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Volume-Translated Peng-Robinson Equation of State for Coalbed Gas/Water Mixtures

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Subject Area: Physical Sciences & Technology

Simulations of enhanced coalbed methane (CBM) recovery and CO₂ sequestration operations require reliable phase equilibrium models capable of describing accurately the vapor-liquid equilibrium (VLE) behavior and phase densities of coalbed gases (methane, nitrogen and CO₂) with water. A successful equation of state model should be applicable over the range of conditions encountered in coalbed reservoirs, where the coalbed gases are near-critical or supercritical. Our recent studies have indicated that the Peng-Robinson equation of state (PR EOS) could be tuned to provide good representation of phase behavior of these systems.

In this work, the PR EOS was modified with a volume translation and scaling-law correction to predict the vapor pressures and the phase densities of the individual CBM components. The modified PR (MPR) led to improved vapor pressure and saturated liquid density predictions (less than 1% average absolute percentage deviations) for CBM gases. Further, the MPR EOS was extended to mixtures for the prediction of phase densities with mixtures of methane, nitrogen and CO₂ with water. The MPR was found capable of describing the phase densities of CBM mixtures within 2% AAD, on average.

The influence of off-the-shelf shoe orthotics on stationary vertical stiffness and muscle activities in jumping and landing activities

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Current evidence in regards to the use of off-the-shelf orthotics is not conclusive. It is also reported that off-the-shelf orthotics reduce joint stiffness and promote proper biomechanical support, thereby reducing the risk of injury. The purpose of the study was to examine the immediate effect of off-the-shelf shoe orthotics on vertical muscle stiffness and muscle activities in subjects with pes planus. We used a cross-over group comparison design. Nineteen college-aged individuals with no acute injuries to the lower extremity in the last 6 months but diagnosed with a positive navicular drop test on both feet participated. We examined 2 treatments; 1) NIKE shoes with standard shoe insoles and 2) NIKE shoes with SUPERfeet shoe orthotics while performing vertical jump trials on the same day. Variables analyzed included vertical leg stiffness, and surface electromyography of 8 separate muscles of the subjects' right lower extremity during the first 50 ms after initial contact in landing. The study did not significantly influence the vertical stiffness (P>.05) and muscle activities (P>.05) compared to the control group. According to our findings, the off-the-shelf orthotics used does not alter muscle function or leg stiffness acutely in a manner necessary to reduce the risk of injury.

Energy Dissipation in Six-Foot Drop Broken-Back Culvert under open Channel Conditions

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Subject Area: Physical Sciences & Technology

This research investigates the reduction in scour downstream of a broken-back culvert by forming a hydraulic jump inside the culvert. A broken-back culvert is used in areas of high relief and steep topography.
as it has one or more breaks in profile slope. A broken-back culvert in the laboratory model has steep slope section of 50 percent and a mild slope section of 1 percent to continue 138 feet to the downstream outlet. The prototypes for these experiments were a two barrel 10-foot by 20-foot reinforced concrete. The drop between inlet and outlet is selected as 6 feet. The Froude number classifies the jump as a weak jump. The jump in experiments began nearly at the toe by placing sills in the flat part. The impact of friction blocks was found to be minimal. For new culvert construction, the best option to maximize energy dissipation under open channel flow conditions is to use one sill located 69 feet from the outlet. The maximum length of the culvert can be reduced by 42 feet to 56 feet. Such a scenario is important where right-of-way problems exist for culvert construction.

Measuring the Erodibility of Cohesive Soils Influenced by Seepage Forces Using a Laboratory Jet Erosion Test Device

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Subject Area: Physical Sciences & Technology

Seepage influences the erodibility of streambanks, streambeds, dams, and embankments. However, the interaction between fluvial and seepage mechanisms in cohesive soils is still poorly understood. Usually the erosion rate of cohesive soils due to fluvial forces is computed using an excess shear stress equation, dependent on two major soil parameters: the critical shear stress and the erodibility coefficient. A submerged jet test apparatus (JET – Jet Erosion Test) is one method for measuring these parameters. In this study, a new miniature version of the jet test device (“mini” JET) and a seepage column were utilized to measure the erodibility of cohesive soils influenced by seepage. The experimental setup was intended to mimic a streambed and a streambank when the devices were placed in vertical and horizontal directions, respectively. Two different soil types, sandy clay loam and sandy loam, were packed in three equal lifts in a standard mold at a uniform bulk density (1.4 to 1.7 Mg/m³) near the soils’ optimum water contents. Soil samples were tested without seepage using only the “mini” JET and with seepage forces by including a constant-head in the seepage column. Results show that the erodibility of cohesive soils increased exponentially when seepage forces increased.

Pac1p/Lis1 interact with SUMO and STUbLs


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Microtubules are proteineceus polymers within the cell that make key contributions to cell motility and cell division. Microtubules are highly dynamic, continuously growing and shrinking. Because microtubules are fundamental for cell division, it is important to understand the molecular mechanisms that regulate them. Pac1p, the Lis1 homologue in yeast, is a microtubule plus-end-tracking protein. Mutations in the Lis1 gene have been correlated with Miller-Dieker lissencephaly syndrome due to defects in neuronal migration. Sumoylation is a post-translational modification that covalently attaches a Small Ubiquitin-like Modifier (SUMO) protein to the target substrate. Sumoylation regulates many cellular processes such as cellular transport, protein stability, and cell cycle progression. Recently a few microtubule associated proteins including Kar9p have been shown to be conjugated to SUMO. Using a two-hybrid assay, Pac1p interacts with SMT3, the SUMO homologue in yeast, and other key players of the sumoylation pathway. In contrast to ubiquitination, sumoylation is not a modification that tags the target substrate for direct degradation. However, SUMO-targeted ubiquitin ligases (STUbLs) can recognize a sumoylated substrate and promote its degradation via ubiquitination. Using a two-hybrid assay, we show that Pac1p interacts with the STUbL enzyme Nis1p/Ris1p suggesting a novel model in which Pac1p is regulated via STUbLs.
Circadian Rhythms and Resistance to Persuasion

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Subject Area: Social Sciences

"When people have to complete tasks during a time of day when they have not reached their functional peak, their ability to perform effortful tasks become impaired. These fluctuations of performance throughout the day are based on a person's circadian rhythm, which cycles every 24 hours. Research shows that individuals do vary in terms of circadian rhythms, with some people being at peak ability in the morning and others in the evening.

