.

**African youth languages: identity, music and the paradox of self-expression.**

ANN KOLLER (Dr. Karen Erickson, Modern and Classical Languages).

Shaping identity is a struggle for a majority of youth. In Africa, youth have begun to create their own languages as a mechanism of fostering identity. They use a variety of languages to form their own syntax and semantics. Through the formation of these languages, youth are striving to set themselves apart and cultivate individuality. Paradoxically, the means by which they hope to accomplish this requires a large group involvement. One of the ways in which they hope to express and spread their new individualism is through music with lyrics centering on the controversies of their daily lives within a community shaped by adults. The construction of language and identity is not easily accomplished but the youth of Africa have found a way to build a community and to make their presence known.

**El aprendizaje del español como segunda lengua/Learning Spanish as a second language.**

HANNA KOPREK, (Dr. Nelsy Echavez-Solano, Hispanic Studies).

Second language acquisition is an important theme in the United States; there are a rapidly increasing number of people who speak more than one language. Why is learning a second language easier for some students, but not others? There are many factors and strategies that affect the acquisition of a second language. First, Noam Chomsky, an import linguist from the second half of the twentieth century, believed that linguistics is part of a cognitive and psychological process. Also, the essay will discuss the idea of a universal grammar – the argument that children and adults do not have access to the same ideas, that children have an inherent predisposition to learn languages, which is why the strategies for learning a second language vary according to the age of the student. The essay also focuses on which strategies are most successful in the classroom for learning a second language.

**Appreciating Tolkien's Elvish.**

NICHOLAS KURTZ (Dr. Ozzie Mayers, English).

*The Lord of the Rings* is a world created around language. Examine that sentence closely. Most other series we know originated from a story and a language was added as its supplement. However, everything you know about *The Lord of the Rings* resulted from an expression of language—first Tolkien began formulating the 14 languages of Middle-earth, and then he created a story to explain them. This presentation is an investigation of perhaps the most popular of those 14 languages: Elvish. Because this is a series based on language, understanding the foundations of Elvish is not only helpful when reading the epic *The Lord of the Rings*-- it is positively necessary.

**Catholicism in China.**

NICK LAHTI and VICTORIA LY (Dr. Sophia Geng, Chinese).

Through our research, we will present the beginnings of Chinese Catholicism to Catholicism today in China. We will talk about the history, the practices, and the major events that have taken place. In addition, we will also compare Chinese Catholicism today to Roman Catholicism.

**Improving start codon prediction accuracy in prokaryotic organisms using naïve Bayesian classification.**

SEAN ROBERT LANDMAN (Dr. Imad Rahal, Computer Science).

With an overwhelming amount of genetic data now becoming publicly available, there is a growing need to develop more effective gene prediction methods that produce reliable results. Although prediction of the end location for genes in prokaryotic organisms is largely considered to be a solved problem, accurate prediction of the exact start location continues to lag behind. We will detail a new approach to predicting more precise gene locations in prokaryotic organisms. This approach uses gene prediction results from other prediction programs to find consistently predicted gene locations. It then uses these “consistent genes” as a training set to build a model that can help to improve accuracy for the remaining genes.

**Building a better youth through strength training.**

ASHLEY M. LAUDENBACH (Janna LaFountaine, Physical Education).

Currently, many people are obsessed with getting fit and losing weight. One effective option is strength training, not only for adults, but for children. When youth start training early it can improve their physical fitness, decrease obesity, raise self esteem, and lower injury rates. Some experts disagree, saying it may promote unhealthy eating habits, and may be pointless prior to puberty. Recent studies have proved this wrong. Strength training is a safe and healthy way for kids to stay fit and have fun.

**Qin Shi Huangde, the first emperor of China .**

POR CHEE LEE, BRANDON GORMAN, MATT LAINE and SHANNON O'NEIL (Dr. Sophia Geng, Modern and Classical Languages).

Born into a noble kingship family, Ying Zheng, who later named himself Qin Shi Huangde succeeded his father's throne at young age of thirteen. Ying Zheng built the first and feudal centralized dynasty, known as the Qin dynasty after becoming the first to successfully conquer and unified China through military, economic and political powers. After successfully unifying China, he proclaimed the name "Qin Shi Huangde" meaning the first emperor of China. With supremacy, Huangde did not want his power to diminished, thus creating the terra cotta army which he believed will continued to serve him in the afterlife after not being able to sought for immortality.

**El Camino de Santiago: A reflection on my experiences and discoveries.**

ANGELA M. LEINEN (Dr. Sarah Schaaf, Hispanic Studies).

The Camino de Santiago is a centuries old pilgrimage that leads to the burial place of St. James, and every year thousands of new travelers choose to walk the 790-kilometer trail through northern Spain. This summer, a group of six CSB/SJU students made the trip along with Professor José Antonio Fábres. The road is a personal journey, but also a culmination of the experiences of every pilgrim who has walked it before. My *camino* on the road to Santiago was a lesson in cultural awareness and communication in a different language, but above all, I learned that the old adage, "It's not the destination, it's the journey" is true. The knowledge I gained about the world and about me during that long walk has continued to be valuable during my small *caminos* every day. I hope to never lose sight of the end of the path, but to also enjoy myself along the way.

**The slippery slope of ski resorts: can going green save the mountains?**

RYAN D. LONGLEY (Janna LaFountaine, Physical Education).

Faced with a warming climate, the ski industry must make a drastic change in their business by preserving either the alpine environment or their five star resorts. Currently, the ski industry is one of the largest energy users in the business world and is more concerned with the success of their resorts than the negative impact they have on the environment. Their wasteful practices have threatened local wildlife populations, depleted natural water supplies and increased urban populations in fragile habitats. Environmentalists are pressuring the ski industry to make the move toward a "greener" approach to the snow business.

**Diversidad, influencia y relaciones lingüísticas en Guatemala.**

ALEX LUDESCHER, (Dr. Nelsy Echavez Solano, Hispanic Studies).

Guatemala is a very linguistically diverse country, with 24 languages spoken within the country. Among these languages are 21 independent Mayan languages, two non-Mayan indigenous languages (Xinca and Garifuna), and Guatemala's unique dialect of Spanish. Although there are very few speakers of Xinca or Garifuna, nearly half of the Guatemalan population speaks a Mayan language as their primary language. Many Guatemalan Mayans are also fluent in Spanish. Due to the multilingual nature of the country, linguistic elements from one language often become incorporated into another. Mayan languages have been quick in recent years to adopt Spanish words into their vocabulary, and Guatemalan Spanish has long since incorporated Mayan words into its vocabulary as well as been both influenced by Mayan phonetics and used Mayan language syntax in spoken Spanish. Therefore, in order to understand any one of Guatemala's many languages, one must first have a general understanding of all of them. Only then, can the true interconnected nature of Guatemalan linguistics really be appreciated.

**The effects of chronic mild stress on the ability to perform the DRL-72 schedule in rats.**

AMY MARSCHALL and MICHAEL KEEGAN (Linda Tennison, Psychology).

