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## **THE GREAT DEPRESSION AND ITS MODERN PARALLELS**

**Coy Chambers, Rebecca Falks, and Justin Little, Department of Accounting and Finance**

**Faculty Sponsor: Dr. Elvan Aktas, Department of Accounting and Finance**

In the last few years the United States, and the world, have experienced what is certainly one of the greatest financial disasters of history. In the midst of this crisis it is easy for many to say that the likes of this disaster has never been seen before and the financial meltdown, and following economic recession, could not have been predicted or prevented. However, as we look back at the history of financial crises in the U.S., we can see that there are similarities between the events of the last few years and the events of the years surrounding the Great Depression of the 1930s. To shed light on today's regulatory and financial events, we have looked back at similarities and laid them out in such a parallel way as we hope will be useful in evaluating how we got where we are and where we should go from here.

## **DESIGNING THE MILITARY VEHICLE OF THE NEXT GENERATION**

**An Seong Hyun, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Barry Hojjatie, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

The objective of this study was to design the military vehicle of the future against advanced flight vehicles, having greater measures of mobility and more effective resource usage such as pure electric engine system, laser armament, flight mine missiles, rifled machine guns, the newest control and communication systems, and new arrangement of the caterpillar. In addition, the vehicle must demonstrate adroit abilities in its implementation. In order to achieve these goals, designs which rely on nanotechnology must be integrated to maximize potential for the defense mechanisms of the future. Also, these designs must capitalize on new optimized materials, Carbon-Nanotube, Cork, elastomeric composite of Carbon-Nanotube and Carbon Black by crystallization, Nickel-Silicide, and super-strength aluminum, which meet new standards for strength and flexibility. Autodesk Inventor software was employed to design the system using the above specifications. Following an analysis of contemporary components, which have demonstrated in this study effectiveness in allied settings, and an overview of the potential effectiveness of an integration of these components, a proposal for a military vehicle which meets the unique needs of future combat engagement is provided.

## **HIGHER EDUCATION AND STUDENTS ON THE AUTISM SPECTRUM: UNCOVERING AND SUPPORTING THE INVISIBLE TEN PERCENT**

**Hazel R. Moon, Honors College and Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Anthony J. Scheffler, College of Education**

This paper examines the existing research literature and programs available to higher education students on the autism spectrum. The research examines best practices, challenges for institutions of higher education, and opportunities for providing best-in-class education and support services to these students. The paper examines the current and future need for colleges and universities to adapt program and support functions for this growing population. Specific recommendations for Valdosta State University are included.

## **SEEDS OF VIOLENCE TOWARDS NATIVE WOMEN**

**Pamela Johnson, Native American Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Native American Studies**

European colonization has produced a history of abuse aimed at Native American women as a means of forced assimilation. The abuse has been perpetuated largely through sexual assault and the denial of legitimacy in claims of sexual assault. The existence of these events is largely absent from traditional academic accounts of Western-Native American encounters. Ignoring historical accounts of sexual violence has perpetuated the invisibility of violence against Native American women. This paper will examine the current statistics involving violence against Native American women as a continuation of hidden colonial practices of assimilation. The paper will trace the theme of violence from the Major Crimes Act 1885 to the government statistics as presented in the BJS Statistical Profile, American Indians and Crime, 1992-2002, and more recent DOJ sources.

## ACER

**Joshua Knight, Department of Communication Arts**

**Faculty Sponsor: Dr. Paula L. McNeill, Department of Art**

This short story, inspired by a photograph by Memphis-based documentary photographer Jamie Harmon, is the recollection of a long night that is familiar to us all. *Acer* combines real-life problems with the technology we use today. What would a desktop computer's night be like if it was able to leave the desk? Find out in... *Acer*.

## USING LINEAR ALGEBRA TO DERIVE A FORMULA FOR THE SUM OF INTEGER POWERS

**Maximilian James Wang, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Sudhir Goel, Department of Mathematics and Computer Science**

A new algorithm is proposed to generate a formula of the sum of integer powers  $S_p(n) = \sum_{k=1}^n k^p$  for an arbitrary positive integer  $p$ . This formula plays an important role in scientific computation, numerical analysis, complexity analysis, academic research, and even in teaching calculus. Faulhaber's formula indicates that  $S_p(n)$  can be expressed as a  $(p + 1)^{th}$  degree polynomial. A special linear system is constructed and then solved to fit this polynomial through the Gaussian Elimination method. This study shows that this new algorithm is more efficient, having a polynomial time  $O(p^3)$  complexity. In the implementation procedure, this algorithm does not use any complicated Bernoulli numbers, Stirling numbers, integrals, differentiations, or recursion methods. Maple software code is used to illustrate how the new algorithm works, and the coding of this algorithm has only five lines. For a power of 20 or 100, the computer execution CPU time (at VSU Math/CS computer lab PC level) takes only 0.062 second or 16.396 seconds respectively.

## **KAHLIL GIBRAN'S QUEST FOR TRANSCENDENT TRUTH**

**Laura N. Hanna, Honors College**

**Faculty Sponsor: Dr. Lai Orenduff, Honors College**

Kahlil Gibran is known in Lebanon and in the United States for his writing and art. Gibran was born in Lebanon in 1883 and came to America when he was eleven—still young enough to be influenced by the new American culture he was immersed in. By the time he was only twenty, Gibran had already written many poems and created much art. I aim to compare Gibran's poetry with T.S. Eliot's poetry and Pablo Picasso's art. Furthermore, I posit that Gibran's works are unique in that they do not reflect the twentieth-century Western idea that the world is a hopeless, disjunctive place. Instead, Gibran's Weltanschauung (or worldview) concentrates on finding God and expressing hope. This paper also demonstrates the differing artistic and literary methods that Gibran uses to depict the fourth dimension, which are contrasted with T.S. Eliot's and Picasso's depictions of the fourth dimension.

## **LIBYA: A NATION IN TRANSITION**

**P. Nathaniel Metzner, Department of Political Science**

**Faculty Sponsor: Dr. James W. Peterson, Department of Political Science**

Attempting to hypothesize on the future directions of a government is often a daunting or even impossible task; however, through comparative politics one may be able formulate a plausible course for governance. The aim of this work is to examine Libyan political, geographical, and cultural history and to compare it to other budding democracies in an attempt to formulate a path to stable governance. Research dictated the importance of a transitional model, a political model, and an economic model. Due to numerous parallels, post-revolutionary Romania is utilized as a transitional model focusing on building nationalism and establishing unity. Likewise, Turkey's political and economic models are used because of their similarities with Libya and due to Turkey's position as the predominant form of democracy in the Middle East. The results of this work stress the importance of unifying the people of a divided nation through utilization of nationalistic rhetoric, military conscription, and eventually national dependence.

## **THEORETICAL DRIVERS OF EARLY CAREER SUCCESS FOR NEW ENTRANTS TO THE JOB MARKET**

**Lesley Nicole Hamm, Department of Management and International Business**

**Faculty Sponsor: Dr. M. Todd Royle, Department of Management and International Business**

Research on career management has primarily focused on cyclical, evolutionary processes that continue throughout the course of adult life. Although important, more attention to career strategies for recent graduates could prove useful. This transition stage from student to employee is critical to career success and proper proactive steps should be taken by new entrants. By integrating research on adult-life development and career management theories, we introduce a model that identifies the major drivers of early career success. Our proposed model explores both individual and organizational levels of early career development. By integrating theories of the self-concept and environmental conditions, we propose a new model of early careers. Our construct helps elucidate how individuals develop and implement goals related to job selection, organizational entry, and early career success.

## **FRANKLIN D. ROOSEVELT: POPULAR SUPPORT AND PEARL HARBOR**

**Chase Kelly, Department of History**

**Faculty Sponsor: Dr. Dixie Haggard, Department of History**

President Franklin D. Roosevelt has been repeatedly ranked high among other Presidents as one of the greatest in terms of leadership. He led the nation through two of the roughest moments in the nation's history: The Great Depression and Pearl Harbor. What made this President stand out to the people? Although the odds were stacked high against him, he continued to maintain popular support during these hard times. This essay shows the power he believed the people of the nation held and the methods he used to win and maintain popular support. Many people believe that President Roosevelt's main gathering of popular support was during The Great Depression, but this essay aims to show that FDR's moment of unifying support came following his actions after the attack on Pearl Harbor. The essay also includes an analysis of the popular support for President Roosevelt based upon class structures of the populace.

## **SPAIN'S ADMISSION INTO THE EUROPEAN UNION AND ITS IMPACT ON THE CULTURAL DIVERSITY AND ECONOMY OF THE COUNTRY**

**Anna Insley Vasquez, Department of Marketing and International Business**

**Faculty Sponsor: Dr. Grazyna Walczak, Department of Modern and Classical Languages**

This paper examines Spain's admission into the European Union in 1986. The background of Spain and the EU, and Spain's decision to become a part of this collaborative association were explored in this research project. In addition, the researcher analyzes the positive and negative effects this agreement has had on Spain's rich and ethnically diverse culture and economy as a result of its admittance. The research and data were collected through numerous sources including: newspaper articles, academic research and scholarly journals found in the GALILEO database, statistical and graphical data from government websites, and other sources from reference books such as the encyclopedia. The data found in this analysis reveals that Spain experienced a steady economic growth and a flourishing cultural renaissance as a result of their association with the EU. However, the paper also discussed the implications of this decision on Spain's economy and society today.

## **PATTERNS OF INSECT SUCCESSION ON DECOMPOSING PIGS IN LOWNDES COUNTY, GEORGIA**

**Paula D. Bicoy, Colleen Y. Bradley, Stacie R. Linton, Department of Biology**

**Faculty Sponsor: Dr. Mark Blackmore, Department of Biology**

Insects colonizing decomposing bodies follow predictable patterns, but this is influenced by geographic variation in fauna and weather. We examined insects colonizing carcasses at 2 sites at the Lake Louise Field Station in Lowndes County, Georgia. The first trial began in September 2012 and the second trial in January 2013. In each trial, we placed 3 pigs in the field, approximately 1 hour post-mortem. In both studies, one carcass was situated in the open without covering vegetation, one was placed beneath low understory trees or shrubs, and a third was wrapped in a polyethylene tarpaulin. We collected insects daily, and monitored the site with a wildlife camera and data logger. Adult insects collected from the carcasses were pinned and identified; larvae were reared on beef liver in the laboratory until they enclosed to adults. Succession of species and variation associated with exposure and time of year will be discussed.

## **THE BERDACHE: DISCOVERING A DEEPER MEANING**

**Eduardo Castillo, Native American Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Native American Studies**

The purpose of this paper is to explore the history and social construction of multiple gendering practices including the concept of the Berdache in Native American societies. The term Berdache, while originally tribally and gender specific, has been expanded in recent years to include a multitude of gendering positions across Native American communities. This paper explores the Berdache from the concept historically and currently based on the Native American understanding. The paper further explores the lack of cultural competency in academic accounts of Native American gendering systems in order to examine colonizing themes that have resulted in misconceptions involving Native American multi-gendered systems. Finally, the paper will illustrate how, through a more comprehensive and culturally aware study, the Berdache lifestyle can be more accurately discussed.

## **OPERATING SYSTEMS FOR THE NOVICE USER**

**Rebecca M. Rusk, Department of Adult and Career Education**

**Faculty Sponsor: Dr. Marcella Prater, Department of Adult and Career Education**

This paper includes a brief history and explanation of the original design objectives of the computer operating system and its evolution into the highly configurable control software we know today. An explanation of various types of systems and platforms is covered through an overview with examples of each type provided. An abbreviated historical survey explores popular systems such as DOS, Windows, Mac, and Unix/Linux. An assessment of capabilities and popular key features of each system is provided through a side-by-side comparison. The key concepts of the operating system kernel and various subsystem manager codes is appraised for the necessary functionality of software programming and the historical significance of the graphical user interface is presented.

## **“THE GYPSY PROBLEM”: A STORY OF EXCLUSION AND MISREPRESENTATION IN EUROPE**

**Alice Mendez, Department of Sociology, Anthropology, and Criminal Justice**

**Faculty Sponsor: Dr. Michael Meacham, Department of Sociology, Anthropology, and  
Criminal Justice**

This paper examines the struggle for the reclamation of Gypsy integrity and dignity within the realm of European society, utilizing the framework of two dominant cultural discourses: 'culture as choice' and 'culture as nature'. The 'culture as choice' discourse suggests that Gypsies have the ability to simply choose a better lifestyle for themselves by abandoning their culture and caravans. In contrast, the 'culture as nature' discourse suggests that nomadism cannot be policed, since Gypsies are inherently nomadic. Therefore, policies and legislation that seek to inhibit and destroy Gypsy culture will ultimately signal the demise of all Gypsies. Both discourses inevitably place Gypsies into a category of otherness, consequently positioning them as outsiders at the mercy of a nation-state that continues to grapple with their asserted "Gypsy problem".

## **THE CLASH OF THE ACTIVE FEMALE AND THE FEMININE IDEAL IN CHARLES PERRAULT’S “DONKEYSKIN”**

**Erica Even, Department of English**

**Faculty Sponsor: Dr. Jane Kinney, Department of English**

When folk tradition is passed down orally, and eventually transcribed, morals of the tales change to suit the morals of the teller or writer’s era. Charles Perrault is notorious for changing morals in folk tales to suit his and the French aristocracy’s opinions of their day. While most would take a Marxist approach in unweaving Perrault’s “Donkeyskin,” I have chosen to take a primarily feminist approach, using social class and wealth only as rewards and punishments for the main character. In my research I analyze the feminine ideal associated with traditional folktales and use it to prove that Donkeyskin is an uncharacteristically active rather than passive princess. An active female was frowned upon by seventeenth century patriarchal France, resulting in Perrault making excuses and shedding the active female in a negative light. By distinguishing the feminine ideal, the masculine ideal surfaces, revealing the true need for passive female characters.

## **THE RELATIONSHIP BETWEEN THE MEDIA AND SCHOOL SHOOTINGS**

**Jennifer Dandron, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Christine James, Department of Philosophy and Religious Studies**

This paper focuses on the relationship between media and school shootings in the past fifteen years, especially in regards to the Columbine, Virginia Tech, and Newtown massacres. It outlines how different types of media, specifically social, print, and broadcast, influenced the public's response to each incident. Likewise, it analyzes how the situations affected media personnel. The paper also compares the demographics to which each form of media most prescribes and how those patrons' reactions differed. Finally, the paper looks at the varying philosophical approaches, including the code of ethics, different media outlets took when reporting each tragedy.