The present study explored how circadian rhythms (synchrony) influence tasks that require self-control. Research shows that when people are lacking in self-control resources, their ability to perform well on self-control tasks is impaired. The purpose of the present study was to link the processes of circadian rhythms (which gives a person optimal performance) with self-control (which should rely upon this optimal performance time) and examine how this influences the ability to resist persuasion. As predicted, there was a significant impact of circadian synchrony on self-control and persuasion. Implications of this work and future directions are discussed further."

Heterologous expression of LysR type transcriptional regulators

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Subject Area: Biological Sciences

Carbon concentrating mechanism (CCM) comprises processes in cyanobacteria evolved to overcome low concentration of inorganic carbon, which is essential for photosynthesis. Many genes are involved with CCM, but little is known about their transcriptional regulation. Two transcriptional regulators of CCM’s genes, CmpR and CcmR, have homology with LysR family transcriptional regulators. Our goal is to characterize the regulation of the CCM. We are studying transcriptional regulators that govern the expression of key genes at the CCM. I will report the results of heterologous expression experiments designed to produce these LysR transcription regulators in E. coli.

Design of a PID Controller to Control MOSFETs

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Subject Area: Physical Sciences & Technology

We present the design and construction of an analog PID controller to rapidly and simply control MOSFET controllable magnetic coils. These coils are used to generate a magnetic-optical trap, a magnetic quadrupole trap, and various other magnetic fields used to generate Sodium 23 Bose-Einstein Condensates in hybrid magnetic and optical traps. For this application we needed to stabilize the current flowing through the coils controlled by MOSFETs, with out sacrificing too much rise or settling time with approximately one millisecond or less settling time needed. We compare the response time of a purely proportional control to a PID controller. Due to a new approach to the design, the analog PID controller is computer tunable allowing for quick and easy optimization. This combines one of the advantages of a digital PID controller with the advantages of the analog controller.
The Space Cowboys: Experiments in Zero Gravity
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Subject Area: Physical Sciences & Technology

For long missions through space, microgravity takes its toll on the human body. In the case of traveling to Mars for example, the estimated travel time is approximately six months. In the 2011 experiments, the Space Cowboy team investigated a design for an artificial gravity simulator consisting of a deployable, rotating habitat with arms that are rotated about an axis. Due to limitations aboard launch vehicles, our team is proposed using inflatable beams as opposed to traditional metal structures for the arms of our simulator in order to reduce mass and volume. In the upcoming 2012 reduced gravity flights, the Space Cowboy team will be evaluating methods for motion capture in weightless and lunar environments to study the impact of reduced gravity on human motion.

A Refugee Young Adult's Acculturation Experiences and Processes in a United States High School: An Autoethnography
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Subject Area: Humanities

This study explored the acculturation experiences and processes of an individual female refugee young adult, myself, in the United States. The research spans from the time of arrival to the present, a period of seven years, however, put emphasis on the four years of being in an American high school as an adolescent. Through autoethnography, a personal narrative of the experience, the intention was to examine my journey of acculturating in the United States as a refugee adolescent and further to do a comparison with the literature findings on refugee adolescent and acculturation processes in the United States. This research anticipated to illuminate common trends within the acculturation process and its developmental effects on youth to help broaden the understanding of refugee youth population in this country. Most importantly, this research seeks to comprehend the complicated lives of refugee young adults in their new country of resettlement.

Effects of bitter melon and toll-like receptor (TLR) 4 on bone parameters in mice fed high fat diet.
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Subject Area: Biological Sciences

A high fat (HF) diet is associated with reduced bone mass and increase risk of bone fracture. Fatty acid metabolites can activate pro-inflammatory signaling cascade through toll like receptor 4 (TLR 4). Bitter melon (Momordica charantia, MC) is a widely consumed vegetable in Asia and has hypoglycemic properties and may potentially affect bone. This study examined whether MC can modulate changes in bone due to a HF diet and whether these effects are mediated through the TLR4 pathway. Eight week old male TLR4 mutant (C3H/HeJ) and control (C57BL/6) mice were randomly assigned to one of four dietary treatment groups for eight weeks (n=12-13/group): control (10% fat calories), HF (60% fat calories), HF+1% MC, or HF+10% MC. The C3H/HeJ strain exhibited significantly higher body weight, body fat, whole body bone mineral content (BMC) and bone mineral density (BMD), and femoral BMC and BMD compared to the C57BL/6 strain regardless of dietary treatment. In both strains, MC at 10% dose reduced body weight, % body fat and increased % lean mass but not to the level of the control diet. MC modulated body composition
but has modest effects on bone parameters and how TLR4 signaling pathway affects these parameters is being explored.

Reconnecting Children & Nature

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Subject Area: Education

In the last two decades, childhood has moved indoors. The average American boy or girl spends just four to seven minutes in unstructured outdoor play each day, and more than seven hours each day in front of an electronic screen (Thomas, 2004). Our kids are out of shape, tuned out and stressed out, because they're missing something essential to their health and development: connection to the natural world (CDC, 2008).

Children who are exposed to natural or outdoor settings receive benefits to their cognitive health, such as reduction of ADHD symptoms (Wells, 2000). Offering environmental education programs in school improves standardized test scores (Bartosh, 2003), and through environmental education offered in schools, students increase their critical thinking skills of performance on tests (Ernst & Monroe, 2004).

Play protects children's emotional development; whereas a loss of free time in combination with a hurried lifestyle can be a source of stress, anxiety, and may even contribute to depression for many children. (Ginsburg & Kenneth, 2007). Increased time in nature makes one nicer, enhances social interactions and more (Weinstein & Ryan, 2009).