Research has shown the Chronic Mild Stress paradigm (CMS) to be an accurate method for inducing symptoms of depression in rats. The Differential Reinforcement of Low (DRL) 72 schedule allows the rats reinforcement only if they wait seventy-two seconds in between responses. Further research has shown that a decreased performance on the DRL-72 schedule is correlated with other depressive symptoms, particularly anhedonia. For our experiment, we trained nine white rats on a DRL-72 schedule and then implemented a CMS paradigm using tactics such as forced swim, exposure to strobe light, tilted cages, et cetera. A sucrose test, the standard measure of depression/anhedonia was used, using a one percent sucrose solution. Following the completion of the CMS paradigm, we will compare the data from before and after its implementation. We anticipate that the performance on the DRL-72 schedule will decrease significantly in response to the CMS.

**Effects of 2,4-D, Triclopyr, Dicamba and pyraflufen ethyl herbicide on *Xenopus laevis* survival, growth, behavior, and pathology.**

NICHOLAS G. MATTHEES (Dr. Elizabeth Wurdak, Biology).

Manufacturers of herbicides against broad-leaved plants warn that they may be toxic to fish and aquatic invertebrates. Under most circumstances, contamination of the ambient environment occurs at the mixing and disposal sites, but it may also occur via runoff or drifting in the wind. African clawed frogs (*Xenopus laevis*) were exposed to either a maximum possible dosage or 10% of the that dose of a combination of 2,4-D, Triclopyr, Dicamba and pyraflufen ethyl herbicides five days after hatching for 7 days and 16 days respectively. The maximal dose represents the amount of herbicide that would be used to treat an area of land that is 1.4 ft<sup>2</sup>; this

reflects the size of the aquarium in which the tadpoles developed. The maximal dose produced in a survival fraction of 0.18; this was a statistically significant difference from the survival fractions of 0.794 and 0.8 for the 10% group and control group, respectively. Tadpoles receiving 10% of the maximal dose were observably less hungry and less pigmented in early developmental stages and displayed abnormal swimming. The exposed tadpoles also demonstrated a higher variability in mass. The experiment was repeated using the maximal dose only; tadpoles were exposed 27 days post-hatch. Survival favored the experimental group in this case (0.836 versus 0.576 for the 100% group and control group, respectively). Tadpoles were preserved in buffered formalin; embedded in paraffin; sectioned; stained with either hematoxylin and eosin, Mallory Trichrome stain, and the periodic acid-Schiff; and examined for histological differences. Abnormalities are expected to be discovered in the digestive system.

### **A trek into the Klingon language.**

NICHOLAS F. MAYHEW (Dr. Ozzie Mayers, English).

Of the many languages created for science fiction, the Klingon language, from *Star Trek*, stands out as highly developed. The language was first developed (by linguist Mark Okrand) to make Klingons more convincing, so it is designed to match Klingon culture. The fictional history of the Klingons allows for the language to retain a highly coherent phonological, syntactical, and semantic identity. Despite the difficulties of Klingon grammar, the language is a powerful creative force. Texts, such as *Hamlet*, have been translated into Klingon with intriguing (some might say even successful) results. Klingon language stands as an atypical example of human ingenuity and artistry.

### **Assessing the potential viability of algae for environmental remediation and as a biofuel feedstock: biochemical composition.**

HADLEY MCINTOSH (Dr. T. Nicolas Jones, Chemistry and Dr. Elizabeth Canuel, Virginia Institute of Marine Science).

Two of the dominant challenges facing society are the need for renewable sources of fuel and methods for removing excess nutrients such as nitrogen and phosphorus from eutrophied sites. Algae may be the solution to both of these environmental problems. The goal of this pilot project was to assess the use of an algal floway as a tool for growing algal biomass and remediating water sources. A secondary goal was to compare the biochemical composition of algae grown on the floway with algae growing on screens deployed in the adjacent York River VA. Preliminary results from this study indicate that the floway provides a useful method for removing dissolved nutrients while growing algae suitable for biofuel production.

### **Driven into disordered eating.**

FATIMA MEDINA (Janna LaFountaine, Physical Education).

There have been many studies done attempting to determine the cause of disordered eating. There are two areas considered as probable causes. The first relates to pressures from society, such as lack of social support, self-esteem or sexual orientation. Another possible cause could be pressures related to sports performance and coaches. Overall, the research indicates that society places more pressure on individuals than sports; providing evidence that the social issues are the main cause rather than pressures from sport participation causing eating disorders.

### **Unity in a palace: The Great Exhibition of 1851 in a class driven society.**

ARIEL MEISTER (Dr. Cynthia Curran, History).

In 1851 Great Britain hosted the first international industrial exhibition. The event was known as the Great Exhibition and was housed in the famous Crystal Palace. It ran for five months and was visited by just over six million people. The organizers of the Great Exhibition placed a high regard on the concept of unity. This exhibition was meant to bring the industrial world together. However more than this, the Exhibition sought to bring the nation of Great Britain together. In the 19th century Great Britain was a highly divided social society. Therefore, bringing social classes together was to be a large accomplishment. In regards to this, the paper examines to what extent unity was accomplished throughout the Great Exhibition. Through newspapers of the time and other primary sources, the ultimate conclusion is that the nation was unified with the confines the Exhibition but past the closing of it society reverted back the social separation.

### **Macho no significa mucho: la representación de la masculinidad en *El Matadero* de Esteban Echeverría.**

JENNA MILLER (Dr. Roy Ketchum, Hispanic Studies).

Machismo has been defined as a male who “links manliness to the domination of women, to hyper-sexuality, to enormous genitals, and to the defeat of another man” (Aramoni, 1972). This hyper-masculine concept entails an intricate set of beliefs, attitudes, values, and behaviors that have been passed on from generation to generation. Through the definition of machismo, men can feel like they are acting as men. However, what defines masculinity? How does this definition influence the manner in which men act? Additionally, with this definition of masculinity, how does a society use that to construct its core set of values? Through the use of *El Matadero* by Echeverría, I will address those questions and the concept of masculinity in a 19<sup>th</sup> century society in Argentina.

**Thermodynamic Perturbation Theory.**

RICHARD MOHER ( Dr. Richard White, Chemistry).

Using the concepts of Thermodynamic Perturbation Theory, we can find the energy and how it is used in the disturbed molecular system, in comparison to when the system is at equilibrium. Perturbation theory uses the summation of the energies in the faces, edges, and vertexes, allowing us to predict and explain the surface tension on the nano-scale along with the surface free energy. In this research, we will be looking at the properties of surface tension in halides, noble gases and aluminum nanoparticles.

**La diferencia de la linguistica entre los generos: la creacion de la oppression de las mujeres**

SOPHIE MORELLI ( Dr. Gladys White, Hispanic Studies)

I discuss Gender as a very crucial element in linguistic studies. My focus is the masculine and feminine styles of dialect, which are not exclusive to which sex it best describes; women can uphold a masculine style and men can upload a feminine style in speaking. The masculine style of speaking, according to Deborah Tannen, is assertive, monotone, and full of examples to demonstrate knowledge. The feminine style is inquisitive; tone fluctuates, and includes stories of failure or embarrassment for higher involvement in conversation. The reason for why women are ridiculed for using a masculine style is the focus point of Cheris Kramarae's study; linguistics is man-made. Language contains a lot of terms that are automatically associated with men, such as "el doctor." The abundance of masculine words creates minimal advancements to the power of women. I describe how language is a very important aspect to the study of oppression of women in society because language creates ideology.