## **A 24 HOUR LAB EXERCISE IN THE OCEAN: NATURAL CHEMICAL CYCLES AT THREE LOCATIONS IN THE FLORIDA KEYS**

**Jordan A. Baker, Tess A. Baker, Cieanna A. Baptiste, Loren A. Binns, Sasha L. Booth, Jonathan R. Brock, Julia D. Broome, Willis W. Brown, Brittany N. Butler, Aaron T. Calvin, Aaron C. Ford, Kelsey S. Johnson, Warren D. Lott, Katie C. Merritt, Rachel T. Mikula, Anastasia V. Nienow, Harsh M. Patel, Mitesh I. Patel, Mircaly Pierre, Sydney E. Plummer, Jesse B. Prince, Jeffrey M. Roland, Department of Chemistry**

**Faculty Sponsors: Dr. Thomas Manning, Department of Chemistry, VSU and Dr. Greg Wylie, Department of Chemistry, UGA**

The famous ocean explorer Jacques Cousteau once said "No aquarium, no tank in a marine land, however spacious it may be, can begin to duplicate the conditions of the sea. And no dolphin who inhabits one of those aquariums or one of those marine lands can be considered normal." While Cousteau's reputation was built around images of marine life, from coral reefs to dolphins, the quote can be applied to marine chemistry. To paraphrase the above quote, you can't replicate the chemistry and its constant changes in a lab setting. In this study, we performed three different twenty four hour labs in the Florida keys monitoring different parameters associated with the cyclical nature of ocean chemistry periodically for twenty four hours. These include nitrate, nitrite, ammonia, pH, dissolved oxygen, alkalinity, hardness, conductivity, salinity, phosphate, ORP, iron, tide height and water temperature. The locations sampled are Sugarloaf Key, Pigeon Key and Fiesta Key. A comparison of the data between the three locations will be outlined in this presentation.

## **THE VIOLENT NATURE OF THE IROQUOIS**

**Thomas Lovett, Department of History**

**Faculty Sponsor: Dr. Dixie Haggard, Department of History**

This paper explores the cultural significance of violence among the Six Nations of the Iroquois Confederacy in the seventeenth century. Using the records of the Jesuit missionaries and the treaties between Iroquois and the British and French governments, the paper argues that the Iroquois were fundamentally bound to violent expression for cultural, economic, and military purposes. The analysis focuses on those aspects of Iroquois society that best exemplify their extensive use of violence. The analysis explores several significant aspects of Iroquois culture, including the transition to manhood, spiritual consolation, population renewal, and conquest. An examination of these specific areas revealed that the Iroquois were dependent on aggressive, war-like behavior to fulfill those cultural institutions. The significance of this research is that it explores new perspectives on the prevalence of violence in Iroquois culture, which allows for a new historical interpretation of the Iroquois through their violent expression.

## **OBESITY RATES ACROSS THE UNITED STATES**

**Tetyana Ard, Department of Political Science**

**Faculty Sponsor: Dr. James LaPlant, Department of Political Science**

“If every American were to lose an average of ten pounds, the United States would save roughly \$29 billion a year within five years.”

Jeffrey Levi, executive director of the Trust for America’s Health

Increasing obesity rates have been a prevalent problem in the United States. Many studies have been conducted in order to determine the cause of this problem. However, it has been evident that more than one factor affects the obesity epidemic that has slowly swept the nation. This research focuses on six of the possible causes of increased obesity rates which include minority population, income levels, education levels, percentage of people without health insurance, exercise levels and region. The dependent variable in this study is the percentage of the population obese for each of the 50 states. This research project discovers that five out of the six factors are statistically significant. The percentage of a state’s population without health insurance is the only variable that was not statistically significant. Percentage African American was positively associated with obesity rates, while the percentage Latino was negatively related to the obesity rate. Per capita income, education levels and exercise levels had a negative impact on obesity. Lastly, an analysis of variance revealed that region also influences obesity rates, with the South having the highest obesity rates.

## **ANALYZING OBSERVATIONS OF A PRE-SERVICE ELEMENTARY MATHEMATICS TEACHER**

**Denisha Dukes, Honors College and Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Sandra Trowell, Department of Mathematics and Computer Science**

This paper states the importance of pre-service mathematics courses in pre-service teacher mathematics preparation. Pre-service mathematics courses should be designed to help pre-service teachers make the connections between the mathematics they are learning and will be teaching. The preparation courses should serve as a model of the situations and strategies mathematics teachers can use in their classroom. This paper is a self-evaluation and reflection of the mathematics lessons that I taught as a pre-service elementary school teacher. An analysis of the Valdosta State University College of Education Observation Instruments for both lessons reveals strengths in the mathematics courses for pre-service elementary teachers at Valdosta State University.

## **AMERICAN POP CULTURE AND THE FORMATION OF IDENTITY IN HANIF KUREISHI'S *THE BLACK ALBUM***

**Laura N. Hanna, Department of English**

**Faculty Sponsor: Dr. Hugh O'Connell, Department of English**

The title for the book *The Black Album*, which was written by Hanif Kureishi, comes from the iconic American music artist Prince, whose Black Album was sold in the bootleg market until 1994. This novel is set in 1989 London—the year of the fatwa against Salman Rushdie's *The Satanic Verses*. Some critics claim that Kureishi's novel is a reaction to Rushdie's *The Satanic Verses*. Accordingly, while Rushdie's book has no steady plot, *The Black Album* is written in traditional Bildungsroman form—a key point discussed in this research paper. I also demonstrate that many of the principal characters in Hanif Kureishi's novel *The Black Album* mold their identities to mimic American popular culture icons such as Madonna and Prince. Finally, I posit that these characters' rejections of their own Asian and British cultures are directly related to the fall of England's empire and the subsequent rise of American hegemony.

## **TAPHONOMIC ASSESSMENT OF PIG CARRION IN SOUTH GEORGIA**

**Paula D. Bicoy, Colleen Y. Bradley, Stacie R. Linton, Department of Sociology,  
Anthropology, and Criminal Justice**

**Faculty Sponsor: Dr. Joyce Chan, Department of Sociology, Anthropology,  
and Criminal Justice**

This paper examines taphonomy of pig carrion over the course of two semesters. Pig taphonomy studies are very helpful in establishing a postmortem interval and a time since death interval for humans in a given environment. The experiment was conducted in two cycles, with three different pigs placed in three different scenarios: a covered pig completely wrapped by a tarp, a partially covered pig that was slightly covered by the surrounding brush, and an uncovered pig that was completely exposed to the environment. The purpose for this research is to understand the decomposition rate of pig carrion based on weather, scavengers, and the three different scenarios as established. The results suggest that weather, scavengers, and the three scenarios affected decomposition in different ways. Colder weather caused the pigs to decay at a slower rate, different scavengers were present based on the season, and the exposed pig decayed faster.

## **SKEPTICAL UNCERTAINTY IN MOORE'S "PROOF OF AN EXTERNAL WORLD"**

**Jason Cole Singletary, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Christine James, Department of Philosophy and Religious Studies**

This paper critiques philosopher G.E. Moore's argument for naive realism as presented in his "Proof of an External World." Moore clearly intends certainty about a given proposition as a requirement for knowledge of that proposition. Ernest Sosa presents a defense of Moore, arguing that Moore's epistemology is superior to alternative theories, including skepticism and contextualism. However, skeptical arguments undermine Moore's theory by taking away the ability for certainty. Jim Stone argues for skepticism as a positive epistemological theory. Peter Unger rejects skepticism as a positive theory, but undertakes a linguistic analysis of the term *certain*, and concludes that uncertainty undermines most claims of knowledge. I argue that, while skepticism does not lend itself to being a positive theory, the doubts posed by the skeptics have not been successfully answered by Moore, and Moore's inclusion of certainty as a requirement for knowledge makes his theory of naive realism untenable.

## **DETERMINATION OF ELECTRON TRANSFER MECHANISM OF ACETAMINOPHEN USING CYCLIC SQUARE WAVE VOLTAMMETRY**

**Aaron T. Calvin, Department of Chemistry**

**Faculty Sponsors: Drs. Lawrence A. Bottomley and Megan Damm, Georgia Institute of Technology, Department of Chemistry and Biochemistry**

This research project investigated the electron transfer mechanism of acetaminophen using cyclic square wave voltammetry. Solutions of acetaminophen were made in buffers of four different pH values and were examined using cyclic square wave voltammetry. Parameters, including step height, sampling width, step time, and pulse height, were varied. The peak height, peak potential, peak area, and peak width on the voltammograms were analyzed and compared. Results indicate a dependence of the electron transfer mechanism on pH.

## **THE EFFECT OF ROOM TONE ON SPATIAL INTELLIGENCE**

**Daniel Ledee, Department of Communication Sciences and Disorders**

**Faculty Sponsors: Dr. R. Renee Hannibal and Dr. Matthew Carter, Department of Communication Sciences and Disorders; Dr. James Archibald, Department of Curriculum, Leadership, and Technology**

It has been found that being exposed to contrapuntal music can temporarily increase spatial intelligence. It has also been found that arousal in the temporal lobe, which is responsible for auditory processing in the cerebral cortex, is associated with increased spatial processing abilities. Spatial processing abilities measure how well a person can visualize the rotations and manipulations of an object in their mind. However, it remains to be investigated whether or not similar results can be found using organized aperiodic sounds produced by household appliances. The purpose of this experiment is to determine the effects of these sounds on spatial processing abilities. This experiment used organized aperiodic sounds to create two different room tones for the experimental groups. The experimental groups completed the task in a sound attenuated booth while the aperiodic sounds were introduced at a level of 30dBHL. The control group completed the same task with no sound being introduced.

## **COPPER AS A DELIVERY AGENT FOR MEDICINAL AGENTS: NEW COMPLEXES FOR A NEW AREA OF MEDICINE**

**Melody Sobhani, John Milam, Lakesha Butler, David Jenkins, Iris Rivera, Satilla B. Johns,  
Rebekah Graham, Haley Franklin, Dustin Jenkins, Department of Chemistry**

**Faculty Sponsor: Dr. Thomas Manning, Department of Chemistry**

Hundreds of thousands of molecular species have been synthesized and tested for medicinal properties worldwide since the advent of modern chemistry some one hundred years ago. Because drugs can often be sidetracked in the body, or not dissolved completely in water, there has been a recent trend of improving efficiency. A wide range of methods have been developed and tested that improve the drug delivery such as micelles, nanoparticles, proteins, and liposomes. Our study is twofold; we demonstrate that a novel carrier, the copper(II) ion, can be used to increase solubility and stability in a physiological environment. Second, multiple drugs with different mechanisms can be attached to a single carrier, allowing them to arrive at the diseased region simultaneously. In this article, we will describe the synthesis and evaluation of cancer and anti-biotic (Tb) species. Our drugs have been accepted for various levels of testing at the National Institutes of Health, particularly the National Cancer Institute and the National Infectious Diseases Institute.

## **SOCCER IN LATIN AMERICA: A POLITICAL TOOL**

**Reyvid Torres, Department of Modern and Classical Languages**

**Faculty Sponsor: Dr. Susan Wehling, Department of Modern and Classical Languages**

This paper examines how soccer has been used as a political tool for oppression and unification in several Latin American countries. It also explores how some aspiring politicians have used soccer as a way to start their political careers. In addition, this project attempts to identify the factors related to soccer that influence Latin American governments and their mandates. Such factors include the importance of soccer on a global scale and the desire for Latin American countries to be acknowledged as both powerful soccer brokers and influential political players.

## **THE HOUSE DIVIDED: AN ANALYSIS OF REPUBLICAN PARTY COHESION, TEA PARTY FACTIONALISM, AND CONDITIONAL PARTY GOVERNMENT IN THE 112TH CONGRESS**

**Nicholas A. Rudnik, Department of Political Science**

**Faculty Sponsor: Dr. Steven Nawara, Department of Political Science**

Following the 2010 midterms and a Republican majority in the House of Representatives, the federal lawmaking apparatus became engulfed in divided government. The 2010 election ushered in a large contingent of lawmakers supported by a new conservative political movement collectively referred to as the Tea Party. From the onset many Tea Party Congresspersons sought to resist institutionalization of the organization, leading to ambiguity as to which specific members of Congress have a propensity to vote within this new coalition. This paper analyzes key votes in order to discern which Republican Congresspersons are likely to diverge from their conference in an attempt to roll the majority leadership, what this coalition has in common and differs from the House Republican conference as a whole, and determines whether legislative factionalism and inactivity in the House during the 112<sup>th</sup> Congress is applicable to Aldrich and Rohde's theory of Conditional Party Government.

## **USING MAPLE TO EXPLORE NUMERICAL METHODS AND QUALITATIVE ANALYSIS FOR SYSTEM OF ORDINARY DIFFERENTIAL EQUATIONS**

**Levi Hibbard, Department of Mathematics and Computer Science**

**Faculty Sponsor: Drs. Jemal Mohammed-Awel and Andreas Lazari,  
Department of Mathematics and Computer Science**

There are three main approaches to understand solutions of a system of Differential equations: (i) analytic solution, (ii) qualitative analysis, and (iii) numerical solution. When the system is nonlinear finding analytic solution can be very challenging, sometimes impossible. A qualitative analysis allows us to understand the global and local behavior of the family of solutions of the system, without actually finding particular solutions. Numerical methods can be used to approximate particular solutions if analytic solution is impossible. We will demonstrate these three approaches using examples: exponential, logistic, and Lotka-Volterra population models. Maple will be used to implement numerical algorithms for the numerical solutions and to discuss qualitative analysis.

## **HOW TUTORING HAS TAUGHT US TO (POTENTIALLY) BE GOOD PROFESSORS**

**Laura N. Hanna, Taylor G. Lanning, Joshua L. Preston, David A. Hall, Department of English**

**Faculty Sponsor: Dr. Chere Peguesse, Department of English**

As tutors, we have noticed some professor habits that help to make the tutoring experience easier, as well as a few habits that we wish professors would improve to help students understand material better. The intent of our presentation is to hopefully help professors across the curriculum to address the teaching of essay writing and the learning of grammar. We demonstrate specific professor techniques that we found to be helpful and what we think professors should improve. For example, many students have trouble understanding how to write a cogent thesis statement and how to support this thesis statement. We will also present some quick fixes to such problems. Another topic we address is how professors word their assignment sheets and the ability of students (and tutors) to interpret these directions. Finally, we will provide good and bad examples of professor commentary, feedback, and assignment sheets. Professors' comments will remain anonymous.

## **PURITAN CALVINISM AND NATIVE AMERICAN CULTURAL IDENTITY**

**Jenny Smith, Department of History**

**Faculty Sponsor: Dr. Dixie Haggard, Department of History**

This paper examines the effect of Puritan Calvinist missions among the Indians of Massachusetts and Connecticut during the seventeenth and eighteenth centuries. It specifically focuses on the incorporation of Puritan Christianity and Native American cultural identity. It argues that in contrast to other religious efforts to proselytize Indians that required renunciation of cultural identity, Puritan missions instead tried to fuse traditional Indian culture with Christianity. The paper explores factors that led to this association including Puritan incorporation of Native language, the rise of Christian family lineages, and the development of indigenous church leadership. It examines the retention of Indian cultural elements such as language, ceremonial dance, and powwow gatherings. Sources used to support this argument include excerpts from missionary accounts as well as Native American testimonies. The paper concludes that within seventeenth- and eighteenth-century New England Puritan Calvinism, Christian and Indian identities were not incompatible.