QUALITATIVE ASSESSMENT OF SCHOOL NUTRITION PROFESSIONALS' ACCEPTANCE OF CHOICE ARCHITECTURE STRATEGIES IN OKLAHOMA MIDDLE SCHOOLS

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Subject Area: Humanities

Choice architecture (CA) strategies have been successfully implemented in the middle school environment by altering the presentation of fruits and vegetables (FV) to influence student selection. In order to ensure successful implementation, it is vital to assess the opinions and point of view of those who would be responsible for implementing the strategies, namely, school nutrition professionals. The purpose of this qualitative study was to conduct focus groups with school nutrition professionals to better understand the potential use of CA strategies aimed at increasing students' (FV) choices.

Six focus groups were conducted with 36 school nutrition professionals from various districts in Oklahoma to assess the clarity of the strategies, strategies already in use, and perceived strengths and weaknesses of each strategy. Each of the one hour sessions was transcribed and analyzed to distinguish common themes.

The focus groups revealed that while certain strategies are more feasible than others, some strategies are already used and school nutrition professionals believe CA strategies can and should be implemented in schools. Feasibility of each strategy was found to be dependent upon facility and school nutrition program. In conclusion, CA strategies are considered to be feasible and sustainable to school nutrition professionals in Oklahoma.
Challenges and progress towards universal salt iodization (USI) in Ethiopia

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Subject Area: Biomedical Sciences

The challenges and progress towards USI in Ethiopia were assessed in December, 2010. A qualitative study was conducted among ten key organizations and comments from the key informants are summarized below.

Salt iodization was first started in 1998 and 80 percent of salt in Ethiopia was iodized. But due to the Ethiopia-Eritrean war iodization was not maintained. To meet the needs of the Ethiopian population salt was imported for a short time but was replaced with local production of non iodized salt due to high cost of importation. Local production of non iodized salt accounts for 90-95 percent of salt supply in the country. Salt iodization was then revitalized in 2004. Accordingly small scale salt iodization was started in Afar region. Although commitment to solve the problem was stronger, lack of technical skills, harsh environmental conditions and instability of the region prevented large scale salt iodization. Hence increased levels of iodine deficiency were reported in a 2005 national survey. At the time of the study 3-5 percent of salt in the country was iodized (ICCIDD/UNICEF Standards) and the maximum iodization capacity could only meet 30-40 percent of salt needed by the country. In March 2010 Ethiopia passed a law that prohibits processing, importing, and sale of non-iodized salt for human consumption in Ethiopia. Although this is an important step in the right direction more efforts are needed to successfully implement USI to combat IDD in Ethiopia.

Employment of SuperQuat Chiral Auxiliaries Toward the Novel Asymmetric Synthesis of Majorenolide and Majorynolide

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Subject Area: Physical Sciences and Technology

Our laboratory is focused on the novel asymmetric total synthesis of majorenolide and majorynolide, two natural products exhibiting cytotoxic activities in human tumor cells. The investigation of the ability of SuperQuat chiral auxiliaries to affect stereoselectivity in asymmetric glycolate alkylations with methylidooacrylates serves as the preliminary step in the preparation of these targets.

Previous investigations in our laboratory on such alkylations of (S)-p-methoxybenzy1glycolyl-i-propyl-2-oxazolidinone provided at best 75:25 diastereoselectivity using t-butyl- and i-butyl-2-(methylidoo)acrylates as electrophiles. We envision that the innovative application of SuperQuat chiral auxiliaries with increased steric hindrance will heighten rigidity of the alklylation transition state, thereby improving diastereoselectivity. SuperQuat chiral auxiliaries (S)-5,5-diphenyl-4-isopropylxazolidin-2-one and (S)-5,5-dimethyl-4-isopropylxazolidin-2-one were thus appended to benzoyloxyacetyl chloride providing their respective (S)-glycoloyloxazolidinones. Subsequent glycolate alkylation with sterically congested methylidooacrylates is expected to provide highly stereo- and regioselective products. Upon optimization of an alkylation protocol, further lactonization, olefin metathesis and protecting group removal should streamline the syntheses of majorenolide and majorynolide.

Utilizing Participant Photography To Understand Undergraduate Place Attachment To A University

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Subject Area: Education

This research study utilized participant photography to aid in understanding how undergraduate students develop attachment bonds to their university or college setting. Participants were given a disposable camera...
and asked to take pictures that most resembled the place attachment statements on their instruction sheet (Williams & Vaske, 2003). Students develop attachment to a school through personal investment, social bonding, inter-student relationships, curricular and extra-curricular involvement, and commitment to traditions and policies (Libbey, 2004).

The researchers’ goal was to know if there is a formation of place attachment to the university of undergraduate students who have not yet completed their fourth full semester of studies at the university. The researchers posed the research question; what specific places at Oklahoma State University represent place attachment bonds in consideration of specific place attachment statements? Through the methodology, the researchers also sought to understand how students would express place attachments through photographs.

The information collected may aid higher education institutions in their goal to develop place attachment bonds to cultivate stronger bonds between students and the university with an ultimate goal of creating lasting bonds between alumni and the university.


Drug Sensitivity Testing of Baboon Herpesvirus 2 as a Model for Monkey B Virus

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Macacine herpesvirus 1 (Monkey B virus; BV) is an alpha-herpesvirus that occurs naturally in macaque monkeys. When transmitted to humans BV is often fatal; current treatment is not fully effective and complete recovery is rare. Consequently, BV is a Risk Group 4 virus and is listed as a Select Agent by the CDC, making work with BV is dangerous and expensive. These limitations have led to little BV research being accomplished. A related Risk Group 2 baboon virus (Papiine herpesvirus 2; HVP2), represents a potential model for BV.

We tested the drug sensitivity of two HVP2 strains both in vitro and in vivo to investigate the potential of HVP2 as a model for BV drug sensitivity. Four antiviral drugs were tested: Acyclovir (ACV), Pencyclovir (PCV), and Gancyclovir (GCV), ethyl-2-deoxyuridine (EDU). For in vitro assays the drugs EDU, GCV and PCV were the most effective with ACV being slightly less effective against both HVP2 and BV. In mice, GCV was the only drug that showed efficacy; PCV and ACV were not effective. For all drugs both in vitro and in vivo HVP2 EC50 values paralleled those of BV. These results indicate that drug sensitivity of HVP2 parallels that of BV.