**Raising warriors: Maasai male socialization.**

CHRIS MORGAN (Dr. Ronald Pagnucco, Peace Studies).

In this paper, I look at the Maasai people of Kenya who have preserved a rich culture. I want to explore their way of socializing the males in their community. I am looking to not only describe how it happens but to point out some valuable methods of socialization and why they are important. My research in Kenya during the fall 2009 semester draws from primary and secondary sources, including: field research, class lectures, and notes from publications. My field assistant helped me during the interviews to see the three distinct stages of life as a Maasai male. I find that their culture provides them with a full structure for becoming what they expect in a man of their community.

**BCS or college football playoff.**

DAVID M. NAUGHTIN (Janna LaFountaine, Physical Education).

A thorough review of the current Bowl Championship Series (BCS) system in college football compared to a college football playoff has been conducted. In this debate both sides had positive and negative aspects. Overall, it was determined that instituting playoffs will better serve college football, primarily due to less controversy and more excitement, than the current BCS system.

**The CSB/SJU all-sky camera.**

JOSHUA E. NOVACHECK (Dr. Jim Crumley, Physics).

Many interesting phenomena occur all the time in the night and daytime sky, such as cloud formations, meteor showers, and aurora. Due to their rarity and speed, some of these occurrences are difficult to study. What is really needed is a continuous record of the entire sky. With this as the goal, using a low-light security camera and a fish-eye lens, the CSB/SJU all-sky camera was designed and constructed. While the camera is capable of observing many celestial and atmospheric occurrences, it is currently being used for meteor detection and analysis. Using the ASGARD meteor detection software, developed by Rob Weryk at the University of Western Ontario, possible meteors are detected from the images of the camera. A future goal of the project is to plan and implement a larger camera network in Central Minnesota to be able to more fully analyze meteor events.

**Recycling yourself: the most sustainable option to dispose of human remains.**

IPHIGENIE NSHUTINYAYO (Dr. Jean Lavigne and Dr. Ernest Dietrich, Environmental Studies).

Life is a wonderful gift. But unfortunately, death is an unavoidable part of it. Death is becoming such an important aspect of living that it is almost comparable to weddings, as people spend ample amounts of time contemplating details of their wardrobe, flower selection and coffin design. However, the price of dying extends beyond simply paying the funeral fees and rather includes such environmental costs as air pollution from cremation and pressure on land resulting from the use of elaborate coffins. When examining the various body disposal methods that are available to Americans, it is therefore crucial to consider the impact of our decisions on the environment. The question of interest, then, is not so much how elegant and spacious our coffins will be, but whether or not there will be room for the remains of both today's and tomorrow's generations.

### **Champions keep studying.**

ASHLEY N. OLSON (Janna LaFountaine, Physical Education).

Sports are an accepted part of school systems today and are becoming increasingly important. When the emphasis on sports dominates the importance of school, academic achievement can be negatively impacted. Problems in certain high school and college programs have raised questions about how sports can interfere with educational goals, and responses to these questions vary. People in American society generally see sports in a positive way, when in reality it is similar a two-edged sword that can produce positive and negative outcomes in the educational world.

### **Chinese food.**

MARISSA K. ORAM, KIM R. DEBEER, KATIE M. NELSON, JULIA M. FRAYNE, and JOSHUA D. MORTENSON (Dr. Sophia Geng, Asian Studies).

Food in our society today is a big part in social interactions; this is true for the Chinese culture as well. Our typical American Chinese food from places such as Lee Ann Chins and Panda Express differ greatly from true ethnic Chinese food. For this presentation we will be exploring the differences between Chinese food and American Chinese food as well as the unique cooking styles, preparations, and tools that are commonly used in China today.

### **Drug resistant *Pseudomonas aeruginosa*.**

NATHAN ORTMANN ( Dr. Henry Jakubowski, Chemistry).

*Pseudomonas aeruginosa* is a drug resistant gram-negative bacteria that is becoming more prevalent and dangerous to patients in the hospital. With its Type III secretion system, *P. aeruginosa* is able to directly inject cytotoxins to damage or kill the surrounding cells. At the same time it protects itself through the MexB protein which recognizes and extrudes substrates. Through mutations of the MexB protein, *P. aeruginosa* is able to pump cytotoxic drugs and other harmful pathogens out via the efflux pump. The bacteria are also able to travel throughout the body to different organs via its tiny legs or pili. Research has been conducted to determine the function of the pili and how to stop the cell from traveling. Scientists are developing new ways to treat *Pseudomonas aeruginosa* infections. Current methods are simply derivatives of existing treatments allowing *Pseudomonas* to mutate and become resistant. Therefore, scientists and other researchers need to discover new ways to treat *Pseudomonas* infections. New methods, including the use of calcium peptidomimetic antibiotics and nitric oxide will be discussed.

**Linguistic acquisition correlation to reading abilities.**

SAMANTHA OWENS (Dr. Ozzie Mayers, English).

Early exposure to language helps the acquisition of reading skills later on in children. Most children have a normal exposure to language and thus develop reading skills normally. Not all children have a normal exposure to language, and some have developmental disabilities that later impair their ability to read. By studying normally developed children, feral children, and speech-language impaired children, research has shown that the correlation between language and reading is inherent and something that should be more well known in order to promote a well-developed, literate generation.

**Music and China: a sojourner's tales.**

NICHOLAS A. PALMQUIST (Dr. Nicholas Raths, Music).

China is a country characterized by its rapid societal changes, burgeoning economy, and generally being known as the new frontier of international relations. In particular, music plays an enormous role in Chinese society and culture, with the guitar at the forefront of Chinese popular music. My semester abroad spent in Chongqing, China allowed me to further broaden my own musical horizons through experiencing Chinese music, learning of the prevalent importance of karaoke, competing in a popular Chinese music university competition, and by allowing my own Western classical and popular musical training to become more shaped by the nuances of East Asian music.

**Fatty acid composition of egg yolks.**

SARAH M. PARKER (Dr. Kate Graham and Dr. T. Nicholas Jones, Chemistry).

Omega-3 fatty acids have shown numerous health benefits in humans. The fatty acid content of chicken egg yolks was quantified in this study. In particular, the fatty acid content of eggs from free-range chickens, organic chickens, conventionally-raised chickens, and chickens whose diets were enriched in omega-3 fatty acids was compared. Although comparisons between conventional eggs and omega-3-enriched eggs have been made, there is currently little data in the literature regarding the fatty acid content of eggs from free-range chickens. Previous results from our research group indicate that in the summer, eggs from both caged and cage-free farm chickens have omega-3 levels comparable to eggs enriched in omega-3 fatty acids. Both farm eggs and “designer” eggs have higher omega-3 fatty acid levels than conventional eggs. Analysis of the fatty acid content of eggs collected in the winter is still being undertaken.

**Spain: a mosaic of language diversity.**

LEAH PETERMEIER (Dr. Nelsy Echavez-Solano, Hispanic Studies).