## **VIOLENT VIDEO GAMES AND THE EFFECT ON YOUTH VIOLENCE AND JUVENILE DELINQUENCY**

**Stephen A. Mitchell, Department of Sociology, Anthropology and Criminal Justice**

**Faculty Sponsor: Dr. Wilson Huang, Department of Sociology, Anthropology and Criminal Justice**

Violent video games have been targeted as a cause for the recent mass shootings. This paper reviews some of the recent studies that looked into the relationship between violent video games and youth violence and delinquency. While these studies show that there is some correlation between violent video games and juvenile delinquency, it appears to primarily affect those who are already at-risk of committing delinquent acts. For these youth, violent video games, especially the duration they are played, seems to be an aggravating factor that, along with their environment, may push the juvenile to commit delinquent acts. However, it is difficult to determine if video games are a large factor in these youth; since they are already in danger of committing violent acts.

## **ALGAL COMMUNITY STRUCTURE CHANGE WITHIN OYSTER REEFS ALONG THE COASTS OF FLORIDA, GEORGIA AND NORTH CAROLINA**

**Justin T. Wynn, Department of Biology**

**Faculty Sponsor: Dr. Matthew Waters, Department of Biology**

Oysters are an important food source and economic commodity in many coastal areas along the Atlantic coast. Oysters are filter feeders that frequently utilize algae as a major food source. As a result, the interaction of nutrients and algae within oyster reefs is essential in promoting oyster reef stability and health. Here, we investigate algal community structure on and beside oyster reefs along a spatial gradient spanning from Florida to North Carolina. Surface sediment samples were collected to determine the effects that nutrient release from the reef has on algal community structure. To determine algal community structure we measured photosynthetic pigments using an HPLC system. Photosynthetic pigments are chlorophylls and carotenoids used to run photosynthesis and can be used to determine algal community structure. Results from this study indicate that changes in community structure along the spatial gradient vary between the dominant groups of diatoms, chlorophytes and cyanobacteria.

## **ARE BIOLOGY MAJORS LEARNING ENOUGH ABOUT EVOLUTION?**

**Keyondra LaShawn Brooks, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Leslie S. Jones, Department of Biology**

After a course on biodiversity, I realized that I had never been taught about evolution even though the subject is clearly included in Georgia's K-12 curriculum. The controversy surrounding evolution in the United States and my own interest in biology lead me to examine why so many citizens fail to understand the scientific premise of this important theory. Since many factors influence acceptance of evolutionary theory, I wondered whether biology majors are learning enough to publically support the theory of evolution. After discovering that many universities do not require biology majors to take a complete course in evolution, my interest in psychology lead me to examine whether certain factors like elite status, geographic region, religious affiliation, and HBCU status correlate with the extent to which a college emphasizes evolution in its biology major's curriculum.

## **DEVELOPING A NEW METHOD FOR ANALYZING SPHEROIDAL CARBONACEOUS PARTICLES (SCPS) IN LAKE SEDIMENT**

**Kimberly Edwards and Shannon Clark, Department of Biology**

**Faculty Sponsor: Dr. Matthew Waters, Department of Biology**

Spheroidal carbonaceous particles (SCPs) are a rounded form of charcoal produced by the burning of coal and other fossil fuels during the production of power. As a result, SCPs serve as a historic indicator of industry in lake sediment records. Traditionally, SCPs were extracted from lake sediments using hydrofluoric acid, which is highly toxic and dangerous for students to use. Here, we attempt to develop a less dangerous method utilizing chemicals typically found in most labs. Briefly, 0.1g samples were chemically digested using nitric and hydrochloric acids, and resuspended in water. This solution was placed on coverslips, incubated over a 24 hour time period, and mounted onto slides using Naphrax. SCPs as well as other charcoal fragments and sponge spicules were counted and recorded. A variety of sediment samples were tested using this method including surface sediment samples and sediment core samples from Lake Seminole and Long Pond, GA.

**DISTRIBUTION AND DISPERSAL OF *SPHENOCLEA ZEYLANICA*  
(SPHENOCLEACEAE) IN NORTH AMERICA**

**Jordan C. Jones, Department of Biology**

**Faculty Sponsor: Dr. Richard Carter, Department of Biology**

*Sphenoclea zeylanica* (gooseweed) is an aquatic plant inhabiting margins of lakes and ponds, streambanks, and disturbed wetlands. Indigenous to the Eastern Hemisphere, it is a major pest of rice (*Oryza sativa*) and is now distributed widely in both Hemispheres in tropical, subtropical, and warm temperate regions. In preparing a taxonomic treatment of *S. zeylanica* for the *Flora of North America*, we have obtained data from more than 300 voucher specimens from more than 30 herbaria. Label data from these specimens indicate gooseweed has been in the United States since the mid-1800s. The earliest records of gooseweed in the United States are from Louisiana, where it was most likely introduced as a contaminant of rice seed. Its distribution is linked strongly with rice agriculture, and we document the distribution and dispersal of *Sphenoclea zeylanica* in the United States over the past 150 years, from Louisiana westward into southeastern Texas, northward through eastern Arkansas and into southeastern Missouri, and sporadically eastward into Florida, Georgia and the Carolinas.

**IGNORANCE ABOUT EVOLUTION COMPROMISES EDUCATION**

**Justyce Lanae Launa Lewis, Department of Middle, Secondary, Reading  
and Deaf Education**

**Faculty Sponsor: Dr. Leslie S. Jones, Department of Biology**

I attended high school in Georgia and was taught nothing about evolution. I wondered whether teachers had been adequately prepared to teach us evolution or were merely avoiding the Evolution/Creationism Controversy since opposition to evolution is usually voiced by people who do not grasp what biological evolution is. Nationally, less than one-third of all secondary school teachers cover evolution correctly, and others either speak about creationism/intelligent design or avoid teaching evolution. Therefore, I investigated pre-service biology teacher requirements and science standards across the nation. I was interested in whether a standalone evolution course was required by state colleges and universities. State requirements vary, but I conclude that biology teachers are not being educated enough to teach the subject at the level prescribed in their state science standards.

## **LINKING THE CURATIVE ACTIVITY OF FUNGICIDES WITH *CERCOSPORA ARACHIDICOLA* DEVELOPMENT ON LEAVES OF PEANUT**

**Robert Colby Johnson, Department of Biology**

**Faculty Sponsor: Dr. Emily G. Cantonwine, Department of Biology**

A detached leaf experiment was conducted to test the curative activity of four fungicides on early leaf spot caused by *Cercospora arachidicola* in peanut (*Arachis hypogaea*). Two trials were conducted with four replications each. Each fungicide was applied to leaves at 3, 5, 7, 9, 11, and 13 days after inoculation (dai) with *C. arachidicola* spores. Pathogen development was also studied to identify time of penetration. Infection frequency relative to untreated controls (RIF) and lesion size were compared by fungicide and spray date using ANOVA. Each systemic fungicide showed curative activity (RIF differences) at 3, 5, and 7 dai, while the protectant fungicide only showed curative activity at 3 dai ( $P < 0.05$ ). Lesion size was significantly reduced by the systemic fungicides on all spray dates, but was only reduced by the protectant fungicide at 3 dai for one trial. Pathogen penetration was significantly correlated to RIF for each fungicide ( $R^2 = 0.238-0.346$ ).

## **METHODS OF MAMMALIAN AND AVIAN SPECIMEN PREPARATION**

**Cameron C. Thomas, Department of Biology**

**Faculty Sponsor: Dr. Brad Bergstrom, Department of Biology**

This poster presentation examines the procedures and techniques used at Valdosta State University for preparing and preserving skins and skeletons of mammalian and avian species. Proper preparation of museum skins and skeletons is crucial in zoological study at any university because a well preserved collection can aid in the study of morphological and ecological changes over many generations of fauna in a geographic region, as well as aid in creating a historical map of the biodiversity within an area. These collections function as a tangible archive of zoological information and are beneficial to a wide variety of interests including, but not limited to, researchers, students, historians, artists, and conservationists.

## **OXYTOCIN RECEPTORS IN THE SUPRACHIASMATIC NUCLEUS**

**Marla Suzanne Darden, Department of Biology**

**Faculty Sponsor: Dr. Robert Gannon, Department of Biology**

Circadian rhythms are cycles that the body goes through in 24 hours such as sleep cycles and hormone production and usage. The suprachiasmatic nucleus located in the hypothalamus controls the circadian rhythms and keeps them on a 24-hour cycle. Disruption in these circadian rhythms can cause depression. While experiencing depression an individual can experience problems with social interaction, however, the hormone oxytocin can help those suffering from depression. The body uses oxytocin during lactation and childbirth, but oxytocin is also associated with social bonding and interaction allowing for the alleviation of depressive symptoms. The receptor for oxytocin was shown to have stained in the SCN after using an ABC immunohistochemistry staining technique. Small sections of hamster brain and a 1:500 dilution of anti-oxytocin receptor antibody were used to determine if the oxytocin receptors are in the SCN. Results of the staining confirmed that the SCN does have receptors for oxytocin.

## **RELATIONSHIP OF BIOFILM AND AMMONIA ON THE SETTLEMENT OF OYSTER LARVAE**

**Amber Blocker and Rebecca Tucker, Department of Biology**

**Faculty Sponsor: Timothy P. Henkel, Department of Biology**

Oysters are filter feeders that consume phytoplankton and improve the quality of water in their ecosystem. Previous work has shown that oyster larvae of *Crassostrea virginica* settle in response to ammonia, as well as oyster shell covered in biofilm. However, the question of whether these two inducers will increase settlement of the larvae when combined has yet to be answered. In the present project, pediveliger larvae will be exposed to wells containing clean shells in an ammonia bathwater solution, biofilm covered shells in a bathwater solution, and biofilm covered shells in an ammonia bathwater solution. Wells will be observed and settlement will be recorded twice over a two day period. If biofilms are a natural source of ammonia, we expect there to be equal levels of settlement on each individual treatment and a potentially synergistic effect of the two signals when combined.

## **THE DISTRIBUTION OF TOPMINNOWS (FUNDULIDAE) IN SOUTH AND SOUTHEAST GEORGIA**

**Ashley Lynn Barnes, Department of Biology**

**Faculty Sponsor: Dr. David Bechler, Department of Biology**

Two major species complexes in the family Fundulidae are found in South and Southeast Georgia. This study is examining the distribution of the members of each complex from the Aucilla River in the western portion of the study area to the east side of the Okefenokee Swamp. Initial work has focused in morphometric characters, with subsequent genetic analysis underway. The *Fundulus lineolatus* complex includes both eastern and western forms with only one population of the western form found in the study area. Members of the *F. chrysotus* complex includes *F. cingulatus* and *F. rubrifrons*, as well as the more abundant *F. chrysotus*. *Fundulus cingulatus* is found in the southeastern portion of the study area in the Alapaha River basin and the Okefenokee Swamp, and *F. rubrifrons* consists of a single population from the Alapaha River Basin in southern Lanier County. *Fundulus chrysotus*, while the most abundant species in the complex, is restricted primarily to the Withlacoochee River Basin.

## **THE EFFECTS OF OCEAN ACIDIFICATION AND COPPER EXPOSURE IN TWO SPECIES OF SCLERACTINIAN CORALS**

**Pratik Pravin Patel, Department of Biology**

**Faculty Sponsor: Dr. Gretchen Bielmyer, Department of Biology**

Ocean acidification and land-based sources of pollution have both been linked to widespread declines of coral cover in coastal reef ecosystems over the last three decades. Ocean acidification is a major problem globally, due to the rapidly changing oceanic carbonate system. At the current rate of change, atmospheric CO<sub>2</sub> levels are predicted to increase up to 1000 ppm by the end of this century. Coral reefs in near shore environments close to heavily populated areas are particularly threatened. Though much attention has been focused on ocean acidification and to some extent metal pollution, very little if any research has addressed the combined exposure of both pollutants to coral reef organisms. Corals, *Acropora cervicornis* and *Pocillopora damicornis* were exposed to two copper levels at two levels of CO<sub>2</sub> for 96 h. Copper accumulation in the coral and the zooxanthellae (dinoflagellate algae symbiont) were measured, as were algal density and photosynthetic activities.

## **THE INFLUENCE OF SALINITY ON COPPER ACCUMULATION AND EFFECTS IN THE SEA ANEMONE, *AIPTASIA PALLIDA***

**Pratik Pravin Patel, Department of Biology**

**Faculty Sponsor: Dr. Gretchen Bielmyer, Department of Biology**

Metal pollution is a common problem in many aquatic environments, particularly those surrounding densely populated areas with substantial anthropogenic inputs. These same areas are also exposed to continuous changes in salinity due to freshwater discharge. In excess, metals may cause deleterious effects in aquatic biota. Although metals are a noted concern, the effects of metals at different salinities on symbiotic cnidarians inhabiting near-shore environments, are only scarcely studied. The sea anemone, *Aiptasia pallida*, was used in a series of experiments designed to investigate copper accumulation and effects in *A. pallida* at two different salinities (20 and 25 ppt). *A. pallida* were exposed to a control and 3 three levels of copper concentrations for 21d. Copper accumulation and the activity of anti-oxidant enzymes were measured. Photosynthetic parameters in the symbiotic dinoflagellate algae were also quantified. *A. pallida* accumulated copper concentration-dependently over time and higher accumulation was observed in lower salinity saltwater.

## **THE INFLUENCE OF WATER HARDNESS ON ACCUMULATION AND EFFECTS OF CD IN THE GREEN ALGA, *PSEUDOKIRCHNERIELLA SUBCAPITATA***

**Garrett L. Carter and Jonathon Brock, Department of Biology**

**Faculty Sponsor: Dr. Gretchen Bielmyer, Department of Biology**

Pollution from anthropogenic sources can pose a serious threat to aquatic systems. Cadmium (Cd) is released into the environment from industrial processes, and in excess, can accumulate and cause adverse effects in aquatic organisms, particularly those in lower trophic levels, such as phytoplankton. Water chemistry parameters, such as hardness, has been shown to modify the toxicity of metals by competing with the metal for binding sites on the biological membrane. The objective of this study was to assess Cd accumulation and growth of the green alga, *Pseudokirchneriella subcapitata*, after exposure to CdCl<sub>2</sub> in waters of varying hardness (soft, moderately hard, hard, and very hard waters) for 7 days. At 0, 2, and 7 days, algal cell density was counted using a hemacytometer. At the end of the exposure, algal cells were digested and measured for Cd concentration using an atomic absorption spectrophotometer.