Modeling Cross Polarization Coupling in a Whispering-Gallery-Mode Microresonator

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In this work, we investigate coupling between the two orthogonally polarized mode structures in an optical microresonator: transverse electric (TE) and transverse magnetic (TM). Using a tunable diode laser, we excite the whispering gallery modes of a glass microsphere by coupling light in from a tapered optical fiber
tangent to the microsphere. We have observed that when the input light is linearly polarized so that only TE modes should be excited, under certain conditions the output light shows that TM modes have also been excited. This phenomenon is called intraresonator coupling between coresonant whispering gallery modes of orthogonal polarization (IPC). This unexpected coupling between supposedly independent modes is potentially useful for various applications and needs to be better understood. The properties of this effect are found by fitting experimental data to a computer model. The model is then used to identify various types of behavior that can result from IPC, and the experimental conditions needed to observe them. Using the same model, we investigate the utility of using this cross polarization coupling effect for polarization analysis or for sensing changes in ambient refractive index.

Synergistic innovations for rapid detection of pathogens, and enhanced storage and portability

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Combining soluble biomaterial-based technologies with molecular tools speeds up sampling and processing, while enhancing portability without compromising accuracy during pathogen detection. We assessed three innovations, individually and combined: 1) soluble paper-based biomaterials (SPB) for sample storage at room temperature, 2) novel elution-independent collection device (EICD), prototype developed at Oklahoma State University (Patent pending, no. 2010.26), and 3) artificial positive controls (APC). Five SPB were used to store pathogen’s nucleic acids at room temperature (DNA, 1 year; RNA, 4 months) and were regularly monitored by PCR. EICD, constructed using SPB as central component, was tested by processing infected plant samples and detecting pathogens by PCR. APC were designed and assessed in silico, synthesized and validated in vitro and compared with positive controls from real infected plants. Samples in SPB and EICD were successfully stored at room temperature and detected by PCR for 1 year (DNA) or 4 months (RNA). APC were as effective as real infected plants and can eliminate risk of handling true pathogens. These three innovations can be applied as synergistic components in the manufacture of pathogen detection kits, allow rapid on-site detection and transport of samples between diagnostic laboratories or according to forensics requirements or chain of custody.

Tetrahydroisoquinolines by Friedel-Crafts Cyclizations Promoted by Iron(III) Chloride Hexahydrate

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A synthetic approach to tetrahydroisoquinolines from N-tosyl-1-(benzylamino)-2-methyl-2-propanol derivatives using an iron (III) chloride hexahydrate-promoted Friedel-Crafts cyclization has been developed. This strategy produced tetrahydroisoquinolines in good to excellent yields. The use of this mild Lewis acid for the transformation reduced unwanted substrate fragmentations observed using more stringent reaction conditions. A comparison of iron (III) chloride hexahydrate with classical acid catalysts for the cyclization will be presented along with the synthesis of reaction substrates and mechanisms for the ring closure and fragmentation processes.
Variables that effect perinatal outcomes among low income African American women

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Scholar Symposium Participant
Subject Area: Minority Issues

Black infants are twice as more likely to die within the first year of life than their white counterparts. The majority of these infant mortalities occurred within the perinatal stage of pregnancy. The purpose of this study was to determine the variables that effect perinatal outcomes among low income African American women. A convenience sample of 19 women in Jefferson County participated in the exploratory study. It was hypothesized that the variables that effect Perinatal outcomes among African American women were adequate prenatal care, child birth classes leading up to the pregnancy, father involvement, and maternal experiences with the Perinatal health staff. A survey was conducted that yielded both quantitative and qualitative results. Single women were more likely to have never attended birth/education classes during their pregnancy. Mothers, who reported that their partners were involved in their pregnancies, consistently reported positive experiences with the perinatal health staff. Adequate prenatal care, regular attendance at child birth classes, and father involvement were necessary for healthy birth outcomes. However, more research is needed to determine reasons for late initiation of prenatal care, and low attendance rates at child birth classes in order to eradicate health disparities among African American women.

Distinct Mechanisms of Interpersonal Dependency in Social Anxiety and Depression

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Interpersonal dependency is related to social anxiety (SA; Darcy et al., 2005) and depression (Holahan & Joiner, 1995), but research has rarely studied them together. The purpose of this study was to examine how dependency relates to both simultaneously. The Interpersonal Dependency Inventory (IDI; Hirschfield et al., 1977) was used to examine this relationship. Its subscales include Emotional Reliance (ER), Lack of Self Confidence (LSC), and Autonomy (AUT). We expected 1) dependency would predict both SA and depression, 2) all three IDI subscales would predict SA, and 3) only ER would predict depression. The study included 318 undergraduates at a Midwestern university. Participants completed the IDI and measures of SA and depression. A regression confirmed that both depression ($\beta=.27, p < .001$) and SA ($\beta=.31, p < .001$) significantly predicted dependency. AUT ($\beta=.15, p = .001$), LSS ($\beta=.15, p < .001$), and depression significantly predicted SA, but ER did not. Only ER ($\beta=.18, p = .001$) and SA ($\beta=.41, p < .001$) predicted depression. Overall, these results suggest there may be different mechanisms for the association between dependency in SA and depression, and further research could help explain comorbidity between these and related disorders.

How Oklahoma State Park System impact the economy at local and state level?

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Subject Area: Social Sciences

The purpose of this study is to provide quantifiable measures of park economic benefits that can inform decisions on policy planning, concession management, budget justifications, marketing alternatives, and resource allocation. The results of different extents including community and state levels can be applicable
to establish partnership within the local community and to identify the roles of parks in those levels in attracting and serving recreation visitors.