Spain is a country that is diverse not only in its geography, traditions, and religions, but also in its linguistic characteristics. Various different regions in Spain have their own languages in addition to using Castilian, the language that is most commonly known as Spanish. In the northern region of Spain Gallego, a language that resembles Portuguese is commonly used; whereas, along Spain's border with France, Basque is spoken. Other languages spoken in Spain include Caló, a language used by the Gitano's and Catalan which is used by those that live on the west coast of Spain. In addition to the different languages spoken in Spain there are also different dialects that create linguistic diversity. The use of different languages and dialects in Spain showcases its unique history and makes Spain more diverse.

**Chinese medicine: a modern approach to a traditional practice.**

TAYLOR PETERSON, REDMOND FRASER, and PHILIP WHITCOMB  
(Dr. Sophia Geng, Modern and Classical Languages).

Health and well-being are on everyone's minds both throughout history and present day. In this fast paced technology based world, medical breakthroughs are on the rise, and the achievements are astounding. However, people are still taking steps backwards to incorporate traditional practices the Chinese have been using for centuries. Traditional Chinese medicine includes, but is not limited to, different types of massage, meditations, herbal and dietary therapies, as well as acupuncture. We will explore how many of these practices have been adopted into the American lifestyle.

**Hunting benefits all.**

JASCHA J.C. PETTIT (Janna LaFountaine, Physical Education).

Historically, mankind has not obtained food through fast food chains and gigantic manufacturing and production companies, as most humans do today. Hunting had been the main way of acquiring meat. Since hunting is such a natural part of human history, why are some people and organizations against it? Hunting is important for individuals and societies, and has played a crucial role in the well-being of the human species, which is evident through its many environmental and economical benefits.

**Aristotle's true contribution to stasis theory.**

SAM PILNEY (Dr. Richard Ice, Communication).

Aristotle's treatment of stasis theory is widely considered to be an incomplete version when compared to that of Hermagoras and Hermogenes. I argue that Aristotle offers a full treatment of stasis, without using the specific term, in his handbook, *On Rhetoric*. I offer several examples of three of the four main stases (fact, definition, and quality) that provide groundwork for stasis theory to be further built upon.

**Christian teaching on food applied to artificial nutrition and hydration.**

SHANNON PRESTON (Dr. Kathleen Cox, Theology).

The use of artificial nutrition and hydration (ANH) is a debated topic because it is unclear if ANH provides food or necessary nutrients to the patient. This project explores the morality of ANH based on Christian tradition and teachings on food. Scripture and doctrine can help Christians explore whether or not ANH constitutes eating in the Christian sense. Some authors describe eating in the Christian context as table fellowship, Eucharist, and finding delight in food. Through delight in food Christians are exposed to gifts of God. Without sharing food with others and experiencing delight in the food you eat is it eating at all? If not, to what extent should ANH be pursued as a means to sustain life?

**How far is too far? A comparison of Nazi eugenic movements during World War II with today's developments in modern eugenics.**

JAY M. RANFRANZ (Mark Thamert, OSB, Ph.D., Modern and Classical Languages).

Scientific breakthroughs in the field of genetics during the 21<sup>st</sup> century have greatly contributed to the science community and general public, but where could these technological advances lead? With new information about the role of genes in human development, classic eugenicists have turned to genetic engineering to manipulate the human genome in hopes of improving the human race. The problem is that even though the science behind this practice has changed, the ethical dilemmas have remained. Modern eugenicists argue that exterminating “bad” genes from the population will better humanity as a whole. This movement is eerily similar to the Nazi Party’s support of racial hygiene. Modern eugenics is morally indefensible based on its close resemblance to the Nazi eugenic movements of WWII, which has already been accepted as wrong. Science pushes the limits of what ethicists deem morally right or wrong, so the question is, how far is too far?

**El *hablar en congo*: Un lenguaje afrohispánico de los *negros congos* de Panamá.**

LARISSA A. RANVEK (Dr. Nelsy Echávez-Solano, Hispanic Studies).

Throughout Latin America, African influences have impacted the Hispanic culture and language, especially altering various linguistic characteristics of the Spanish language. The purpose of this project was to explore an African-influenced, ritualized language of the *negros congos* population of Panama, *hablar en congo*, spoken during Carnival celebrations. This language presents unique linguistic components that include semantic inversion, syntax reduction, morphology reduction, the use of rare vocabulary, and phonetic distortion.

**Interpretation in the courtroom: characteristics, linguistic conflicts, and the future.**

SHALANE K. REEVES-TORKELSON (Dr. Tania Goméz, Hispanic Studies).

Due to the very nature of interpretation and the conversion of one language to another, errors are a possibility. However, these errors can often infringe upon the right of an accused to a fair trial or even lead to unjust verdicts. Thus, a court interpreter is necessary to preserve the integrity of the trial. Yet this link between the court and the defendant can be faulty. With the study of interpretation and its weaknesses, one can better analyze a court case from the United States concerning a Spanish speaker, finding the errors made and seeing how they are avoidable. The information from these instances is essential to the future of interpretation and its betterment.

**Iron Status of Division III male cross country runners: A follow-up study.**

KELSEY L. REHWALDT and ALISON J. GALZKI (Dr. Amy Olson PhD, RD, LD, Nutrition and Dr. Manuel Campos, Biology).

College-aged males are seldom iron-deficient; however cross country runners have an increased risk for iron deficiency due to the stress of running. This stress causes damage to erythrocytes and blood loss from the gastrointestinal and urinary tracts. Last year, a study identified iron-deficiency in 21% of Division III cross country runners. We reexamined this population by measuring serum ferritin and hemoglobin levels twice during the season. Iron deficiency is defined by low serum ferritin levels (an indicator of iron stores) accompanied by normal hemoglobin levels (13.5-16g/dL). Diet records, analyzed using Diet Analysis Plus Version 9.0, were collected and provided an estimate of daily dietary iron intake. The study was approved by the Institutional Review Board of the College and 35 subjects signed informed consent forms. The diets of all subjects met the RDA [RDA is 8 mg]. This year only 1/35 (3%) of subjects was iron-deficient which may reflect an increased awareness due to testing and the individualized feedback regarding labs/diet given during the study last year.

**Using higher dimensions to make codes.**

KRISTIN M. REINSVOLD and NICHOLAS B. ZWEBER (Dr. Thomas Q. Sibley, Mathematics).

Codes are an integral part of our society. These strings of zeros and ones electronically transmit information, though not always correctly. Error correcting codes consist of code words which are different enough that if there is a mistake in the transmission of the code, it will be fixed. Mathematicians have learned how to model this, using higher dimensional shapes called polytopes. Each point on the polytopes we looked at is a coordinate of zeros and ones similar to a code word. The differences between code words can be understood as the distances between points on a polytope; higher dimensions allow for more efficient codes. We investigated patterns relating to these distances by analyzing the three dimensional cube and the four dimensional hypercube and extending our findings into higher dimensions. We used these patterns to explore how many code words are possible and how easy they are to find.

**Teaching Chinese culture through children's theater: a senior theater honors thesis project.**

JENNIFER RICHTER (Dr. Kaarin S. Johnston, Theater).

While in China for six weeks as a part of the Summer 2009 Research Exchange Program, Jennifer Richter conducted research focusing on Chinese history and culture, especially through analyzing traditional Chinese children's folk tales and stories. Returning to the College of Saint Benedict/Saint John's University, she continued her research and focused on the use of theater as pedagogy. She then created a scenario for an improvisational drama to be performed for young people who would actively participate in the piece with the ultimate goal of helping Minnesota children learn about Chinese culture. Richter then served as the director/team leader for a group of six college actors who performed the interactive theater piece at local elementary schools in October 2009.