## **AEROSOL ASSISTED VAPOR SYNTHESIS OF VANADIUM NITRIDE**

**Travis D. Johnson, Department of Chemistry**

**Faculty Sponsor: Dr. Gary L. Wood, Department of Chemistry**

Vanadium nitride (VN) is a ceramic material with applications in catalysis and more recently has been suggested as a possible supercapacitor. Vanadium nitride previously has been synthesized using several methods that involve multiple time-intensive steps. Aerosol Assisted Vapor Synthesis (AAVS) is a one-step rapid method of VN synthesis. In AAVS, a reagent in the form of an aerosol is allowed to react with a hot gas in a tube furnace. This method results in a rapid conversion to product. Vanadium Nitride was synthesized from vapor composed of  $\text{NH}_4(\text{VO}_3)$  dissolved in 0.1M Acetic Acid which was allowed to react with ammonia gas at  $900^\circ\text{C}$ . The resulting brown-black solid was characterized with powder X-ray diffraction (XRD), Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (FT-IR). FT-IR and XRD data are consistent with the formation of Vanadium Nitride. Scanning Electron Microscopy revealed solid, spherical particles.

## **AQUEOUS PHASE STUDIES INVOLVING THE COPPER-PEG-MEDICINE INTERACTIONS**

**Haley A. Franklin, Rachel L. Robertson, Satilla B. Johns, Damazio A. Odusanya, Melody E. Sobhani, Iris Rivera, Lindsay N. McMullen, Dustin C. Jenkins, Thomas K. Leggett, Harsh M. Patel, Department of Chemistry**

**Faculty Sponsor: Thomas Manning, Department of Chemistry**

Polyethylene glycol (PEG) is a common polymer used in many areas of medicinal chemistry. Its uses range from a delivery agent of pharmaceutical agents to its role as a mild laxative. In this study, our group uses some common solution chemistry techniques such as conductivity and total dissolved solid measurements, laser diffraction, LC-MS and NMR to study the ability of PEG to bind a medicinal agent and territorial trap it when in the aqueous phase. The focus in this project is on the first and second line tuberculosis drugs ethambutol, isoniazid, pyrazinamide, rifampicin capreomycin and amikacin.

## **CALCIUM METAL AS A FUEL FOR DEEP OCEAN EXPLORATION: PROTOTYPE TESTING IN AN UNDERWATER CONTEST**

**Jordan A. Baker, Tess A. Baker, Cianna A. Baptiste, Loren A. Binns, Sasha L. Booth, Jonathan R. Brock, Julia D. Broome, Willis W. Brown, Brittany N. Butler, Aaron T. Calvin, Aaron C. Ford, Kelsey S. Johnson, Warren D. Lott, Katie C. Merritt, Rachel T. Mikula, Anastasia V. Nienow, Harsh M. Patel, Mitesh I. Patel, Mircaly Pierre, Sydney E. Plummer, Jesse B. Prince, Jeffrey M. Roland, Department of Chemistry**

**Faculty Sponsors: Dr Thomas Manning, Department of Chemistry, VSU and Dr. Greg Wylie, Department of Chemistry, UGA**

Calcium metal reacts with seawater to produce calcium hydroxide and hydrogen gas. The starting time and the reaction rate is controlled using a chemical fuse. A simple device is built that can sink to any depth in the ocean, stay there for a prescribed amount of time, collect microbial samples, than rise back to the surface using the hydrogen gas. Hydrogen gas is used as a robust flotation method to lift the collect device back to the surface. This presentation will describe a student contest that took place at an oceanographic institute in the Florida Keys. The goal of the contest is to optimize the chemical fuse so the device can stay on the bottom of the ocean for a predictable amount of time, than rise to the surface for collection.

## **COMPUTATIONAL STUDIES OF FIRST AND SECOND LINE TB DRUGS**

**Robert C. Bauer, Amanda S. Ehlin, David M. Jenkins, John W. Ledwitch, Courtney R. Morris, Department of Chemistry**

**Faculty Sponsor: Dr. Thomas Manning, Department of Chemistry**

Tuberculosis (Tb) is a bacterial infection that is found in over two billion people or approximately thirty percent of the planets population. Many of these cases are latent but close to three million people died last year of Tb. The front line drugs for treating tuberculosis are isoniazid, rifampin, ethambutol, and pyrazinamide. The bacterial species responsible for this disease has built up different levels of resistance referred to as multidrug-resistant tuberculosis (MDR-TB) extensively drug-resistant tuberculosis (XDR-TB). A second line of drugs is used for this treatment including aminoglycosides such as amikacin, polypeptides such as capreomycin, and fluoroquinolones such moxifloxacin. Work in this lab, coupled with cell line testing of our compounds at the National Institutes of Health, and has demonstrated that this resistance may be overcome when the antibiotics are delivered as part of a metal complex. This computational project focuses on modeling the first and second line drugs geometries with an without metal binding. Parameters ranging from dipole moments to Ramachandran plot (also known as a Ramachandran diagram or a  $[\phi, \psi]$  plot), will be calculated using a Linux based program. This data will help understand how cation binding allows an antibiotic to evade any resistance the organism has built up to it.

## **DESIGN, CONSTRUCTION AND DEPLOYMENT OF A UNDER WATER REMOTE OPERATED VEHICLE TO COLLECT MARINE SPECIES**

**Jordan A. Baker, Tess A. Baker, Cianna A. Baptiste, Loren A. Binns, Sasha L. Booth,  
Jonathan R. Brock, Julia D. Broome, Willis W. Brown, Brittany N. Butler, Aaron T.  
Calvin, Aaron C. Ford, Kelsey S. Johnson, Warren D. Lott, Katie C. Merritt, Rachel T.  
Mikula, Anastasia V. Nienow, Harsh M. Patel, Mitesh I. Patel, Mircaly Pierre, Sydney E.  
Plummer, Jesse B. Prince, Jeffrey M. Roland, Department of Chemistry**

**Faculty Sponsors: Dr. Thomas Manning, Department of Chemistry, VSU and Dr. Greg  
Wylie, Department of Chemistry, UGA**

Our group visited historic Pigeon Key, located in the Florida Keys, in mid-March. One of our projects was to contract, test and utilize underwater remote operated vehicles for sediment collection. The presentation will focus on the contraction of the motorized vehicles and their use in collecting sediment samples as well as marine organisms. Coordinating the collection with an underwater video camera, organisms that appear at night will be targeted. A number of collection mechanisms will be constructed, evaluated and tested.

## **HYDROGEN POWERED UNDERWATER VEHICLES: USING CALCIUM REACTIONS AS AN ALTERNATIVE FUEL SOURCE FOR DEEP SEA MINING**

**Shannon Clark and Kimberly Edwards, Department of Chemistry**

**Faculty Advisor: Dr. Thomas Manning, Department of Chemistry**

Large deposits of rare earth metals such as lanthanides, copper, and gold have been found on the Pacific Ocean floor. Because of the use of these metals in electronics such as cell phones and computers, this discovery has caused a renewed interest in the process of deep sea mining. Thus, using the concepts taught in an undergraduate physical chemistry course, a project was designed to create a cost effective underwater vehicle which can retrieve sediment samples from the bottom of the ocean. In order to reduce the ecological footprint of this device, the Valdosta Sediment Collector (VSC) would use the production of hydrogen gas from the reaction of calcium metal with seawater to rise back to the surface. Thus, using theoretical calculations (thermodynamics, equilibrium, electrochemistry) based on the reactions of calcium in seawater, a series of experiments were designed and conducted in order to construct an underwater sediment collector. With no pressure differential, no electronics and no moving parts, the system is economical and can work in the ocean depths (high pressure) with great reliability. In addition, the commercial potential of this vehicle was investigated as a means for filing a patent.

## **KINETICS OF EVAPORATION: TIME DURATION AND REACTION ORDERS**

**Cianna A. Baptiste, Lakesha N. Butler, Shannon Clark, Kimberly N. Edwards, Joseph A. Etheridge, Nicholas T. Fight, Ivan L. Furtado, Courtney L. Hall, Kokeisha M. Jackson, Dustin C. Jenkins, Seul Lee, Thomas K. Leggett, Warren D. Lott, Monica A. McGauley, Lindsay N. McMullen, Oscar A. Otieno, Mircaly Pierre, Department of Chemistry**

**Faculty Advisor: Dr. Thomas Manning, Department of Chemistry**

We performed two experiments involving the evaporation rate of methanol, an endothermic process. Both are focused on the kinetics of evaporation, first at different temperatures and second over different time scales. The first set of experiments takes place over an eighty minute window and the data is plotted for zero, first, second and third order. Each order gives good fits ( $r^2 > 0.99$ ). This raises the question concerning the order of the reaction. Typically these plots are used to differentiate order and provide information about the reaction mechanism ( $\text{MeOH(l)} \rightarrow \text{MeOH(g)}$ ). The reaction is then performed over a thirteen hour time scale, with a data point acquired every five minutes, and the same calculations performed. After the longer time frame the reaction order becomes apparent.

## **LEWIS ACID CATALYZED 2,3-REARRANGEMENTS OF O- ALLYLHYDROXYLAMINES**

**James C. Lord and Hilary F. Lee, Department of Chemistry**

**Faculty Sponsor: Dr. Jenny M. Baxter Vu, Department of Chemistry**

Although chiral carbinamines are common pharmacophores, a green, rapid, and economical construction of these small molecules remains a challenge to the synthetic chemist. This work focuses on the formation of tertiary carbinamine centers via a 2,3-rearrangement of hydroxylamine allyl ethers. After screening a variety of Lewis and Brønsted acids, we have developed a silver trifluoromethanesulfonate promoted 2,3-rearrangement of O-allylhydroxylamines. This Lewis acid catalyzed rearrangement offers several advantages over current technology: 1) it lends itself towards developing an asymmetric variant of this transformation via the use of a chiral Lewis acid or a metal salt with chiral ligand additives, 2) the exclusion of *n*-BuLi to promote the reaction will result in a broader substrate scope by allowing acidic or electrophilic functional groups to be present in the molecule, and 3) this rearrangement is an environmentally friendly alternative to the Overman rearrangement.

## **LIQUID CHROMATOGRAPHY-MASS SPECTROMETRY STUDIES OF COPPER AND IRON INTERACTIONS WITH BRYOSTATIN**

**Destiny I. Aighobahi, Tess A. Baker, Willis W. Brown, Gregory A. Jackson, Kokeisha M. Jackson, Warren D. Lott, Rachel T. Mikula, John W. Milam, Christopher P. Strickland, John Milam, Reginald D. Blake, Tyler L. Peterson, Department of Chemistry**

**Faculty Advisor: Dr. Thomas Manning, Department of Chemistry**

The marine natural product bryostatin-1 ( $C_{47}H_{68}O_{17}$ ) is extracted from the bryozoan *Bugula neritina* in very low yields. It has been shown to have strong anti-cancer activity, the first drug to reverse the onset of Alzheimer's disease and improved activity against HIV when compared to current drugs on the market. Our group postulated in past studies that bryostatin, which is produced by a symbiotic bacterium, is in fact a siderophore or an iron binder. Its central bryophan ring has a geometry that should allow it to bind various cations. In this study we perform a series of LC-MS measurements to help under the competitive nature of cation binding (i.e. Fe(III), Cu(II), Na(I)).

## **PHOTOCURRENT PRODUCTION OF IRON OXIDE FILMS MODIFIED WITH ENEDIOL LIGANDS**

**Raymond G. Fontanez, Department of Chemistry**

**Faculty Sponsor: Dr. Linda de la Garza, Department of Chemistry**

Iron (III) Oxide ( $Fe_2O_3$ ) nanocrystalline films are being pursued as materials in solar cell fabrication because of the high efficiency in energy conversion in the visible range of the electromagnetic spectrum and their potential for the splitting of water for hydrogen gas production. Iron (III) oxide films prepared from iron (III) oxide nanoparticles colloidal solution were annealed under oxygen at  $450^\circ C$  for 1 hr. The annealed  $Fe_2O_3$ -ITO slides photocurrents were measured in a three-electrode photoelectrochemical cell before and after modification with 3,4-dihydroxyphenylacetic acid (DC), and 3,4-dihydroxyphenethyl amine (DA) bearing different pendant chemical groups. Experiments were carried out in buffer electrolyte solution containing hydroquinone as the redox carrier at several pHs. Results on the effect of the pendant-chemical group, either  $-COOH$  or  $-NH_2$  in the efficiency of photocurrent production will be presented.

## PRODUCING AN EDUCATIONAL VIDEO ON THE WORLD HEALTH ORGANIZATIONS LIST OF ESSENTIAL MEDICINES

**Tess A. Baker, Willis W. Brown, Lakesha N. Butler, Zachary J. Chandler, Courtney B. Edwards, Allison F. Howard, David M. Jenkins, John W. Ledwitch, Hilary F. Lee, Tamiah S. Martin, John W. Milam, Chelsie D. Northcutt, Harsh M. Patel, Mitesh I. Patel, Paul A. Patterson, Caitlin B. Perryman, Michael J. Reaves, Rachel L. Robertson, Nathan B. Shiver, Levi J. Vedas, Department of Chemistry**

**Faculty Advisor: Dr. Thomas Manning, Department of Chemistry**

Students in a Medicinal Chemistry course (CHEM4920) produced an hour long video summarizing the medicinal agents listed on the World Health Organizations List of Essential Medicine. The highly technical video covers almost three hundred drugs, their structures and medicinal applications. The drugs on the list treat and range of ailments, from leprosy to malaria. The video serves as an educational tool for any individual that would like a summary of this critical list. In addition to the poster presentation featuring some of the more prominent drugs, the video, which is posted on the video provider *youtube*, will be shown.  
<https://www.youtube.com/watch?v=zn57BJsFrSY&feature=youtu.be>

## SEARCH FOR THE SOFT TISSUE SARCOMA DRUG ET743 IN A FLORIDA KEYS TIDAL FLAT

**Jordan A. Baker, Tess A. Baker, Cienna A. Baptiste, Loren A. Binns, Sasha L. Booth, Jonathan R. Brock, Julia D. Broome, Willis W. Brown, Brittany N. Butler, Aaron T. Calvin, Aaron C. Ford, Kelsey S. Johnson, Warren D. Lott, Katie C. Merritt, Rachel T. Mikula, Anastasia V. Nienow, Harsh M. Patel, Mitesh I. Patel, Mircaly Pierre, Sydney E. Plummer, Jesse B. Prince, Jeffrey M. Roland, Department of Chemistry**

**Faculty Sponsors: Dr. Thomas Manning, Department of Chemistry, VSU and Dr. Greg Wylie, Department of Chemistry, UGA**

ET743 (also known as Trabectedin, *ecteinascidin* 743 and Yondelis) is a relatively large, difficult to synthesize marine natural product ( $C_{39}H_{43}N_3O_{11}S$ , 761.84 g/mol). While its total synthesis has been published and is used occasionally, the molecule is still harvested in very low yields (i.e.  $10^{-8}$  mass percent) from the sea squirt *Ecteinascidia turbinata*. In past studies our group identified ET743 not only in the sea squirt but also at trace levels in a Florida Keys mangrove ecosystems sediment. For many marine natural products, it is widely believed that symbiotic microbes actually produce the medicinal agent. We have since developed a technique called bacterial amplification chambers (BAC's) or farming the ocean to produce drugs of this nature. In this project, tidal flats along the coast of Sugarloaf Key in the Florida Keys will be the site of the experiment to find the microbe in the sediment and have it produce ET743 outside of the sea squirt. The BAC concept, utilizing over one hundred chemicals as nutrients and chemical buffers, will be tested and the results reported.