**Fat distribution, insulin resistance and serum adiponectin of older women with and without metabolic syndrome**

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**Subject Area: Biomedical Sciences**

This study assessed associations among dietary intakes, body fat distribution and serum biomarkers in 41 women aged > 50 yrs with and without metabolic syndrome (MetS). MetS by International Diabetes Federation definition (IDF) was waist circumference ≥88cm with two additional factors: elevated blood pressure, triglycerides, or glucose; or decreased HDL-cholesterol. Three-day diet records and 24-hr duplicate plates were collected. Dual-energy X-ray absorptiometry (DEXA) scans was used to estimate body fat distribution. Total antioxidant capacity (TAC) in diet and serum were measured with the ferric reducing antioxidant power (FRAP) assay. The MetS group had significantly higher serum insulin and adiponectin as well as higher homeostasis model assessment (HOMA)-β, HOMA-IR, and android:gynoid ratio. TAC in serum and 24-hr duplicate plate diet samples were not significantly different between control and MetS groups; however, dietary fiber intakes were positively associated with dietary vitamin C (p<0.03). Total body fat, android fat, android:gynoid ratio, and serum adiponectin were significantly (p<0.05) associated with insulin resistance in these older women.

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**American Indian Student Retention: A Study on College Self-Efficacy and Enculturation**

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**Subject Area: Education**

Although enrollment rates have increased in recent years, rates reflecting American Indian/Native American (AI/NA) graduation are low compared to the national average (NCES, 2008). In 2008, the rate of AI/NA students graduating from undergraduate programs at degree-granting institutions was lower than other racial minority groups and only constituted 12,222 out of the 1.6 million degrees awarded that year (NCES, 2009). Extensive research on factors affecting American Indian student persistence and retention have been conducted examining environmental factors that affect American Indian student retention. While the breadth of previous literature on AI/NA student retention has focused on familial, cultural, and institutional support of AI/NA college student experiences, there is a need for research to explore the personal factors that facilitate success in college among AI/NA students. A specific variable identified in college student success in achieving degree completion is self-efficacy beliefs (Gore, 2006). The purpose of the current study is to explore the relationship between college self-efficacy and college student success for American Indian college students as a way to better understand personal factors related to college retention and academic persistence for American Indians.
Social Work Programs and Their Use of Social Media Sites

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Subject Area: Social Sciences

This research focuses on how university social work programs are using social media sites, such as Facebook, twitter, and YouTube, to either promote their programs or advocate for change. Key points of focus will include, but are not limited to: what the programs are advocating for, what events and organizations are being promoted, and what school information is being published publicly. By examining in what ways these programs are making use of social media technology, researchers will be able to identify what trends, if any, exist. Once the data collection is completed, we will examine what areas of the programs are being promoted the most and if the social media sites are having a positive impact on the university social work programs. It is our hope that research gathered here will provide data and information necessary for improving the programs' means of advocacy and self-promotion, both for community-specific and university-related purposes.

Student Awareness of HIV/AIDS Prevention at the University of Arkansas at Pine Bluff

Runndie Crawford
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Scholar Symposium Participant
Subject Area: Minority Issues

The HIV/AIDS infection is a threat to people all over the world, men, women, and children. HIV/AIDS has been a global epidemic for the past 27 years killing nearly 25 million people. In 2008, alone, approximately 2 million people around the world died from AIDS. HIV/AIDS diagnoses are growing rapidly, in the world and more and more on college campuses. Currently college students have caught the attention of many researchers because of their risky behavior. Surveys that consisted of 27 questions that were related to demographics, risky behavior, and knowledge of HIV/AIDS were administered to 100 students (61 females and 39 males). The data was then entered into the Statistical Package for the Social Sciences (SPSS). This program was able to take in the large amounts of information and correlate the frequencies and cross-tabulations.

Data Collection for the Prioritization of Streambank Restoration Implementation

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Subject Area: Physical Sciences & Technology

In northeastern Oklahoma many streams have been listed as impaired due to nutrients and turbidity. Possibly the largest contributor to these impairments is sediment. In many areas, bank erosion is one of the principle sources of excess sediment in streams, and while streambank stabilization projects are being used to solve this issue, additional research is needed to make these projects more viable in providing long-term, cost-effective solutions. The objective of this study was to develop and refine a methodology to determine the most beneficial locations for the implementation of streambank stabilization projects in the Eucha/Spavinaw and Illinois River watersheds. This is in support of an overall goal to encourage partnerships of cooperating agencies to prioritize and implement stream channel restoration projects. Both quantitative and qualitative data were collected within the two target watersheds on representative stream reaches to be used in Conservational Channel Evolution and Pollutant Transport System (CONCEPTS), a model used to simulate incised streams, the impacts of restoration projects, and the resulting stabilization and reduction in sediment
loads. By running a series of computer simulations based on stream orders and flow characteristics, recommendations will be made on the most beneficial and cost-effective locations for streambank stabilization projects.

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Next generation sequencing as a diagnostic tool for biosecurity agencies

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Subject Area: Biological Sciences

Biosecurity agencies require detection systems that can be rapidly updated and altered as needed to meet current and future biological threats. Although individual pathogen assays are available, current screening methods have limited ability to detect multiple pathogens concurrently. Microbial forensics combined with the sequencing power of pyrosequencing allows for the creation of a single assay to detect simultaneously, any and all microbes in a sample, including pathogens that have been genetically modified. This project uses bioinformatic pipelines for mock sample databases generation used in simulating 454 runs, query "probe" design and BLAST searches for plant diseased models. Pathogen specific queries, ranging in lengths from 20 nt to 140 nt, were created for detection of the bacterial select agents Xylella fastidiosa 9a5c, Xanthomonas oryzae, and Ralstonia solanacearum race 3 biovar 2, as well as for Candidatus Liberibacter asiaticus (not a select agent). The query sets were used to BLAST mock sample databases mixing one host sequence with pathogen sequences at various ratios. All four bacterial pathogens were readily detectable in silico. Testing is currently underway using pathogen infected samples. This research merges bioinformatics and plant pathology for addressing national security needs.