**El maíz en México: la tradición y la amenaza de la modificación genética.**

CAITLIN RIES (Dr. Bruce Campbell, Hispanic Studies).

Hace diez mil años, los indígenas domesticaron el maíz en México. La importancia del maíz se extendió más allá de la alimentación porque el cultivo fue integrado en todos los aspectos de la cultura y la vida de los indígenas. El maíz es un símbolo del ciclo de la vida y la muerte, el objeto central de las celebraciones culturales y religiosas y una parte fuerte de su conexión con el pasado. La transición al uso del maíz transgénico amenaza la tradición, la tierra, la identidad y la autonomía de los indígenas en México.

**Kinetic study of aluminum catalysts in the ring-opening polymerization of  $\epsilon$ -caprolactone**

STEPHANIE ROE (Dr. Chris Schaller, Chemistry)

Metal catalysts with complex organic ligands have been successfully used in the polymerization of cyclic esters, but the exact catalytic mechanism is not well understood. Polyesters such as poly- $\epsilon$ -caprolactone are commercially valuable as biodegradable plastics and are being used for slow drug delivery. The  $H_4L^{(R)}(O^iPr)$  catalysts are a series of related aluminum catalysts containing variants of one substitution group that alter the electron donating properties of the ligand, tuning the electronic environment of the metal center. The rate of polymerization of these catalysts does not follow a direct trend relating rate and electron donating capabilities of the ligand substituents, so kinetic studies under conditions of catalyst saturation were performed in an effort to understand which mechanistic steps are most affected by changes in the electronic environment of the catalysts. Further understanding of the catalytic mechanism can indicate important catalyst features for efficient polymerization and direct future synthetic research.

### **Effects of parent-coaches on children in sports.**

MARY K. RYMANOWSKI (Janna LaFountaine, Physical Education).

Numerous studies have been conducted to determine the psychological and emotional influence parent-coaches have on their own children. The research indicates that there are both negative and positive aspects. Positive factors include such things as strengthening the parent-child relationship and increasing the time spent together. Some negative effects, such as favoritism and strained relationships with the parent can also occur when parents coach.

### **The significance of the word *Volk* [German People] from the Romantic period to today.**

DAN SALAY (Dr. Anna Lisa Ohm, Modern and Classical Languages).

The words *DEM DEUTSCHEN VOLK* [To the German People] stand over the main entrance to the Reichstag building in Berlin. The interpretation of *Volk* has transformed since the time of the Romantics. The placement of these words on the Reichstag in 1916 stirred early debates about the true meaning of *Volk* for all Germans. The word *Volk* has undergone changes that carry both positive and negative connotations connected directly to the history of German politics and culture. Beginning in the Romantic period, and following through the Weimar Republic, the Third Reich, the Cold War, and up to today, *Volk* has gained no universally accepted definition regarding its proper usage for the modern day. Its presence on the Reichstag publicly presents the question of its meaning to this day. This unresolved question generates debate and remains a thorn in the side of Germany's identity and its position in the world.

### **The Berlin airlift: the start of the US-German relationship.**

GREG SANDQUIST (Dr. Anna Lisa Ohm, Modern and Classical Languages).

From June 1948 until 1949, the city of West Berlin suffered under the hands of the Soviet blockade of all Allied supply lines through the Soviet-occupied zone. The Berlin Airlift in the end was a success, but many Americans and Germans were extremely worried that it would fail in the beginning stages. During the 11 months of the Airlift, the US came to understand its previous enemy as a mutual partner and friend. After 50-60 years of almost being forgotten, interest in the Berlin Airlift exploded in the late 1990s and early 2000s. Anniversaries were being celebrated and the veterans who participated in one of America's finest hours are passing on, but Americans are also seeking answers in a previous era, the era of the "Greatest Generation," when the US found solutions instead of being the problem.

### **Opportunities from Title IX.**

DUSTIN M. SCHLANGEN (Janna LaFountaine, Physical Education).

Title IX of the 1972 Educational Amendment prohibits sex discrimination in educational institutions. The enactment of Title IX in 1972 prompted significant advancements in the opportunities available to female athletes. As of 2006, the number of female collegiate teams has grown to an average of 8.5 per university, compared to the 2.5 in 1972. However, universities are forced to comply with Title IX and accordingly have had to cut back on some men's sports. With that being said, the positive impact Title IX has had on females outweighs the constraints it has placed on male athletics.

### **Rebel without a brand.**

MEGAN A. SCHMIDT (Janna LaFountaine, Physical Education).

Famous phrases, advertisements, and faces of top athletes influence society into buying products. Due to the 114.9 million households owning televisions; endorsements are able to make connections with consumers more effectively. Companies agree on the importance of endorsements, however, the type of athlete chosen is often debated. Some argue that these athletic deals should be based on a positive image, without scandal. Others believe talent is the key, and worth the risk should the athlete make poor choices resulting in a negative public image. Both views are important when selecting an athlete for the purpose of endorsing products.

### **Subtraction games and computer applications.**

KARLA S. SCHOMMER (Dr. Lynn Ziegler, Computer Science and Dr. Gary Brown, Mathematics).

Subtraction games are a type of mathematical game in which players take turns removing a set number of objects from a pile until there are no more moves remaining. The last person to remove objects wins. Subtraction games have been proven by game theorists to be periodic. In this research, we combine programming skills and game theory to investigate patterns in the periods of subtraction games.

### ***Ecclesia gentilium?: the metaphorical use of the Jewish temple cultus among the early Christians.***

BENJAMIN S. SEHNERT (Dr. Richard Ice, Communications).

The epistles of Paul and Pseudo-Barnabas contain metaphors that use the Jerusalem temple as a symbol for some greater rhetorical purpose. By analyzing these metaphors with both modern and ancient rhetorical theory, we discover how they confirmed and restructured the world-view

of the earliest Christians. According to modern theorist George Lakoff, these metaphors shape our conceptual system. More importantly, ancient theorists, such as Aristotle, included discussion on the use and effectiveness of metaphors in discourse. Having interpreted the temple metaphors according to these approaches, I will show how they indicate the rapidly changing social makeup of early Christianity as well as their need to define their own identity.

### **The pure love of the bridegroom: St. Macrina as the bride of the Song of Songs.**

BENJAMIN S. SEHNERT (S. Mary Forman, OSB, PhD, Theology).

This paper focuses primarily on two works of St. Gregory of Nyssa, namely *The Life of St. Macrina* and his *Commentary on the Song of Songs*. Both these texts are characterized by several of the same themes regarding gender and philosophical reflection. While he does not completely abandon gender division, Gregory, in good Cappadocian fashion, stresses the sexual ambiguity of Macrina and the characters of the Song of Songs. *Eros*, or desire, is thus not directed toward earthly things but rather toward union with God; it is the expression of an apophatic philosophy focused solely on spiritual rather than physical matters. For this study, the actual correspondence between Gregory's Macrina and the actual Macrina is a non-issue; the meaning of Gregory's biography of his sister lies instead in Gregory's Macrina serving as an example *par excellence* of the bride of the Song of Songs.