## **STRUCTURAL AND MEDICINAL CHARACTERISTICS OF THE COPPER (II)-HYDROXYCHLOROQUINE COMPLEX**

**Thomas Leggett, Dustin Jenkins, Rebekah Grantham, Allison Fritzchze, Ivan Furtado,  
Department of Chemistry**

**Faculty Advisor: Dr. Thomas Manning, Department of Chemistry**

Various malaria drugs, such as chloroquin and hydroxychloroquin, have shown some efficacy against pancreatic cancer. Pancreatic cancer is an aggressive and often fatal disease for which there is little treatment. In the first phase of this study, the binding of hydroxychloroquine to the copper(II) cation is examined using liquid chromatography-mass spectrometry (LC-MS), Matrix Assisted laser Desorption Ionization-Time of Flight Mass Spectrometry (MALDI-TOF-MS), Fourier Transform-Ion Cyclotron Resonance spectrometry (FT-ICR) and Nuclear Magnetic Resonance ( $^1\text{H}$  and  $^{13}\text{C}$  NMR) in one and two dimensions. The data suggest the metal-ligand complex is a polarity adaptive molecule. In the second phase of the study, the complexes activity is tested against the National Cancer Institute's sixty cell line panel. Its anti-cancer activity is compared to quinine, Cu(II)-quinine and hydroxychloroquine. It serves as a base line for future anti-cancer complexes in which hydroxychloroquine is utilized for its ability to impact cell autophagy.

## **STUDY OF THE CATALYTIC PROPERTIES OF STRONTIUM SULFONATE $\text{Sr}[\text{C}_2\text{H}_4(\text{SO}_3)_2]$ (VALD-1)**

**Jordan A. Carroll and Frankie A. Stackhouse, Department of Chemistry**

**Faculty Sponsor: Dr. Tolulope O. Salami, Department of Chemistry**

In recent years research has focused on developing a new generation of catalyst for use in various chemical reactions. We have been synthesizing news solid state materials with potential application in the area of catalysis. Presently we are testing the catalytic property of some of our materials. The poster will highlight some of the organic reactions that are being studied with strontium sulfonate  $\text{Sr}[\text{C}_2\text{H}_4(\text{SO}_3)_2]$  (VALD- 1).

## **SYNTHESIS OF CHIRAL AMINES**

**Ranya Tomlinson, Brittany Butler, Caitlin Perryman, and Jordan Baker,  
Department of Chemistry**

**Faculty Advisor: Dr. John T. Barbas, Department of Chemistry**

Recently we have been investigating “greener” and more economical methods for the synthesis of chiral imines and chiral amines. We have discovered that we can synthesize these compounds in tandem, in one pot, at ambient temperatures, in quantitative yields. Furthermore, our syntheses take place in minutes, use little solvent or no solvent at all, and are complete in just a few minutes. Typically, 2 g of activated silica, are added to a flask containing an anhydrous ethereal solution of equimolar quantities ( $2 \times 10^{-3}$  mol) of an aldehyde and a primary chiral amine. The reaction commences immediately, and product formation is monitored by GC-MS. Formation of the imine is complete in just a few minutes. To this suspension, 0.15 g of sodium borohydride are added, and the suspension is stirred briefly. The flask is then cooled in an ice bath, and a few drops of water are added periodically to complete the reduction of the imine. In turn, the mixture is filtered to remove the silica, and the silica is washed several times with ether, and the extracts are combined with the original filtrate. The solution is dried over anhydrous sodium sulfate. The ether is removed under vacuum to yield pure chiral amines. The products are analyzed by IR, GC-MS, and proton and C-13 NMR, and polarimetry.

## **THE ADSORPTION OF METOLACHLOR IN SOIL**

**Aaron T. Calvin and Frederique Dunham, Department of Chemistry**

**Faculty Sponsor: Dr. Jim Baxter, Dr. Jesse Spencer, Dr. John Barbas, Dr. Donna Gosnell,  
Department of Chemistry, Dr. Thomas Potter, Southeast Watershed Research Laboratory,  
Department of Chemistry**

This research project examines the retention of metolachlor, a widely used herbicide, in six different soil samples. The soil samples were mixed with water solutions containing known concentrations of metolachlor using a hematology mixer. Analysis of the water solutions for metolachlor was done by extraction with hexane followed by quantitative analysis using gas chromatography-mass spectrometry (GC-MS). Initial results indicate different retention rates for the soil samples.

## **EXAMINING PARENT-CHILD INTERACTION WITHIN EVERYDAY ROUTINES**

**Elizabeth Melton and Chelsea Bartholomew,  
Department of Communication Sciences and Disorders**

**Faculty Sponsor: Dr. Jade Coston, Department of Communication Sciences and Disorders**

To better understand the relationships among parental language input, child development, and environmental influences, student researchers collected and analyzed 30-minute video samples of young children as they participated in daily routines with their parents. Analysis first involved identifying the types of routines families engaged in during the samples. Routines were coded as play, caregiver, pre-academic, or family routines. Then, for each routine, student researchers used the Parental INteraction Scale (PINS; Coston, 2012) to rate parent use of the following strategies: (a) *Setting the Stage* by means of physical position, arrangement of materials for participation, logical sequence, and emotional interaction style, (b) *Encouraging Communication* by use of turn-taking, contextualized language, and appropriate language complexity level, and (c) *Responding* to the child's actions and communication attempts. This presentation will help determine correlations between parent-child interaction and the routines in which they are involved and provide reliability evidence for the PINS measure.

## **AUTISM IN CHILDREN**

**Juliet Jones, Department of Early Childhood Special Education**

**Faculty sponsor: Dr. Lucia Lu, Department of Early Childhood Special Education**

My research interest is about the children who are suffering Autism. Autism is not a single disorder. Autism is a spectrum of closely related disorders. People who have autism share core symptoms. Every person on the autism spectrum has a problem with social skills, empathy, communication, and flexible behavior. There are many different types of autism including high-functioning autism, atypical autism, Asperger's syndrome, and Rett syndrome. Autism can be detected as early as eighteen months. Since it can make a huge impact on the child's development and early treatment can reduce some of the effects which cause disorder.

## **CHILD ABUSE**

**Jaicee Brewton, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research is about Child Abuse. I have been very concerned about the causes and prevention of child abuse. I have firsthand experience with child abuse in my family with my cousins due to parental divorce. The impact that divorce has on children can lead to child abuse and school failure in the future. My cousins are now 12 and 14 and have been through a miserable childhood that children should not have to go through at such a young age. There are many precautions that can be taken to prevent child abuse in the family and my goal is to research all aspects of this subject to better understand the reasons for child abuse and what can be done to stop child abuse in America and across the world. I have confidence that my research will influence the lives of many children and their families.

## **CRITICAL LITERACY BY INTEGRATING LITERATURE INTO MATH EDUCATION**

**Mitchell Donahoo and Leslie Kautzman, Middle and Secondary Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

There are thousands of children's literature books published each year, and those books could be used in math through teachers' designing and modeling. For example, we used *A Chair for My Mother* by Vera B. Williams. The story is about a girl who tried to earn money to buy a comfortable chair for her mother when she came home very late and tired every night. We devised many strategies in this book like addition, subtraction, multiplication and division when the little girl worked with her grandma to accumulate the coupons, the tips, and the small money she saved over the hours worked. The girl eventually saved enough money to purchase the beautiful and comfortable chair. Using children's literature motivates students' interest in math, and relating to children's real-world experiences that enables students to concrete methods in their minds. We will demonstrate our integrating children literature in math instruction from preK-6.

## **CUP SYSTEM FOR CHANGE**

**Angel Kelly, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Shaunita Strozier, Department of Early Childhood and Special Education**

This behavior change project focused on decreasing the amount of times a student was found off task during instruction. The off task behaviors included sharpening pencils and going outside of the classroom for unnecessary nose blowing. This particular Cup System intervention was used in 2012 for a student that seemingly got off task to escape doing difficult assignments. The independent variable is the Cup System and the dependent variable is the number of times the student is off task. To successfully implement this intervention, the teacher needed a point recording sheet, a cup, a non tangible reward, and time set aside for providing feedback. The teacher followed a strict and valid AB design to implement this intervention. The data collected from this design was used to decide the student's progress overtime and the intervention's overall effectiveness. This intervention seemed to be effective.

## **CYBER BULLYING AT A SCHOOL SETTING**

**Calen Lee, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research is on "Cyber Bullying" at a school setting. Cyber bullying is the side effect of technology. Over half of adolescents and teens have been bullied online repeatedly and about the same number have engaged in cyber bullying. Cyber bullying is bullying through email instant messaging, chat room exchanges, web site posts, digital messages or images sent to a cellular phone or personal digital device (PDA). Cyber Bullying, like traditional bullying involves an imbalance of power, aggression, and a negative action that is often repeated. Those who have been bullied display the following behaviors like depression, anxiety, suicide, lower self-esteem, changes in sleep and eating patterns, loss of interest in activities, use of alcohol and drugs, having more health problems, skipping school, etc. How to help the young people from the suffering of cyber bullying is an emergency issue in our society.

## **EXPLORING THE RELIGION OF HINDUISM**

**Tiffany Benefield, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

Hinduism is one the many popular religions in the world. It is the oldest religion and has 750 million followers. It is the third most popular religion in the world. Hinduism is often referred to as Santana Dharma, a Sanskrit phrase meaning “the eternal law.” Hinduism has been developed out of Brahmanism. Aum is the main symbol of Hinduism, and the name most suited for God. Hindu comes from the name of the river Indus. Hindus believe in a lot of things. They believe that there is a part of Brahman in everyone and this is called the Atman. They also believe in reincarnation and the existence of this cycle is governed by Karma. Hindus actually only believe in one God, Brahman. The three most important Hindu gods (forms of Brahman) is Brahma, Vishnu, and Shiva. The Hindu building for communal worship is called the Mandir (Hindu Temple).

## **FEMINISM IN SOUTH KOREA**

**Hye-Ji Kim, Middle Grade Education**

**Faculty Sponsor: Dr. Lucia Y. Lu, Department of Early Childhood and Special Education**

This research explores the history of women’s rights in South Korea. South Koreans basically enshrined the second-class status of women in the civil code. Over several decades, South Korea built one of the most patriarchal societies. If women failed to give birth to a male child, they were badly treated like domestic servants in her family. Although some women could be highly educated, it is extremely rare to get a higher position in politics, economics and education because of Confucianism. During the 70s and 80s, women were pushed into the workforce because of the governmental decision for industrialization. After that, women started participating in various fields where only men could take part. South Koreans still have a stereotype which women should not participate in politics. Consequently, there are a very small number of women who are involved except Ms. Park Geun-Hye, the former South Korean president’s daughter who has been elected president, and she might break the civil code to South Korea women in the near future.

## **HIGH SCHOOL DROP-OUT IN THE UNITED STATES**

**Jeremy Rowe, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

Since the beginning of this century, the high school drop-out rate in America is steadily on the rise. One-third of individuals who enter high school do not graduate; choosing to drop-out instead, and this nation was called “Dropout Nation” by Thornburg (2006) in the Time magazine. Are students not receiving the proper education prior to high school? Is the drop-out rate family related? Is the drop-out rate socially related? These are just some of the many questions I wish to explore in this research. While on this journey, I look forward to finding any possible solutions – if there are any – to this epidemic. If this issue is not diminished soon, it will be yet another adverse effect on America’s decline in economics, politics, family, society, and globalization, not only in education.

## **HOMELESSNESS: HOW DOES IT IMPACT THE EDUCATION OF CHILDREN?**

**Melanie Morris, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research is on homeless children from PreK - 5 grades in the United States. Based on 2010 census, there are nearly 1.5 million of children homeless in this nation. The survey shows that homeless children struggle immensely throughout childhood due to poverty, frequent relocation, broken family, child abuse, etc. There are countless ways that teachers can help including differentiating education, maintaining encouragement and positively preventing stereotypes in the school setting. Social workers in the community have to inform the homeless families that their children are entitled to compulsory education as well as advance education in college through academic support like HOPE and Pell scholarships. Homeless children are a minority group in the United States and around the world; however, their needs have been severely ignored. Educating these children by leading them on the right track of school success is critically significant in our society for globalization.

## KOREAN LANGUAGE INSTRUCTION

### Jieun Joeng, International Exchange Program

#### Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education

My research is about the effectiveness of the program which offer two years of Korean language instruction (4 semesters) that allow students to complete their World Languages requirement in Korean. For a description of the first- and second-year courses, you can find information [here](#). Third-Year Korean is also available for students interested in taking additional courses beyond the GE requirement.

Korean is spoken natively by around 80 million people living on the Korean peninsula and by large groups in the United States, Japan, China, and Russia as a heritage language. Because of its economic success and the spread of South Korean popular cultures, an ever-increasing number of non-Koreans worldwide are learning Korean as a foreign language.

#### Hangeul, The Korean Alphabet

The Korean Alphabet, Hangeul [한글], was created by King Sejong the Great in 1446, and the first Korean alphabet was proclaimed under the name Hunminjeongeum [훈민정음, 訓民正音], which literally meant "the correct sounds for the instruction of the people." When first proclaimed by King Sejong in 1446, Hangeul had 28 letters, of which only 24 are in use today. Four letters are not being used any more. The 24 letters still in use are as follows:

#### Consonants (14):

ㄱ (g, k), ㄴ (n), ㄷ (d, t), ㄹ (r, l), ㅁ (m), ㅂ (b, p), ㅅ (s),  
ㅇ (ng), ㅈ (j), ㅊ (ch), ㅋ (k), ㅌ (t), ㅍ (p), ㅎ (h)

#### Vowels (10):

ㅏ (a), ㅑ (ya), ㅓ (eo), ㅕ (yeo), ㅗ (o), ㅛ (yo), ㅜ (u), ㅠ (yu), ㅡ (eu), ㅣ (i)

Hangeul [한글], which consists of the 10 vowels and 14 consonants presented above, can be combined to form numerous syllables with initial, medial, and/or final phonemes, and to represent any sounds. It is simple yet systematic and comprehensive, and is considered one of the most scientific writing systems in the world by many linguists. Hangeul is easy to learn and type, is an important part of Korean cultural heritage, and has greatly contributed to Korea's high literacy rate.