Num1p interaction with SUMO

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Subject Area: Biological Sciences

During cell division, the daughter centrosome is pulled to the centre of the bud cortex by Num1 dynein-dynactin. Num1 is a protein that works as a cortical anchor for the dynein motor, transporting the nucleus from the mother cell to the bud. It is suspected that the Num1 protein is sumoylated. Sumoylation is the post-translational modification of proteins by Small Ubiquitin like modifiers (SUMO). SUMO proteins regulate various cellular processes including nuclear transport, transcription, chromosome segregation, and DNA repair. Sumoylation can affect the stability, localization, or activity of a protein. A two-hybrid assay will be used to test for the interaction of Num1 with SMT3, the SUMO homologue in yeast. A temperature sensitive strain of Ubiquitin- Like Protein-1 (Ulp1), that inactivates the protease activity of Ulp1p at 37°C and cleaves Smt3p from any proteins conjugated to it, will be used to identify whether Num1p is sumoylated. These findings will lead to a better understanding of how Num1p functions and interacts with other proteins.
Evidence for ecological speciation in west Texas katydids (Orthoptera: Tettigoniidae)

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Subject Area: Biological Sciences

Understanding patterns of speciation has been the focus of thousands of scientists since the time of Darwin. Dichopetala is a genus of katydids distributed from the southwestern United States through Mexico that contains at least 9 cryptic species that overlap in their distributions. Two species, D. oreoeca and D. brevi hastata, overlap in mountainous regions of the Trans-Pecos. D. brevi hastata are widely distributed at lower elevation than their relative, but coexist with D. oreoeca at intermediate elevations. We hypothesize that speciation in these two has arisen from the punctuated divergence of mate choice signals; however, adaptations in morphology to local climate (temperature, humidity, precipitation, vegetation) would provide evidence to the contrary and support an ecological adaptation model of speciation. Detailed morphological characters of multiple populations of each species will be measured, and we will use multiple regression to examine the strength of correlations between morphology and ecological variables. Strong correlations between species distributions and ecological variables would suggest that the speciation event between these groups was largely ecological, and not a result of sexual selection on mate choice signals.

SINGLE AMINO ACID SUBSTITUTIONS TO THE CP43 SUBUNIT OF PHOTOSYSTEM II INHIBIT OXYGEN EVOLUTION AND ALLOW THE OBSERVATION OF INTERMEDIATES IN THE FORMATION AND RELEASE OF O2

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Subject Area: Biological Sciences

The active site water oxidation in Photosystem II (PSII) is an oxidized manganese calcium cluster (Mn4CaO5) that accumulates oxidizing equivalents as it undergoes a series of four redox state transitions. To prevent the accumulation of a positive charge on the Mn4CaO5¿, which would inhibit oxygen evolution, the release of protons from the water oxidation complex (WOC) is facilitated by a catalytic base that is formed by the deprotonation of the residue CP43-Arg357 which would in turn feed protons into a proton exit pathway beginning with the residue D1-Asp61. The mutation of D1-Asp61 to asparagine revealed the presence of a pH sensitive lag phase in the release of O2 that is thought to represent a stable intermediate in the final stages of the O2 formation chemistry of PSII. To continue this research we have examined the residue CP4-Glu354, which is not thought to participate in the proton exit pathway. Here the O2 release kinetics of the CP43-E354Q mutant have been measured at various pH values, showing that the CP43-E354Q PSII centers that are capable of evolving oxygen have slowed O2 release kinetics (including an observable lag phase) compared to wild type PSII centers in low pH buffers.
A Sustainable Lighting Survey: Addressing Energy Saving Opportunities at Argonne National Lab

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Department of Design, Housing and Merchandising
Subject Area: Physical Sciences & Technology

In order to promote energy efficiency throughout Argonne National Laboratory, the lighting of interior and exterior spaces has been an important focus. A survey was performed to gather data regarding lighting quantity, fixture wattages, light levels, and occupant usage. Lighting fixtures in every accessible space were identified and documented in control sheets, spreadsheets, and floor plans. Using a light meter, light levels were also measured and watts per square foot were calculated. Light-level data were then compared to the office and laboratory lighting standards of the Occupational Safety and Health Administration and Illuminating Engineering Society. The researchers concluded that the facilities studied exceeded these standards. Recommendations to reduce energy usage, such as de-lamping and installing occupancy sensors, were provided.

Identifying Contributing Factors for Male Student Motivation within Residential Life

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Oklahoma State University
College Student Development program
Subject Area: Education

A significant gap exists regarding the number of male undergraduate applicants and qualified male undergraduate applicants for Oklahoma State University's Housing and Residential Life student staff selection process compared to their female counterparts. With the emergence of student development theory regarding male gender identity development and the growing field of men's development, there is a need to understand the factors that influence male students to apply for these staff positions so that the department may best serve their residents through effective role modeling and community leadership from male peers. Contributing factors were discovered and resources were created for the recruitment of undergraduate male students grounded in student development theory and best practice through qualitative assessments of three salient focus groups, comprised of current Oklahoma State University male undergraduate students, and the application of current literature.

Effects of Bamboo as a Reinforcing Material for Buildings in Developing Countries to Resist Seismic Loading

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School of Civil and Environmental Engineering
Subject Area: Physical Sciences & Technology

Across the world, often in developing countries, infrastructure fails during natural disasters and many lives are lost. Though we can't control the tragic occurrence of natural disasters, we can control the infrastructure built. With better infrastructure in developing countries many lives can be saved. This research project served to assess the feasibility of using bamboo, a cheap and more readily available natural resources that steel rebar, to reinforce concrete so that developing countries will be more willing to adequately reinforce their concrete buildings. Two models were created out of cinder blocks, concrete mix, and the reinforcing agent. One was constructed solely with concrete and no reinforcement while the other was reinforced with construction grade bamboo. A hydraulic ram was used to transfer lateral load to the beam at the top of each wall and a calibrated instrument measured the increasing magnitude of the load in pounds per square inch (psi). As the load increased, any major cracking or damage was observed and recorded. The bamboo reinforced wall withstood more than three times the amount of lateral load than did the unreinforced
concrete wall. This research project shows that bamboo may be a feasible solution for improved infrastructure in developing countries.