### **Entrepreneurship in Theater: *Night Games***

"Producing a theatrical production; managing *Night Games*".

JARED R. SHERLOCK (Dr. Kaarin S. Johnston, Theater).

Three years in the making: project *Night Games* was a new and unique theatrical production from the The Magic of Jared Sherlock. Playing to over 1700 people in two days, and boasting involvement of over 50 CSB/SJU students and faculty, *Night Games* may be one of the largest student produced theatrical productions and interdisciplinary collaborations these campuses have ever seen. Come and hear the story.

### **Immersion schools: preparing the students of today for tomorrow.**

ASHLEY SINNEN (Dr. Tania Gomez, Hispanic Studies).

The future of today's children lies in the hands of educators. Teachers, administrators, politicians and community members have the responsibility to foster well rounded, intelligent and culturally accepting individuals. Immersion schools provide the highest form of an enriching educational environment. Not only do immersion schools improve and accelerate second language acquisition, they also progress math and reading skills and promote students to be culturally aware as well as understanding of others' perspectives. Looking forward, the necessity of immersion schools increases. As the future progresses, children assume the positions of national and world leaders. It becomes their responsibility to resolve world issues—mostly through communication with other prominent world figures. Therefore, students need to be at or above

par academically with students of other nations and be able to communicate effectively without assuming that others will be able to communicate with them. Immersion schools provide the optimal learning environment for all types of students.

**The implications of gender roles in savior narratives.**

MEGAN N. SINNER (Dr. Cynthia Malone, English).

What do Harry Potter, Aslan, and Jesus have in common? All three die to save a community of people they love, they all rise again, and, most significantly, they are all male. My research examines the Harry Potter series, the Chronicles of Narnia, and the Gospels to better understand the consequences the traditional male savior role has for young people developing their own senses of “normal” gender roles.

**The effect of Accelerade versus water on the hydration status of cross country skiers.**

SARAH SORENSEN and JARED SUNDSTROM (Dr. Amy Olson PhD, RD, LD, Nutrition).

To excel in any competition or race, college athletes need to be in top physical condition. Dehydration of only 2-3% can severely decrease performance. Staying properly hydrated can prevent injuries such as muscle cramps or heat related illnesses. Determining the right beverage to consume for specific sports can significantly improve performance. We studied ten cross country skiers that consumed 5 ounces of Accelerade or water every 15 minutes on two separate trials while roller-skiing for 90 minutes at 70% of their maximum heart rate. Urine osmolality and volume will be measured once before and for four hours after the trials to determine hydration status. Accelerade is a sports drink comparable to Gatorade except that it contains protein as well. Our purpose of the experiment is to determine which drink is better at hydrating cross country skiers.

**Canada thistle: best management practice.**

MATTHEW STASICA (Dr. Derek Larson and Dr. Jean Lavigne, Environmental Studies).

A non-native invasive species, Canada thistle is mandated by state and federal laws in the U.S. to be managed and controlled in order to support human and environmental health. Using single management techniques do not prevent Canada thistle from reoccurring annually. An integrated multi-dimensional approach at managing Canada thistle can benefit a spectrum of variables and can control the re-growth and reoccurrence of Canada thistle. Interdisciplinary evaluation, and analyzing each management technique, can improve savings in time, money, and resources.

**The effect of soil structure on the efficiency of ground source heat pumps through heat conductivity.**

LUKE E. STEINER (Dr. Richard White, Chemistry).

The efficiency of heat pumps greatly depends on how quickly heat can be transferred to the buried ground loops. The rate at which this heat can be transferred to the glycol solution running through the ground loop is determined by the heat conductivity of the soil around the loops. This experiment examined the rate at which heat is transferred through sandy and loamy soils. The temperature data from this experiment will show which soil allows for better heat pump efficiency.

**Investigation of modern day seseo and ceceo in Spain from a sociolinguistic perspective.**

ANDREW C. STEVENS (Dr. Tania Gómez, Hispanic Studies).

It is known that at the end of the 14<sup>th</sup> century in Spain the dental affricative phonemes of Castilian Spanish began to change and take on a fricative mode of realization. The change continued throughout the 15<sup>th</sup> century, and diverged into two distinct sets of realizations—the centro-peninsular and the Atlantic. Each set developed independently and gave rise to multiple realizations of the fricative phonemes. The fricative variants still exist in Spain today and are noted as the major difference between Castilian Spanish and American Spanish. The intention of this work is to describe the development and evolution of the old Castilian affricates into their modern day descendants—the fricative phonemes—and to describe how these fricative phonemes gave rise to the modern day phenomena of seseo and ceceo; but furthermore to distinguish between the centro-peninsular and Atlantic realizations of seseo and ceceo.

**Fighting Sioux logo: a racist or respectful representation.**

ELIZABETH A. STOCKER (Janna LaFountaine, Physical Education).

In 2005, the NCAA issued a policy stating that the University of North Dakota's fighting Sioux logo, along with eighteen other colleges, was hostile and abusive towards American Indians. Some see the logo as honorable and respectful, while others see the logo as racist and offensive. This NCAA policy has only intensified a heated debate that started when Native Americans began to attend UND. Clearly, the UND logo, should be retired because it is a stereotype that denigrates Native American culture, encourages tolerance of racism, and creates a hostile and abusive environment for UND Native American students.

**Weight loss, dehydration practices and serum electrolyte levels in division III wrestlers 2010.**

BRIAN SYVERSON and STEPHANIE MACKENTHUN, (Dr. Amy Olson PhD, RD, LD, Nutrition, and Dr. Mani Campos, Biology).

The death of three wrestlers in 1997 resulted in the NCAA instituting a Wrestling Weight-Certification Program (WWCP), which instituted rules to limit weight loss procedures. The purpose of this study was to assess weight loss practices and potential adverse changes in serum electrolytes. Twelve wrestlers participated in the study; body weights, diet information, blood and urine samples were collected prior to weigh-in on competition day. Mean urine osmolality was  $962 \pm 207$  mOsm/L (range 730-1310 mOsmol/L) and 68% of the wrestlers were significantly dehydrated prior to competition. The average weight loss to *make weight* was  $2.1 \pm 0.9$  kg (range 0-4.1 kg). The mean serum sodium level the day of competition was  $142.7 \pm 2.2$  mmol/L (normal range 138-146 mmol/L) and mean serum potassium levels were  $4.2 \text{ mmol/L} \pm 0.5$  (normal range 3.5-4.9 mmol/L). Wrestlers still use dehydration to make weight; however, the current magnitude of weight loss does not appear to affect serum electrolytes.

**Plato's *Phaedrus* and *Apology*: illustrations of Socrates' rhetorical consistency.**

ANGELA TATE (Dr. Richard White, Communication).

Plato's *Apology of Socrates* is not a standard judicial speech, and scholars are split over Socrates' goal with the *Apology*. While Socrates delivers the speech in a court setting and presents it to an audience that he needs to convince of his innocence, his past experiences and speeches influence the impact – and uniqueness – of this speech. Regardless of the fact that Socrates was convicted after delivering this speech, the *Apology* successfully highlights Socrates' ideas of rhetoric, and he remains consistent in his position on rhetoric that he outlined in the *Phaedrus*. I will illustrate this by analyzing scholarly interpretations of the *Apology* that focus on Socrates' relationship with the jury, his use of irony, and the court setting itself, and by showing that those topics are not as important as his ideas of truth and rhetoric.