According to the documentary film *Hangeul, the Birth of Great Letters* [한글, 위대한 문자의 탄생], produced for the Anniversary of Korean Writing Day, "For linguists, Korea is a fascinating country in two aspects. First, it was the first country to invent the printing press. In fact, the printing press was used in Korea 200 years before it was made in Gutenberg, Germany. Another aspect is Hangeul, the Korean writing system. With exceptional phonetic markings, it was created by the determination of a Korean King Sejong the Great, in the 15th century. This phenomenal system was methodically developed and represents one of the finest alphabets existing today."

## **MARRIAGE AND DIVORCE**

**Bianca Williams, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research interest is about the age of marital capacity among the young generation in this country. Based on Vivian E. Hamilton, marrying young is one of the common factors leading to divorce. She also stated that women ages 21 or younger who marry early develop mental and physical issues, their goals for achieving a higher education reduces. She also compared women who married young to those who have never been married at all when it comes to the welfare of the children when processing a divorce the children who belong with to the mother that has never been married are more stable. What I have gathered from the reading the article is that stability wise; it is better to marry later on ages 25+. When the young couple marry at a younger age it is harder to provide their family adequate support either financial or educational level.

## **POINT-OUT THE BEHAVIOR INTERVENTION**

**Jessica Edwards, Department of Early Childhood and Special Education**

**Faculty Sponsor: Dr. Shaunita Strozier, Department of Early Childhood and Special Education**

This behavior change project focused on decreasing a student's off-task behavior during whole-group presentations and independent seatwork. The off-task behavior was exhibited in various ways, including blurt outs, talking with peers, playing with various items such as pencils, paper, and jackets, gazing around the room, putting his head down on his desk, and so on. This off-task behavior served as the dependent variable for this study, and the *Point-Out the Behavior Intervention* was the independent variable. This intervention incorporated the use of a behavior contract, a point system, a self-monitoring technique, and a tangible reward. An AB design was used to display the data collected from this intervention. Event Recording was used to mark the number of times the student was observed off task during the forty-five minute period. A significant decrease in off-task behavior was seen as a result of the implementation of the *Point-Out the Behavior Intervention*.

## **THE BEAUTY OF CHINESE WRITTEN CHARACTERS**

**Xiao-Ying Jiang, International Exchanging Program**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research is about the beauty of Chinese written characters. Since last year when I came to VSU, I was unexpectedly assigned to teach one Chinese course. To motivate students' interest, I began my lesson by introducing the origins of Chinese written characters, the formation of Chinese written characters, the evolution of Chinese written characters, and the Chinese people's attitude towards Chinese written characters and Chinese calligraphy. Based on my students' responses, I become more interested in the new approaches using technology and the Internet for effective teaching and learning of Chinese language including writing and speaking, and Chinese cultures. The purpose is for globalization when China becomes more outstanding in the world, and more people are interested in knowing Chinese culture, like Chinese people, family, economics, politics, geography, education, tradition, dialects, arts, music, folk dance, etc.

## **THE SCIENTIFIC PRINCIPLES FOR LEARNING KOREAN LANGUAGE TOWARD GLOBALIZATION**

**Aekyong Jung, International Exchange Program**

**Faculty Sponsor: Dr. Lucia Lu, Department of Early Childhood and Special Education**

My research is using the scientific principles to teach Korean language. The world is globalizing, and English is prevalent as global language. However, as the scientific principles approach, Korean language becomes more accessible to the Korean language learning tribes who try to use Korean as the expressing vehicle and communication tools, for example, Korean culture including art, music, dance, drama, literatures, etc. When K-POP or Korean drama is getting popular not only in Asia, many people in the United States are interested in the meaning of the lyrics or actors/actresses lines in Korean drama. To help people from diverse cultures who are interested in learning Korean, I will share the scientific principles in the teaching and learning of Korean language, and how the people in Solomon Islands applied these approaches to learn Korean languages effectively.

## **AN AMERICAN SCHOLAR: A DIFFICULT PATH**

**Amanda Benz, Department of English**

**Faculty Sponsor: Dr. Sheri Gravett, Department of English**

With my research I am exploring the similarities and contrasting points between Ralph Waldo Emerson and Henry David Thoreau. Analysis of Emerson's "The American Scholar" and "Self Reliance" and Thoreau's Walden show that both men shared a concern for the division of labor taking place in the US in the mid 19th century, the condition of the scholar, and the detrimental effects of relying on consistency and memory over exploration of new ideas. In contrast to Emerson, however, Thoreau put in to practice what Emerson theorized about. Also, according to research, as Thoreau strove to implement these ideals he isolated himself from society in more ways than just physically while he lived on Walden pond. Thoreau would not follow any societal norms, and while this allowed him to always follow his own path it isolated him as opposed to Emerson who took the path of fitting in to society while thinking radically. Another difference between Thoreau and Emerson is that while Emerson accepted that there was no absolute best way to live and thus all men had to be willing to constantly change, Thoreau consistently changed in hopes of finding an absolute best way to exist. Thoreau shows readers with his presentation of his life in Walden that the path of an American while not an easy one is, at least for him one to strive to achieve.

## **THE IMPACT OF THE LGBT PRESS ON MAINSTREAM MEDIA**

**Jerry Daniel Young, Department of English**

**Faculty Sponsor: Dr. Patricia Miller, Department of English**

This newspaper poster presentation examines the impact of the Lesbian, Gay, Bisexual and Transgendered (LGBT) press on mainstream media. The news article will examine the history of the gay press from the early newspapers through the proliferation of current LGBT news outlets. Features articles include spotlights on three journalists involved in the reporting of LGBT news and how each have impacted the narrative within their respective communities. In addition, the newspaper addresses the influences of social and political movements toward attitudes on LGBT issues and how they have been often under reported. Current attitudes and the rhetoric regarding LGBT have changed significantly since the beginnings of the gay press.

## **ANDROID VS. WINDOWS PHONE**

**David DeMeritt and Jordan Carhuff, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Sudip Chakraborty, Department of Mathematics and Computer Science**

In the last 5 years we have observed tremendous growth in mobile communication systems, especially in smartphone technologies. This growth can be attributed to the advent of different operating systems for mobile devices (smartphones). Some of these are new (Android) and some of them are lighter versions of existing operating systems (Windows Phone, iOS). In this study we compare and contrast two of these operating systems – Android and Windows Phone. Our focus is on the core components of these two in the light of operating system contexts, rather than their interfaces and looks. We mainly investigated how these two OSs manage processes, memory, storage, and system security. We have observed that many of the differences in these two operating systems stem from the differences in their non-mobile counterparts, Linux 2.6 and Windows 7, respectively.

## **CHALLENGES, OPPORTUNITIES, AND COMPETITION IN ONLINE ENTERTAINMENT**

**Neil Thomas, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Chunlei Liu, Department of Mathematics and Computer Science**

Online entertainment, mainly video games, is a vast and rapidly growing industry. Due to its size and growth rate, multiple challenges and opportunities arise often. Competition between companies is another prevalent factor when it comes to online entertainment. This paper aims to pinpoint problems in the challenges and opportunities, as well as the competition amongst developers, and come up with possible solutions to these tribulations.

An observation of mine is, as of late, that companies are taking different routes for acquiring capital from their products. Micro-transactions (or micropayments) and real time auctions in-game for real world currency are two of the different routes utilized and this paper attempts to show and explain how these could potentially build customer bases and increase capital gain for companies.

## **DETERMINING THE VALUE OF A VOTE IN THE UNITED STATES UNDER THE ELECTORAL COLLEGE VOTING SYSTEM USING BINARY INTEGER PROGRAMMING**

**Joseph M. Cauley, Department of Mathematics and Computer Science**

**Faculty Sponsor: Jin Wang, Department of Mathematics and Computer Science**

The Electoral College system in the United States allows for a leader to be elected to the position of president without the support of the majority of the population by a large margin. In this paper we derive the minimum percentage of registered voters required to elect a president by creating a binary integer programming problem to represent the minimum number of registered voters to win the Electoral College. To find this minimum number, we make some reasonable assumptions to cut down on run time and then apply an algorithm that we created to exhaustively test every remaining possibility. To confirm this result, we also apply Balas Algorithm to the problem. We compare this minimum number of voters against the whole population to see the magnitude of the difference. We found that only 21.91% of the registered voters are required to win a majority vote in the current Electoral College system. This represents less than 10% of the total U.S. population.

## **HEGLE – HIGH ENGAGEMENT GRAPHICAL LEARNING ENVIRONMENT**

**Ilya K. Rogers, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Sudip Chakraborty, Department of Mathematics and Computer Science**

Active participation in classroom activities affects student learning positively. However, engaging students in class participation is one of the challenging aspects of teaching. Even a quiz session can become mundane to some of the students as interactions happen between the instructor and student(s). In this work we attempt to alleviate the above issue by developing a Java GUI-based tool to be used in quiz sessions where students will “compete” with other students in a “challenge-response” manner. Using the tool, an instructor can set up a quiz where a student group will pick up a topic and a question will be selected randomly from a pre-set question bank on the topic. The competing student group will answer the question and will throw another topic/question to the former group. This will enhance collaboration (teamwork) among students and will engage them in competitive learning which in turn promotes more active classroom participation.

## **IOS AND OS X -- THE BUILDING BLOCKS OF APPLE'S "ECOSYSTEM"**

**Ethan Rogers and William Adams, Department of Mathematics and Computer Science**

**Faculty Advisor: Dr. Sudip Chakraborty, Department of Mathematics and Computer Science**

Apple Inc. has become a leader in the desktop and mobile computing markets over the last decade. They have also made significant steps to blur the lines between these two (desktop & mobile) markets and create an "ecosystem" that serves users in developing safe and secure apps which can create a seamless integrated experience. In this study we discuss Apple's mobile operating system, iOS, and its desktop platform, OS X to compare similarities and integration aspects between the two platforms. Our main focus is on two main aspects of these two operating systems: Core Feature Integration and Application Security via Sandboxing and Gatekeeper. The goal of looking at these aspects is to illustrate Apple's push toward multiplatform applications and seamless cross platform transitions to create an environment that can serve all user's computing needs.

## **MODULAR LINEAR ALGEBRA AND BASIC CRYPTANALYSIS**

**Adam Dryden, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. José A. Vélez-Marulanda, Department of Mathematics and Computer Science**

In this poster presentation, we use properties of square matrices whose coefficients lie in a finite cyclic group and some results from elementary number theory to solve linear systems of congruences. We apply these methods to encrypt and decrypt messages using plain-text characters.

## **TRENDS AND APPLICATIONS IN SOCIAL NETWORKING**

**Randy French, Department of Mathematics and Computer Science**

**Faculty Sponsor: Dr. Chunlei Liu, Department of Mathematics and Computer Science**

Web 2.0 revolutionized the internet by providing sophisticated graphics and improved applications. This caused an increase in the amount of time primitive web users spent online compared to when the internet simply supported text based e-mail communication. This research explains how improvements in the tools that made communication more spontaneous and effective gave rise to the concept of social networking. Social networks allow users to appear personal in their online communication with other connections. Additionally, it draws focus to how the increased popularity of social networking has made web data mining a problem with regards to protecting personal private information of users. This research highlights failures of pioneering networks like Friendster and MySpace and how the present social networking giant; Facebook; capitalized on their missteps. Finally, the paper observes how the mobile social networking trend could be the future of social networking.

## **THE HEALTHCARE SYSTEM OF FRANCE**

**Stephanie Byington, Modern and Classical Languages**

**Faculty Sponsor: Dr. Ofélia Nikolova, Modern and Classical Languages**

Healthcare, and more importantly healthcare systems, is a global issue. Several countries, including the United States, are searching for new solutions for governing their healthcare systems. This study examined the organization of the healthcare system in France, a country famous for its social welfare system that includes five-week paid vacation, various family allocations, and an extended maternity, among others. Beginning with a brief historical survey, this study explored the ideological basis for the French healthcare system and the role that the government plays in it. A comparison between the American system and the French system was made with the use of statistics regarding the cost and the financing of healthcare along with the ideologies behind it for both countries. The findings of this study indicated that the current healthcare system for each country is aligned with the underlying beliefs of the respective society and its trust or mistrust in the regulatory role of the government.

## **SEARCHING THROUGH THE BRIAR PATCH: BRER RABBIT AND HIS NATIVE AMERICAN ROOTS**

**Garrett Hall, Native American Studies Program**

**Faculty Sponsor: Dr. Lavonna Lovern, Native American Studies Program**

Many Americans are familiar with Brer Rabbit, especially the story relating to the briar patch from the Walt Disney film *Song of the South* adapted from the book *Uncle Remus*. The stories told in *Uncle Remus* can be traced back to trickster mythologies passed down by Native American peoples indigenous to the southeastern United States as well as the indigenous peoples of western Africa. Through research, it is observable that an assimilation of Native American and African American knowledge stories blended throughout the southeast including the trickster stories. As people of European descent attempted to understand indigenous mythologies by translating them into western ideology, the true nature of Brer Rabbit's origin became lost. Brer Rabbit was transformed from significant culture hero into a beloved children's character.

## **THE GOVERNMENTAL MAKE-UP OF ANCIENT INCA CIVILIZATION**

**Scott Harrison Wren, Native American Studies Program**

**Faculty Sponsor: Dr. Fred Knowles, Jr., Native American Studies Program**

Societies have established governments and laws with systems of punishment. The Inca constructed a military style formation that established community leaders as "law enforcement officials". These community leaders were held to a higher standard and were punished more harshly for infractions than the common villager in order to ensure loyalty. The Incans used this form of colonization in the territories near Cuzco as a means of assimilation along with the requirement that all villages pay taxes, not monetarily, but in the form of labor and products. The use of non-monetary tax further ensured the participation and investment in the Inca government. This paper will focus on the general structure of the Incan government, the roles of the leaders, and the punishment of lawbreakers in order to better understand the Incan process of colonization and assimilation.

## **COMPETING REALITIES AND CONSTRUCTED TRUTH: SOPHISM IN PHILOSOPHY AND POLITICS**

**Danielle Roush, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Aristotelis Santas, Department of Philosophy and Religious Studies**

Despite the centuries-old criticism of its theories, sophism has retained a persistent presence in Western philosophy for thousands of years. This paper identifies the Pre-Socratic Sophistic tradition, citing Protagoras and Gorgias as two Sophist champions, and traces the ideas through postmodernism with a special emphasis on the work of Richard Rorty. Given the development and manifestation of sophistic thought through these philosophies, I will then apply the sophistic tradition to the modern areas of politics, citing specifically the example of George W. Bush's 2002 State of the Union speech. The logic and rhetoric of modern political speech will be discussed in the context of this tradition.