**Maze Traversal Using Object-Oriented Programming**

**Andy Erickson and Tom Stokke**

*Scholar from the University of North Dakota*
*Scholar Symposium Participant*
*Subject Area: Physical Sciences and Technology*

With this project, a LEGO Mindstorm robotic kit was used to build and program a simple robot that could traverse through a maze made up of different colored squares using the Java programming language. The purpose of this program is for the robot to gain knowledge about an environment and then use this knowledge to make decisions on how to escape the maze. The decision making processes involved were implemented using object oriented programming and each square of the maze was created as an object; these objects were then stored in memory and used as a tool for the robot to make intelligent decisions. It is hoped that with this method of storing information, new programming techniques may be implemented that will enable the robot to make a variety of intelligent decisions based on the available knowledge it has about its surrounding environment.

**Effects of Parental Discipline**

**Kayla Ford, Mariah Laver and Dr. April Bradley**

*Scholar from the University of North Dakota*
*Scholar Symposium Participant*
*Subject Area: Social Sciences*

The current study will be similar to previous literature because it will investigate correlations between parental discipline methods and psychological function (e.g., Afifi, Brownridge, Cox, & Sareen, 2006; Briere & Runtz, 1988; Miller-Perrin, Perrin, & Kocur, 2009). However, the current study will investigate the impact of parental discipline methods on college students' current levels of anxiety, depression, and substance use, while taking in account the students' perception of excessiveness of their parents' discipline methods, including psychological aggression. The current study further expands the literature because of the high number of participants from rural areas that can be obtained at the University of North Dakota. Many studies on parenting and children's functioning are outdated or too focused on one form of discipline, suggesting the need for newer research. The study is acting as a pilot study in order to investigate the general relationships between the discussed variables.

**NSU College Algebra iPad Project**

**Luke Foster**

*Oklahoma State University*
*College of Education*
*Subject Area: Education*

Within the last two years, Apple has developed and distributed a relatively new type of technological tool called an iPad. It is assumed by many (and hoped by the developer) that iPads will enhance and improve users' lives in areas of business, social networking, entertainment, and education. With this new tool available for purchase and use, several institutions of higher learning have initiated studies to measure the impact of iPads in the classroom. In the spring semester of 2011 at NSU, multiple research projects were undertaken involving iPads in the classroom. One of these projects studied the iPad's effect, if any, on student learning in College Algebra.
The Progressive Learning Platform for Computer Engineering

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School of Electrical and Computer Engineering
Subject Area: Physical Sciences & Technology

The Progressive Learning Platform is a novel, open, and adaptable, multi-course Computer Engineering curriculum and technology platform. The Progressive Learning Platform is designed to improve student learning by closing gaps between courses in a Computer Engineering curriculum, provide students with soft engineering skills, especially communication skills, and provide a more hands-on classroom experience.

The Progressive Learning Platform (PLP) is comprised of both a technology platform and a surrounding curriculum. The technology is a complete computing platform including a CPU, support hardware, programming tools, instruction set architecture, assembler, compiler, cycle accurate simulator, and support code. Every component of the design, including hardware, is mutable, open-source, and community developed. This allows the rapid and easy adaptation of PLP to other courses and their objectives. PLP is designed to run on a number of FPGA based development platforms.

Validity of a Parent Report Measure in School-Age Children

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Subject Area: Social Sciences

Parent report is used as a screening and assessment tool for speech-language pathologists with early language learners, however there has been limited research on parent report in school-age children. This study investigated the validity of a parent report measure in school-age children. The purpose of this pilot study was to determine the validity of the Speech Language Assessment Scale (SLAS) for use with school-age children.

Eight school-age children and a parent of each child participated in this study. Parents were administered the SLAS along with the Behavior Assessment System for Children- Second Edition and the Social Responsiveness Scale. Children were administered the Test of Language Development-Primary: Fourth Edition and the Goldman Fristoe Test of Articulation-Second Edition.

Results indicate that there are numerous statistically significant correlations between parent ratings of school-age children's speech and language skills on the SLAS and the children's speech and language skills as determined by standardized measures. Statistically significant correlations were evident in the SLAS subscales of Assertiveness, Responsiveness, Semantics, and Syntax. There were no statistically significant correlations between parent ratings and child scores in the area of articulation.

Coxiella burnetii Driven Modulation of Host Cell NF-κB Activation During Infection

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Subject Area: Biological Sciences

Coxiella burnetii, is an obligate intracellular pathogen and the causative agent of acute Q fever as well as chronic disease in humans. Asymptomatic nature of acute infections and the chronic form of disease highlights the immunomodulatory properties of this organism. After inhalation and subsequent infection of alveolar macrophages, C. burnetii replicates within parasitophorous vacuoles by escaping host cell innate immune detection mechanisms. Preliminary studies using comparative mRNA expression analysis of untreated and chloramphenicol (CAM) treated C.burnetii infections has identified a set of 36 host genes which are actively modulated by de novo C. burnetii protein synthesis. Gene ontology studies performed on
the identified gene set recognizes a subset of 4 cytokine genes which are regulated via NF-κB signaling pathway and play an active role in immune cell signaling and trafficking processes. In this study we have analyzed C. burnetii driven modulation of NF-κB activation throughout the C. burnetii cellular infectious-cycle. Using antibodies against phosphorylated p65, an NF-κB subunit we show that C. burnetii protein suppresses NF-κB activation during early infection. Additionally, C. burnetii infection induces NF-κB activation during mid infection (24-72h) but levels of activation are increased with the application of CAM. NF-κB induction is reduced to lower levels during late infection and C. burnetii protein synthesis does not appear required for this decrease.