**Women batterers: the new face of oppression.**

SHAWN A. THURSTON (Dr. Jean Keller, Philosophy).

Recent research shows that domestic violence victims are not just heterosexual women but are also lesbians and heterosexual men and that heterosexual women can be batterers as well. Unfortunately, lesbian and male victims of domestic violence do not receive the same aid compared to their heterosexual, female counterparts because of underreported crimes due to the preconceived notions of sexuality and masculinity that are embedded within our society. Therefore, it is necessary to assist them by expanding standardize treatment to include therapy groups for both lesbian and male survivors of domestic violence.

**Using fluorescence spectroscopy to study the binding of phosphopeptides to mutants of human low molecular weight protein tyrosine phosphatase (PTP).**  
COURTNEY R. A. TIEGS (Dr. Henry Jakubowski, Biochemistry).

PTP dephosphorylates phosphoproteins involved in cell growth and differentiation and is a potential target for novel chemotherapeutic drugs. The interaction of a phosphopeptide (GVISKY(P)KPMIT) from the ephrin receptor, a natural protein ligand of PTP, was studied in two double mutants. In one mutant, tryptophan 39 was changed to phenylalanine and cysteine 12 was changed to serine (W39FC12S). The other mutant had in addition to C12S a change of tryptophan 49 to phenylalanine (W49FC12S). The C12S alteration allows the protein to bind to, but not cleave, phosphosubstrates while the W39F allows the binding of the phosphopeptide to the active site to be measured by W49 fluorescence perturbation. These proteins were purified from *E. coli* that had been transformed using a PGEX-6T plasmid containing the cDNA for PTP linked to the gene for glutathione *S*-transferase (GST). The protein was purified and analyzed using GST-Bind Fractogel chromatography and SDS-PAGE electrophoresis. The binding of the C12SW39F to GVISKY(P)KPMIT was tested by analyzing changes in the tryptophan 49 fluorescence in the W39FC12S mutant (using C12SW49F as the control). The interaction of C12SW39F with the peptide was also studied through fluorescence anisotropy using an N-terminal, fluoresceinated version of the phosphopeptide.

**Banco Esperanza: using micro-credit to empower low-income Hispanic women in rural Minnesota.**

CHRISTIN TOMY (Dr. Roy Ketchum, Hispanic Studies).

Through the lens of Banco Esperanza, a student-run micro-lending program serving the Cold Spring area, this paper explores the potential of micro-credit as an empowerment tool for low-income Hispanic women in rural Minnesota. An historical and contemporary overview of micro-lending worldwide and in the United States and a brief history of the Cold Spring community provide the context for the analysis. Additionally, viability is explored through a comparison of the strategies, goals, and structure of Banco Esperanza and the Grameen Bank model, upon which the program is based.

**Income inequality in China.**

NGA TRAN and LEE MOUA (Dr. Sophia Geng, Modern and Classical Languages).

China has been admired for its high economic growth rate. Since the economic reform in 1978, the average growth rate was on average approximately 10 percent. Supposedly, the high growth rates would bring economic welfare to the people in China. However, behind this achievement lies an income inequality between rural and urban areas and among regions. This research provides an analysis on the situation of income disparities in China and the effort of the government in narrowing the income gap.

**The combined experience of minimalist ceramic art and sound.**

PAULA J. TRAUT and KEVIN T. SPRINGER (Dr. Samuel Johnson, Art and Dr. Mark Hennigs, Theater).

A ceramic artist and sound artist team up and create an installation designed to provide a simultaneous experience of minimalist-inspired visual and audio art. The visual artwork consists of simple large-scale tile pieces presented on the wall. Primary concerns in the development of these tiles were the creation of a sense of stability and presence. The audio pieces are made up of processed and bowed electric guitar. The sounds explore simple textures, rhythms, and gradual change over time. Together, these works encourage exploration of subtlety and facilitate heightened self-awareness through the experience of the work.

**Portavoz: Marcos as an exemplary organic intellectual**

DOUG TRUMM (Roy Ketchum, Hispanic Studies)

Eduardo Galeano explains Marcos's rise to *subcomandante* of the Zapatistas of Chiapas, Mexico with a simple parable. The Zapatistas live behind the mist of the jungle and wear it like a mask. Hoping to lead the indigenous out of oppression, Marcos arrives talking jargon, but slowly he discovers that people do not identify with his message. Marcos shifts his approach. By learning to listen, he becomes capable of speaking. He sheds his jargon and adopts a more poetic vision. Thus, Marcos becomes the *portavoz* of the Zapatistas, their voice of voices. Galeano's story illustrates how Marcos became an organic intellectual—a person who lives in solidarity with the oppressed and works toward raising them out of oppression. My project highlights key passages in Marcos and other writers that, first, show how Marcos shifted from condescension to being an organic intellectual and, second, demonstrate the poetic vision of social change that Marcos weaves together.

**An exploration of the reproductive activity of the giant ground bromeliad *Puya clavaherculis* found in the Andes mountain range.**

ALASTAIR J. TULLOCH and CONNOR P. MCINTEE (Dr. Kristina Timmerman, Biology).

Puya is found in the high-altitude páramo of Ecuador and produces hundreds of thousands of seeds on a large inflorescence which blooms once in its lifetime preceding death. Each inflorescence is composed of clusters of seedpods, all containing hundreds of seeds. This study examined the reproductive period, providing evidence for coupled growth of clusters, seedpods, and seeds. This signifies an abrupt release of carbohydrate stores from the plant's thick leaves to support rapid growth. The relatively low seed viability before dispersal validates the high number of seeds produced in order to maximize genetic success. This plant is important as it is a significant source of nutrients for the Andean bear and may be a keystone species in this region.

**The importance of watercraft inspectors.**

BENJAMIN L. UNDERHILL (Dr. Jeanne Lust, Biology).

I participated in an internship with the DNR during the summer of 2009 on Lake Minnetonka. My primary duties consisted of educating boaters about the problems aquatic invasive species pose for Minnesota lakes. These invasive species cause problems not just for boaters, but for all Minnesotans. Four species are particularly devastating to Minnetonka and other Minnesota lakes and streams. These include Zebra Mussels, Eurasian Watermilfoil, Spiny Waterflea, and Flowering Rush. The majority of people I spoke with responded positively to this information and was effective in preventing the spread of aquatic invaders.

**Un empuje para un Chile bilingüe.**

RACHEL M. VANDERHEYDEN (Dr. Corey Shouse Tourino, Hispanic Studies).

El Idioma Inglés está presente en todas partes, incluso en culturas donde no es su idioma oficial. En Chile, se disfruta de la música y películas en Inglés, y la enseñanza del Inglés existe en la mayoría de los colegios. Pero a pesar de eso, el nivel de fluidez de Inglés en los estudiantes de Enseñanza Media chilena sigue muy bajo. Este ensayo explora las razones del por qué existe ese nivel bajo y explica algunos programas estatales dedicados al mejoramiento del Inglés. También propone algunas soluciones posibles para aumentar el nivel del Inglés dirigido a alumnos chilenos en un caso específico: el programa del Inglés del Instituto Comercial Alberto Valenzuela Llanos de San Fernando, Chile.