## **DEATH AND THE GEDE LWA IN HAITIAN VODOU**

**Brian Dodd, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Department of Philosophy and Religious Studies**

This presentation will examine Haitian Vodou concepts of death in relation to their African origins. The presentation will begin with an examination involving the traditions of death as expressed through the *Gede -Lwa*. The *Lwa* are spirits who are invoked in services during rituals, possessions, and healing practices. The *Gede* are spirits concerned primarily with death but are also invoked for healing and advice. This presentation will draw concepts from the works of Chita Tann, Kenaz Filan, Karen McCarthy Brown, and John S. Mbiti to advance the discussion. Chita Tann and Kenaz Filan are priests in Haitian Vodou who discuss Vodou beliefs and practices from an internal perspective. By tracing concepts from African indigenous traditions to the Haitian Vodou practices, one can gain a better understanding of the peoples' views.

## **PAUL TILLICH ON BEING AND THE ULTIMATE CONCERN**

**Brian Dodd, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Department of Philosophy and Religious Studies**

This paper examines Paul Tillich's concept of the ultimate concern through the examination of "being" as expressed in *Systematic Theology*. Tillich's work focuses on the intersection of free will and the authority of the Christian God. He argues that the two concepts can co-exist. Tillich is critical of other theologians who he claims limit God to a finite object by trying to define God in human language. Tillich argues that God is indefinable and uses this to argue that freewill can exist along with the authority of the Christian God. This paper will use works from Guy Hammond, Richard Grigg, William Rowe, and Frederick Sontag to flesh out the concepts and criticisms of Tillich's position.

## **SOME PROS AND CONS OF EXISTENTIALISM**

**Robert Eric Spivey, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Department of Philosophy and Religious Studies**

This project explores the existential concept of freewill as it stems from the proposition "existence precedes essence". To begin, the paper examines how the issue of subjectivity influences the concepts of good and bad faith as explained by Jean-Paul Sartre. Simone de Beauvoir's work *The Ethics of Ambiguity* is used to further address the issue of subjectivity. Beyond subjectivity, the paper explores Soren Kierkegaard's concept of angst and the role of decision making. Finally, these concepts are evaluated in terms of Fyodor Dostoyevsky's work *Notes from the Underground* in order to delve into the strengths and weaknesses of existential philosophy.

## **THE AKAN: FATE, CONCEPTION, DEATH AND BEYOND**

**Colin James Law, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Lavonna Lovern, Department of Philosophy and Religious Studies**

Religion is a deeply personal experience; at the same time, it is part of a collective consciousness that connects people. The Akan in west Africa, maintain a deep rooted religious tradition that has been passed along through oral memory. This paper will address the theories and ideas of various stages of life held by the Akan. This paper will focus on three basic concepts of Akan religious belief including the various stages of life, the names and elements of Gods as they portray them, and the understanding of fate in the Akan soul. In order to illustrate these three concepts, Akan proverbs concerning death and life after death will be explored in terms of their understanding of individuals, family inheritance, and treatment of elders and ancestors.

## **UNDERSTANDING BUDDHIST SOCIAL ACTION IN MYANMAR**

**Jason Cole Singletary, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Dr. Michael Stoltzfus, Department of Philosophy and Religious Studies**

The turbulent political history of Myanmar (Burma) involves both colonization and military dictatorship. Activists like Nobel Peace Prize winner Aung San Suu Kyi highlight the role of spiritual practice in confronting the continued suppression of any opposition to the ruling military junta. Both Buddhist monks and laypersons have led peaceful pro democracy movements, though they have often been met with violent opposition. The continued peaceful social action in Myanmar can be examined through tenets of Buddhist thought including nonduality, dukkha (suffering), and sunyata (emptiness). Through an examination of these concepts, the goals and methods of Buddhist social movements in Myanmar can be better understood, and hopes for communication between the military government, the citizens of Myanmar, and the outside world can be encouraged.

## **WOMEN IN BUDDHISM: A PATH TO ENLIGHTENED EQUALITY**

**Sydney Beckmann, Department of Philosophy and Religious Studies**

**Faculty Sponsor: Lily C. Vuong, Department of Philosophy and Religious Studies**

The Buddha is remembered for having both resisted the formation of the *bhikshuni sangha* (order of the women), but also for his teaching that nirvana was achievable for all regardless of gender. These conflicting views have contributed to the ambiguous status of women in Buddhism today. David S. Noss notes it was not until the Buddha's own aunt pleaded her case for the importance of a women's order that Buddhist women gained a status within the tradition. Unfortunately, this order of nuns eventually died out forever leaving the status of women in question. This project attempts to explore the different roles and treatment of monks and nuns as well as the general status of women in Buddhism. Additionally, I will suggest that the lack of female symbols in the Buddhist tradition contributed to the unequal treatment of monks/nuns and male/female laity.

## **ANALYSIS OF CHANGE TO THE VEGETATION OF THE OKEFENOCKEE SWAMP AFTER THE 2007 WILDFIRE**

**Justin A. Ham, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Paul C. Vincent, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

In 2007 the Okefenokee Swamp was devastated by wildfires all through that year. However the one that started in April lasted for several months and did the most damage. The purpose of this investigation is to examine the extent of damage from that fire. The study area includes: Honey Island, New Island, Billy's Island, and the swampland in between the islands. Satellite imagery taken before and after the fire was analyzed using geographic information systems software to examine the extent to which the study area that was burned as well as impacts on the vegetative layer. Findings showed that the trees on the islands suffered much more damage than trees in the swampland area and that New Island was not majorly burned.

## **COMPARISON OF $\delta^{18}\text{O}$ AND $\delta\text{D}$ OF SOUTH BEACH OCEAN WATER TO THE SOUTHWEST FLORIDA ESTUARIES**

**Jan Paul Acevedo, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Dr. Weimin Feng, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

Oceanic water samples have been collected in 4 ml glass vials from five sites along South Beach, Miami to test possible differences between open beach and estuary environments. The samples were taken during the months of May and June of 2012. The sampling area covers a distance of ~300 m of the coast line. Eight samples were analyzed for their oxygen ( $\delta^{18}\text{O}$ ) and hydrogen ( $\delta\text{D}$ ) isotopic compositions. With the exception of one sample, analysis results show a range for  $\delta^{18}\text{O}$  values of 0.9 to 1.4 ‰ and a range of 7 to 10 ‰ for  $\delta\text{D}$  values. The more positive than zero values indicate the evaporative effects of seawater, or the higher salinity than mean oceanic water in the Gulf environment. In comparison, published  $\delta^{18}\text{O}$  values of samples collected in May and June of 1998 from the SW Florida estuaries, with more fresh water input, show oxygen ranges of 1.7 to 2.2 ‰ (Blackwater River), 1.1 to 1.8 ‰ (Henderson Creek) and 1.8 to 2.4 ‰ (Faka-Union Canal). South Beach Miami water samples are similar to samples from Henderson Creek, but are generally more negative than estuary samples. This may be due to the more pronounced evaporative effect of the estuary environment, which tends to increase  $\delta^{18}\text{O}$  values of the water. One sample collected on June 21st has a  $\delta^{18}\text{O}$  value of 3.3 ‰ and a  $\delta\text{D}$  value of 14 ‰. This is significantly higher than all other analyzed samples, and seems to represent an influx of large body of water with more positive  $\delta^{18}\text{O}$  and  $\delta\text{D}$  values that displaced the near-beach water. The source of this influx of water is yet to be identified.

## **DEPLOYABLE SOLAR CONCENTRATORS FOR USE IN SPACE**

**Ethan Nino, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Francis Flaherty, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

This paper explores a design I have conceived for a deployable solar concentrator for use in satellites. In recent years, designs for inflatable structures have emerged which are a lightweight and compact alternative to current rigid body structures for use in outer space. This paper looks at the costs, practicality of solar concentrators, as well as how they compare to other power systems. Additionally, for space industry, deployable concentrators may be more economical than bulky radioisotope generators.

## **DETERMINING CORRECTION FACTORS TO THE ALFVÈN SPEED IN ASTROPHYSICAL PLASMAS**

**Brian Shanken, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Dereth J. Drake, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

Turbulent interactions between large electromagnetic waves in astrophysical plasmas are a common occurrence. One type of wave-wave interaction is between two counter propagating Alfvén waves. These waves are very difficult to study in space due to their wavelengths, ~100 km. Scientists are now able to replicate Alfvén waves in laboratory settings, like the Large Plasma Device at UCLA. For most waves, the electric field and magnetic field are related by  $\mathbf{E}/\mathbf{B} = c$ , where  $c$  is the speed of light. Inside of a plasma,  $c$  is replaced by the group velocities, which for an Alfvén wave, is given by the Alfvén speed:  $v_A = \frac{B_0}{\sqrt{\mu_0 \rho_0}}$ . Most theories assume that the perpendicular wave number,  $k_{\perp}$ , is very close to zero. However, this is not always the case. Thus, a correction factor must be included in the relationship between the  $\mathbf{E}$  and  $\mathbf{B}$ . Research is being conducted to collect data on waves with a non-zero  $k_{\perp}$ , which I will analyze to determine this correction factor.

## **DEVELOPMENT OF THE ETHANOL INDUSTRY IN THE 21<sup>ST</sup> CENTURY**

**Rodrica A. Davis Jr., Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Dr. Michael G. Noll, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

The overlying purpose of this report is to present relevant information on the technological improvements, government policies, and current economic status of the ethanol industry in the United States. Information will also be provided on the history of ethanol production and the future prospects of the ethanol industry. Corn is the most common feedstock of ethanol in the US. There are a number of potential benefits, caveats, and costs associated with corn as a feedstock for ethanol. One example is the competition between food and fuel production and its impact on global food security. Also to be examined are the effects of government policies such as the Renewable Fuel Standard and the availability of tax incentives. Included in this report are also the results of a survey which gathered feedback from teachers and professors in the agricultural field in regard to the viability and future of the US ethanol industry.

## **MEASUREMENTS AND ANALYSES OF BEAM DEFLECTION**

**Terry Collin Ho, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Dr. Barry Hojjatie, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

Experiments were performed to determine flexure behavior of various cantilever beams subjected to vertically applied loads at the end of the beams using a mechanical testing machine at the VSU engineering mechanics laboratory. The objective of the experiments was to compare the results from the experiments with those from theoretical analysis using the deflection formula given in mechanics of materials textbooks. Also, we determined the influence of beam geometric shapes and dimensions on the strength behavior of the engineering structure. Two types of geometric shapes corresponding to rectangular and circular cross sections were analyzed. The main material used in the experiments was aluminum, but for one of the circular cross sections bending tests were also performed using a brass material. Several different tests were performed to ensure accuracy and repeatability. Possible source of error in measurements came from the inability to get the force directly on the end of the beams, and also from the difficulty in clamping down the circular cross sections with clamps made for rectangular cross sections. Nevertheless, the experiments have proven to yield reasonable results.

## **MODELING IRREGULAR POROUS MATERIALS BY ULTRASOUND: APPLICATION TO LUNG-TISSUE, AND COMPLEX COMPOSITE MATERIALS**

**Jared C. Harris, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Hasson M. Tavossi, Department of Physics, Astronomy,  
Geosciences, and Engineering Studies**

Porous medium of random distribution of the pore sizes of irregular shapes is a good physical-model for the human lung tissue. Different binary mixtures of solid spheres and liquid filled pores are made to model lung tissue in the laboratory. The mechanical characteristics of the lung model, such as its modulus of elasticity, sound waves speed in the material, sound absorption spectrum, and wave attenuation by scattering and absorption as a function of frequency are investigated. The goal of this research is to obtain experimental data in both time and frequency domains to characterize the medium by numerical analyses of the findings. In order to determine a robust method for the health monitoring of lung tissue, as well as damaged zones in other irregular complex porous composite materials, to distinguish between healthy and damaged or altered zones in the tissue or material, and to locate these damaged or altered zones and their relative sizes.

## **ORIGIN OF PEGMATITES IN THE WESTERN BLUE RIDGE OF UNION AND PICKENS COUNTIES, GEORGIA**

**Richard Warren Thomas, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Dr. Mark Groszos, Department of Physics, Astronomy, Geosciences, and  
Engineering Studies**

Previous workers have described occurrences of pegmatite dikes in the Western Blue Ridge geologic terrane of Union and Pickens Counties, Georgia. The origin of these pegmatites is uncertain. Pegmatites are very coarse-grained igneous rocks that usually occur as tabular, cross-cutting intrusions called dikes. Some pegmatites show relatively simple mineralogy (quartz, mica, feldspar), while other pegmatites show more complex mineralogy (quartz, mica, feldspar,  $\pm$  beryl  $\pm$  Li-minerals,  $\pm$  Ta-minerals). The simple pegmatites are interpreted to form from in-situ metamorphic fluids derived from adjacent rocks. Complex pegmatites are thought to be derived from a true igneous magma. The pegmatites here may hold special significance because no other felsic igneous rocks occur in the Western Blue Ridge. The current study examined only those pegmatites that were described as containing a diverse mineral assemblage. One pegmatite was found to contain a mineral assemblage characteristic of complex pegmatites, the remaining pegmatites were all simple pegmatites.

## **PETROGRAPHIC ANALYSIS OF THE ALTAMAHA FORMATION OUTCROP OF TURNER COUNTY**

**Ethan W. Bundrick, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Mark S. Groszos, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

The Miocene Altamaha Formation is a well-indurated sandstone that crops out as prominent exposures in the Atlantic coastal plain of Georgia. Preliminary analysis indicates that it is composed primarily of bimodal angular quartz grains with an extensive clay matrix. Some samples show significant secondary staining from iron oxides. The mineralogy and texture of the Altamaha is not characteristic of other coastal plain rocks. Samples were collected from two locations along I-75 approximately 3 miles north of Ashburn, Georgia, in Turner County. The samples were then cut and shipped for thin sections processing. The thin sections are now undergoing further analysis using the petrographic microscope.

## **STREAM NETWORKS ABOVE AND BELOW CODY ESCARPMENT**

**Elizabeth Pierce, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Donald Thieme, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

The Cody Escarpment is an irregular topographic boundary where land that is mantled by clay and sand materials (Hawthorn Group) changes more or less abruptly to karst developed in underlying limestones. Below the Cody Escarpment the topography is characterized by sinkholes, cave entrances, dry valleys, and disappearing streams where surface waters pass directly in and out of the underlying Upper Floridan aquifer. We analyzed the spatial patterns for one stream network above the Cody Escarpment (>100 ft amsl) and one network below the Cody Escarpment (<100 ft amsl). Both are tributaries in the Suwannee River system. Although the results are complicated by the movement of water in and out of the aquifer, the drainage network below the Cody Escarpment does have significantly shorter stream segments and greater drainage density overall.

## **STRUCTURAL ANALYSIS OF BEDROCK FRACTURES ALONG THE SUWANNEE RIVER, SUWANNEE COUNTY, FLORIDA**

**Joshua R. Funte, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsors: Dr. Mark S. Groszos and Dr. Can Denizman, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

The Suwannee River in north Florida has locally developed a moderately entrenched channel that cuts steep cliffs into well-indurated carbonate rocks along its banks. These rock exposures show numerous fractures (joints) of varying attitude. This study examines these joints in an effort to determine their origin as well as how their orientation compares to other regional lineaments such as stream channels and cave passageways. The study area is approximately 9 miles north of Live Oak, Florida, on the Suwannee River. Canoe traverses on the Suwannee River were made to access the exposures. The strike and dip of all prominent fractures were taken and recorded. These structural data will be plotted on standard stereographic projections and analyzed to determine major fracture trends. The fracture trends from this study will be compared to area/regional trends from other studies to determine if there are any similarities between the different types of linear trends.

## **THE URBAN HEAT ISLAND EFFECT IN ATLANTA, GEORGIA**

**Chris Ryan, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Jason Allard, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

Research has shown that urban areas are generally warmer than surrounding rural areas, with urban areas being up to 22° F warmer than rural areas. These warmer temperatures result from lower surface albedos, buildings, and lower rates of evaporation due to increased runoff and reduced vegetation. In the current study, monthly and daily snowfall data were obtained for 40 cooperative weather stations within 100 miles of Atlanta over the period 1995-2005 from the National Climatic Data Center. The frequency of snowfall events for Atlanta was compared to snowfall events at rural stations to determine if an urban heat island effect in Atlanta would reduce its number of snowfall events. Results indicate that snowfall events occur more often at rural locations. Other factors, such as elevation and latitude, do not explain the patterns of snowfall, suggesting that an urban-warming effect is responsible for the reduced amounts of snowfall in Atlanta.

## **WATER CHEMISTRY ANALYSIS OF SURFACE – GROUNDWATER INTERACTIONS OF THE WITHLACOOCHEE SINK AREA**

**Eric Emmett, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

**Faculty Sponsor: Dr. Can Denizman, Department of Physics, Astronomy, Geosciences, and Engineering Studies**

In the area of the Withlacoochee River just north of Valdosta, Georgia, there is a series of sinkholes where it is believed that water from the surface is interacting with and exchanging properties with the local groundwater. By examining changes in pH, electrical conductivity, temperature, and oxidation reduction potential we hope to show how the surface water is being changed during its underground travel by measuring these values both before it submerges and when it emerges again downstream. Sampling was done two to three times a week for approximately two, two month periods, one in the summer months and the other in the winter. Rainfall amounts were also taken into consideration for sudden changes in recorded levels.

## **WATER QUALITY AT THREE BLACKWATER STREAM SITES, SOUTH GEORGIA,**

**Charles R. Nimmo, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

**Faculty Sponsor: Dr. D. M. Thieme, Department of Physics, Astronomy, Geosciences,  
and Engineering Studies**

Water quality conditions are reported for three blackwater streams in the central region of South Georgia based upon measurements from September to December, 2012. Data collected on a weekly basis included air and water temperatures, pH levels, dissolved oxygen, and electrical conductivity. The Winkler method using sodium thiosulfate titration was used for dissolved oxygen, and all of the measurements followed the procedures of the Georgia “Adopt-a-Stream” program. The three locations were on the Withlacoochee River, Okapilco Creek, and Piscola Creek, all of which are in Brooks County. While the Withlacoochee River can be considered “unimpaired” at this location, the two creeks are examples of “impaired” streams mostly as a result of agricultural runoff. Results show consistently lower dissolved oxygen, pH, and electrical conductivity for the impaired locations in spite of fluctuations with rainfall and temperature during period of study.

## **HOW ACCURATE WERE THE POLLS IN THE 2012 PRESIDENTIAL ELECTION?**

**Margaret Maynard, Department of Political Science**

**Faculty Sponsor: Dr. James T. LaPlant, Department of Political Science**

This paper examines the factors influencing the accuracy of public opinion polling across the 50 states in the 2012 presidential election between Barack Obama and Mitt Romney. The dependent variable is the difference between the election results and the final public opinion polls conducted before the November election. The analysis explores independent variables such as percent minorities, swing state vs. non-swing states, per capita income, poverty levels, and region. The units of analysis were the 50 states. Overall, the analysis showed that the polling prior to the election was more accurate for Mitt Romney rather than Barack Obama. Percent Latino, per capita income, the amount of people below the poverty level, and region were all statistically significant with a probability of less than .01. The polling for Romney was significantly more accurate in swing states than non-swing states but no statistically significant difference emerged for Obama.

## **PARTY LOYALTY IN THE 111TH U.S. SENATE**

**Kenneth Donte Holiday, Department of Political Science**

**Faculty Sponsor: Dr. James LaPlant, Department of Political Science**

This paper examines party loyalty in the 111<sup>th</sup> United States Senate. The United States Senate is as an important part of the American political process seeing that it is the upper house in the legislative branch of the United States government. This paper examines the party loyalty scores of the members of the 111<sup>th</sup> Senate. The independent variables examined in this study are the party, age, region, gender, years severed, race and leadership status of the Senators. The statistics show that the party members are overwhelmingly loyal to their party no matter what independent variable was introduced to the study. Party, race and the region of the Senator were statistical significant factors in this study.

## **THE 2012 CHARTER SCHOOLS CONSTITUTIONAL AMENDMENT IN GEORGIA: A COUNTY LEVEL ANALYSIS OF THE ELECTION RESULTS**

**Christopher John May, Department of Political Science**

**Faculty Sponsor: Dr. James T. LaPlant, Department of Political Science**

This study examines the demographic, socio-economic, and political factors which predict a “yes” vote for the 2012 Georgia Charter School Amendment or Amendment One. Amendment One would allow the Georgia State Constitution to be amended whereas a state appointed commission could approve the opening of charter schools over the objection of local school boards. The Republican backed legislative initiative was introduced as a means by which student achievement could be improved. The language of the amendment and school choice were among the contentious issues which pervaded this hotly contested item of legislation. A multivariate regression analysis reveals that the Romney vote, percentage African American, and high school graduation rate are negatively associated with the “yes” vote, while per capita income is positively associated with the vote. The results indicate that a broad voting coalition beyond Republican support was the key to approval of Amendment One.

## **THE FALLEN GENERAL**

**Miguel Cortes, Department of Political Science**

**Faculty Sponsor: Dr. Steven Nawara, Department of Political Science**

This paper analyzes the development and fallout surrounding the David Petraeus sex scandal. In order to accurately analyze the scandal I collected and discussed the three phases of the scandal as it progressed from the act itself, the revelation, and the fallout. Through the careful analysis of each stage of the scandal one is better able to understand how unimportant matters to the average citizen can escalate to the scandals our politicians endure. Analyzing the scandal at each stage of the event also allows for the actions at each stage of the scandal to be better understood, especially in the David Petraeus scandal which at times possessed a plot more convoluted than a James Bond movie.

## **THE GREEN MACHINE: VOTING BEHAVIOR ON THE RECREATIONAL USE OF MARIJUANA**

**Taton Thompson, Department of Political Science**

**Faculty Sponsor: Dr. James LaPlant, Department of Political Science**

This paper examines the factors influencing voting behavior in the states of Colorado, Washington, and Oregon where recreational marijuana was included on the 2012 ballot. For the purpose of this research paper, the dependent variable is the percentage “yes” vote on the recreational use of marijuana. The analysis includes seven independent variables: the percent Romney vote, per capita income, the percent white, percent Hispanic, population per square mile, percent population over 65, and percent with a bachelor’s degree. The units of analysis were the 139 counties in the three states (CO, WA, and OR). The data shows that race contained little correlation with the yes vote, whereas the Romney vote, per capita income, population density, age, and education played a crucial role in determining voting behavior, all with statistically significant correlations.

## **THE UNITED ARAB EMIRATES: THE CONSTITUTION, RIGHTS, AND FREEDOMS**

**Shelby Caroline Simmons, Department of Sociology, Anthropology, and Criminal Justice**

**Faculty sponsor: Dr. Marc G. Pufong, Department of Political Science**

This report examines the freedoms of the people of the United Arab Emirates since the Constitution of that country was established in 1971. The specific focus here is on how the government of the United Arab Emirates complies with its Constitutional obligation. From the Constitution and four human rights reports utilized, this essay shows how the central government does not always ensure the rights of the people and Emirates (the individual states that constitutes the Emirate) as it claims to do. I also show how the power of the executive diminishes the rights of the people, the state and other branches of government. The report concludes that the judiciary is not independent as the Constitution provides, and that the executive overexerts their power by ignoring this governing document. **It is hoped** by exposing the corrupt executive, the government will stop the gross human rights violations visited on its people.

## **EFFECTS OF HAIR LENGTH AND PARTICIPANT GENDER ON RATINGS OF BEAUTY AND FEMININITY**

**Kristen Dawn Hilton, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Jeremy Tost, Department of Psychology and Counseling**

This study examined the effects of hair length and participant gender on participants' ratings of beauty and femininity. Participants, 22 males and 21 females, viewed ten photos of women with either short hair (chin length or above) or long hair (below the shoulders). Participants then rated the subjects of the photos on a ten point scale for beauty and a ten point scale for femininity. Contrary to prediction, participants who viewed photos of women with short hair gave similar ratings on both beauty and femininity to those who viewed photos of women with long hair. As predicted, female participants gave higher ratings on both beauty and femininity as compared to male participants.

## **EFFECTS OF LOCUS OF CONTROL AND DREAM RECALL TRAINING ON DREAMING**

**Crystal Dawn Logan, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Jeremy Tost, Department of Psychology and Counseling**

This study investigated the relationship between Locus of Control and the ability to lucid dream. A Dream Recall Training program, modeled after a previously successful Reflection-Intention Technique, was also utilized to increase nonlucid and lucid dream recall (Paulsson & Parker, 2006). Participants ( $N = 15$ ) were haphazardly selected and were given a demographics survey including questions regarding prior dream recall and the Locus of Control Scale. Dream Recall Training was provided to the randomly assigned experimental group only, and Dream Diaries were provided to all participants to record number of recalled dreams for five consecutive days. While increases in lucid dreaming were found, none were statistically significant for either Locus or Dream Recall Training on lucid dream recall. Decreases in nonlucid dreaming were noted with participants showing an Internal LOC who received Dream Recall Training, possibly because their dreams were becoming more lucid. Again, this result was not significant.

## **THE EFFECT OF AROMATHERAPY ON ALERTNESS**

**Nancy Rachel Albritton, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Julie Troyer, Department of Psychology and Counseling**

A 2 X 3 Within Subjects ANOVA was conducted to investigate the connection between congruence (congruent and non-congruent) of cognitive task and aromatherapy, (none, peppermint and eucalyptus essential oils) on alertness, measured as reaction time (in seconds). The ANOVA indicated a significant difference for the congruence factor as well as the aromatherapy factor, with no significant difference seen between the two levels of aromatherapy administered. Due to a small sample size no significant interactions were observed. A replication of the study is planned in which a larger sample size will be utilized.

## **THE EFFECTS OF CAFFEINE AND MUSIC GENRE ON SCHOLASTIC ABILITY**

**Lisa Michelle Wiltsee, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Jeremy Tost, Department of Psychology and Counseling**

This paper explores the effect of caffeine consumption and music genre on scholastic ability, in the context of a general knowledge test. College students (N = 40) were randomly assigned to either caffeine or no caffeine condition; both conditions received both levels of music genre. Participants in both the caffeine and non-caffeine conditions took a scholastic test whilst listening to music of the folk genre, then a similar test whilst listening to music of the hard core genre. The results indicate that participants with caffeine scored more correct answers than those without, participants in the hardcore music condition responded faster than those in the folk music condition. There was a significant interaction between music genre and caffeine on response time such that those in the caffeine group under the hardcore music genre condition responded significantly quicker than those in the other conditions.

## **THE ROLE OF AGE OF VICTIM ON ATTRIBUTION OF FAULT IN RELATION TO SCHADENFREUDE**

**Benjamin Richard Fawcett, Department of Psychology and Counseling**

**Faculty Sponsor: Dr. Whatley, Department of Psychology and Counseling**

This study examined the effect of age of victim and mood priming on Schadenfreude (defined as taking pleasure in the misfortune of others). Participants, 43 males and 41 females, were shown a video of either a young or old victim of misfortune with the second independent variable being whether participants received a mood enhancing prime before exposure to the video of misfortune. After reviewing the video of misfortune, participants were asked to report the extent to which the victim was to blame for the misfortune as well as perceived funniness. Contrary to prediction there was no difference in perceived funniness of the video comparing those who watched the young vs. old victim of misfortune. As predicted more fault was attributed to the old victim than the young victim. Current findings suggest that the age of victim has little to no effect on the sentiment of Schadenfreude.

## **A SOCIOLOGICAL PERSPECTIVE ON TEENAGE DRUG USE**

**Samantha Wheeler, Department of Sociology, Anthropology, and Criminal Justice**

**Faculty Sponsor: Dr. Michael Meacham, Department of Sociology, Anthropology, and Criminal Justice**

The consistent increase of teenage drug use is currently one of America's most challenging social problems. This paper links symbolic interactionism theory, cross-cultural differences and personal observations in order to get to the roots of teenage drug use. Based on these three components, the paper discusses causes as well as solutions for teenage drug use. Among other findings, the paper explores a correlation between the increase of teenage drug use and the decay of social control in American culture. Relating to this discovery, the paper asks if an increase of social control should be considered as an option to counteract the increase of teenage drug use.

## **RATE OF DECOMPOSITION IN PIG CARRION**

**Carrie D. McKenzie, Department of Sociology, Anthropology, and Criminal Justice**

**Faculty Sponsor: Dr. Joyce Chan, Department of Sociology, Anthropology, and Criminal Justice**

This poster examines the rate of decomposition achieved by the placement of three adult pigs in varying levels of environmental exposure. The research was conducted over a period of two consecutive three month semesters to allow carrion exposure to differing climactic circumstances. Exposure was controlled by placing each pig in a different environmental condition: one pig was completely covered and unexposed after tightly wrapping it in a tarp and securing it with string, the second pig was partially exposed by placing it in an area that was somewhat covered with low growing brush, while the third pig was laid out in a clearing and completely exposed. The research was conducted to observe the rate of decomposition in the presence of scavengers, insects, and weather. The results establish that the pigs decayed at a slower rate in the colder weather while the exposed pig decomposed fastest in both climates.

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