**Saving a democracy by first destroying it: the fall of democracy in Chile.**

ABBY M. WALCH (Dr. Corey Shouse Tourino, Hispanic Studies).

One country to suffer because of the United States' mindset during the Cold War was the South American country of Chile. When Salvador Allende, a Marxist leader, was elected president, the U.S. feared Chile would fall to Communism. The covert actions the U.S. preceded to engage in instigated actions that led to the overthrow of Allende's democratically elected government and the beginning of a military dictatorship in which thousands of political prisoners were tortured, exiled, and killed. The U.S. often disregarded the potential negative consequences of the measures it took in Chile in its zealous efforts to contain Communism. Under Pinochet's rule, thousands of Chilean citizens suffered, and trust for the U.S. was severely undermined as it acted against its own basic democratic principles.

**Building a nation: the construction of a post-World War II Austrian identity, 1945-1955.**

TERESA M. WALCH (Dr. Gregory Schroeder, History).

Austria was officially incorporated into the Nazi-German state in 1938, and many Austrians participated in the Third Reich. The Allies, however, labeled Austria as the first victim of German aggression in the Moscow Declaration of 1943 and considered Austria a liberated state after the war. The Austrians created and used a distinct, non-German identity to conform to the Austria-as-victim myth. Previous postwar Austrian identity studies fail to reflect seriously on the formation of this separate Austrian identity in its larger historical context of the Cold War. Therefore, this study shows how the victim myth developed and was utilized by Austrian political elites in the early postwar years, and it explores the effects of the Cold War and subsequent Allied policies on Austrian nation-building.

**Supporting a myth: the effect of Vienna's post-World War II monuments on Austrian identity, 1945-1955.**

TERESA M. WALCH (Fr. Mark Thamert, Modern and Classical Languages).

Although many Austrians participated in the crimes of the third Reich, Austria was labeled as the first victim of German aggression in the Allied Moscow Declaration of 1943. In order to conform to this victim myth, postwar Austrian political elites created and used a distinct, non-German identity to serve their own political agendas. Provincial and locally-sponsored Austrian memorials disputed the official memory that was supported and sustained by politically-sponsored monuments in Vienna during the initial postwar decade. This study delves into Austria's post-World War II monument culture, specifically focusing on Vienna's monuments and memorials, and it analyzes Austrian political elites' utilization of these sites of memory to support the official postwar Austrian identity.

**Playboy and the expansion of traditional masculinity.**

JAIMIE WELLE (Dr. Shane Miller, Communication and Gender and Women's Studies).

Playboy magazine managed to successfully challenge traditional conceptions of masculinity. By equating urbanity, cultural sophistication, and emotional sensitivity with masculinity, Heffner's magazine used traditionally feminine qualities to challenge the stereotype of the rustic, blue-collar macho man.

**Woman and the new race: is Margaret Sanger a feminist?**

KATHERINE H. WESTLUND (Dr. Shane Miller, Communication and Gender and Women's Studies).

Feminist scholars who have traditionally dismissed Margaret Sanger because of her eugenics program, have failed to give her due consideration. Sanger was a victim of her time—a time rife with classism and racism. If we define feminism as “the advocacy of women’s rights on the grounds of political, social, and equality to men,” Sanger worked within all three realms. She was the catalyst for the birth control movement in the United States, which was a huge area of focus for the second wave feminists who followed her. She also redefined women’s role and empowered women to be in control of their own destinies.

**Indigenous assimilation in Peru: past and present.**

KATHERINE H. WESTLUND (Dr. Roy Ketchum, Hispanic Studies).

Indigenous populations are often represented by the dominant culture that has a voice—the *ladino*, or non-indigenous, population. My project assesses two fictional pieces from Peru: *Aves Sin Nido* (Birds Without a Nest) written in 1889 by Clorinda Matto de Turner, and *El Hablador* (The Storyteller) written one hundred years later by Mario Vargas Llosa. Despite the difference in era, the paternalistic implications of the books are analogous. Both books suggest that the indigenous people must assimilate themselves into *ladino* culture or risk annihilation. My research explores 1) the consequences of misrepresentation of the indigenous peoples by the *ladino* spokesperson, and 2) whether or not there are alternatives to assimilation/annihilation that better preserve indigenous culture and dignity.

**Participation or not – the U.S debate over the 1936 Olympics.**

AXEL WIKSTROM (Janna LaFountaine, Physical Education).

After the Nazi-regimes rise to power in 1933, concerns were raised that the treatment of German Jews and other minorities would spoil the Olympic ideals and values. A debate over whether the United States should participate or not followed; with the German honesty about its pledges to

obey Olympic values taking center stage. Also, the question to what extent sports and politics should be separated was highly debated. The United States' decision to participate in 1936 Olympics in Berlin was wrong. However, the circumstances, individuals involved, and the facts available at the time help explain the outcome.

### **El simbolismo en el Cuarto de Atrás.**

KENDRA WILLHITE (Dr. Christina Hennessy, Hispanic Studies).

In Carmen Martin Gaite's book *El Cuarto de Atrás*, we read about an evening of insomnia for the author and are given a fantastic novel because we are unaware if she is awake or dreaming. I argue that the symbolism throughout her book gives us a representation of a Freudian psychoanalytic session where the author deals with the consequences of growing up during the Franco regime. Main elements of the story give us symbolic insight as to how she goes from potentially having a psychological disorder to a resolution of the disorder and finally being able to sleep. Her book gives its readers insight to her past and present experiences and traumas, and how she deals with them and is eventually able to move past them.

### **The rusty crayfish: is it beneficial in Minnesota waterways?**

WIMMER, RYAN (Dr. Jean LaVigne, Environmental Studies and Dr. Bill Lambert, Biology).

The rusty crayfish is an invasive species to the waters of Minnesota. It was introduced in the 1960's and has since expanded via human travel. The impacts of the rusty crayfish are extensive that include the cutting down of lake vegetation and crayfish to crayfish competition of native crayfish species. Consequently, invasive species due to their negative impacts on introduced bodies of water have a bad reputation. However, we need to look at the good in bad situations and find benefits from a increasing problem in Minnesota. As a result, these benefits could be at the end of your line or at the end of your dinner table.

### **Los deseos incumplidos: frustración e impotencia femeninas en Lorca.**

ERIN K. YATES (Dr. Christina Hennessy, Hispanic Studies).

The three plays of Federico García Lorca that comprise his folk trilogy, including *Yerma*, *La casa de Bernarda Alba*, and *Bodas de sangre*, delve into the theme of the unsatisfied desires of women living in the Spanish countryside in the years preceding the Spanish Civil War. Lorca's female protagonists suffer from the inability to satisfy their desires related to fertility, love, romance, and liberty. These women are impeded by the concept of honor in their society, the enclosed spaces in which they must live, and the amount of power that their husbands and other male relations hold over them. García Lorca was able to write thoughtfully about the problems that these women faced due to his own reduced status in society because of his lifestyle as a homosexual man during the conservative period that he lived in, including the restrictive years of the dictatorship of Miguel Primo de Rivera.