Age Differences in Self-Reported Suicidal Ideation in a College Sample

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Subject Area: Social Sciences

Many studies have been conducted on suicidal ideation in college students. However, few studies have examined the potential impact of age on college students' self-report of suicidal ideation. Research in the past (Brener, Hassan &Barrios, 1999) has examined differences between students ages 18-24 and students older than 25. This study aims to examine students 18-24 years-old and students who are 25 years old or older in relation to self-reported suicidal ideation. Individuals ages 25 or older may experience increased stress as they are older than a typical undergraduate student. Specifically, it is hypothesized that older college students (ages 25 and older) will report higher levels of suicidal ideation than younger college students (ages 18-24). Participants include 2,228 undergraduate students from a large Midwestern university. Participants completed a demographics questionnaire and a self-report measure of suicidal ideation. An independent samples t-test will be conducted to test for significant differences between the two age groups on self-reported suicidal ideation. The findings of this study have the potential to identify a demographic (older college students) who may be at an increased risk for suicidal ideation.

Nutrient requirements for Clostridium ragsdalei in production of ethanol from syngas

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Subject Area: Biological Sciences

Cellulosic ethanol can be used as an alternative to fossil fuels if produced economically. Cellulosic ethanol can be produced by fermentation of sugars or syngas. Biomass is gasified to syngas (a mixture of CO, CO₂ and H₂), then fermented to ethanol by a novel Clostridium ragsdalei strain P11. The objective of this study is to determine the nutrients’ requirement for P11 and develop a cost effective medium for ethanol production. Experiments with removal of morpholinoethane sulfonic acid (MES) buffer, reducing nutrients such as yeast extract (YE) and replacing YE with inositol were performed. The results indicated that MES can be removed from the medium to reduce the cost by over 90%. YE was necessary for P11 cell growth. However, more ethanol was produced with the medium containing lower concentrations of YE when the gas mixture was 20 CO: 15 CO₂: 5 H₂. Replacing YE with inositol did not improve ethanol production. Future research will be undertaken to evaluate the effects of other nutrients on ethanol production. Providing only necessary nutrient to the medium for P11 to produce ethanol will make syngas fermentation more competitive on a cost basis.
Better Understanding the Readiness of Oklahoma School Principals in Implementing Coordinated School Health

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Subject Area: Education

Coordinated school health (CSH) programs are related to improved health and academic performance among school-age children. Despite the benefits, many schools are not implementing CSH. This study assessed the readiness of Oklahoma public school principals to implement CSH. An electronic survey was used to collect data from principals. Respondents were stratified into stages of readiness. ANOVA was used to compare stage of readiness by grade classification, geographical location and school size. Regression analysis identified the correlation between efficacy of resources and stage of change. Content analysis of responses to an open-ended question identified themes related to barriers and benefits. Approximately 1/3 of the respondents were in the preaction stages; and almost 2/3 of principals were in the action/maintenance stages. Principals in rural areas were in lower stages compared to those in urban areas. Resources best predicting principals' readiness were, teachers understanding and supporting their role in CSH, and support from the school district's school board. Principals in lower stages felt teachers needed more professional development to implement CSH. This information can be used in developing appropriate messages for principals and decision makers regarding the need of Oklahoma schools to improve the health of faculty and students, and academic performance.

The Effect of Body Composition on Self-Esteem among Female College Students

Rose Gomez
Scholar from Harding University
Scholar Symposium Participant
Subject Area: Social Sciences

This study measured the self-esteem of college females in relation to their waist-to-hip ratio and their body fat percentage. There were 70 female participants from the Harding University from ages 18 to 22. They completed the Rosenberg Self-Esteem score and were then measured with a standard measuring tape their WHR and with a Body Fat Analyzer measured their body fat percentage. The results from a 2x2 ANOVA indicated that those females who had a "below average" body fat percentage had a lower self-esteem. There was also a significant interacting that the females who fell in a "below average" of waist-t-hip ratio and Body fat percentage had a lower self-esteem score. This research indicates that body size has an influence on the self-esteem of college females.

In Vivo Analysis of Insulin Delivery Using CPEs Designed Via In Silico QSPR Approach

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Subject Area: Biomedical Sciences

The uneasiness and pain of multiple injection therapy courses for diabetic patients and the non-compliance of patients with poorly controlled type 2 diabetes have prompted the development of alternative, pain-free methods. Transdermal drug delivery is gaining significance in the recent years due to its advantages over other invasive methods. An insulin transdermal patch placed on the skin may be able to deliver sustained physiological levels of basal insulin in a pain-free manner; however, since insulin is a relatively large molecule, it does not penetrate the skin easily. Altering the characteristics of the skin by chemical penetration enhancers (CPEs) is one of the promising ways to breach the skin's barrier to drugs. Using this concept, we have reported on the methodology of predicting CPEs using improved algorithms for non-
linear, quantitative structure-property relationship (QSPR) models based upon representative molecular properties [1-7]. The predicted molecules were extensively tested for cytotoxicity and ex vivo delivery. This study focuses in evaluating the in vivo efficacy delivering insulin across the skin with and without CPEs in a rodent model. Rats were starved eight hours before the application of the patch and then blood glucose levels were monitored. After five days, we evaluated the overall body weight change, hepatotoxicity and skin condition. Our findings through animal trials indicate proven efficacy of the newly designed CPEs.

**DEVELOPMENT OF PRODUCTION-BASED AND COST-BASED GHG EMISSION MODEL AND ESTIMATOR FOR EARTHWORK CONSTRUCTION ACTIVITIES**

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Subject Area: Physical Sciences & Technology

The construction sector produced 6% of total US industrial GHG emissions. The purpose of this paper is to develop an innovative methodology and user friendly emission estimator, particularly for GHG emission or CO2 released from earthwork construction activity. The estimator will be demonstrated to two types of earthwork activity: bulk excavating with dozer and bulk excavating with scrapers. The estimator will include the production rate of activity, the unit cost of the activity, and CO2 emission rate of the activity, and modeled by using multiple regression analysis method. Information regarding the production rate and unit cost can be found in RS Means Heavy Construction Data 2011; CO2 emission rate can be obtained from the EPA's Inventory of US Green House Gas Emission. Production-based emission model for CO2 can help construction professionals, an estimator in particular, to forecast the emission footprint of a project based on a quantity takeoff using construction plans and specifications. At the same time, it can help the construction estimator to assign dollar value to construction emissions.

**THE INFLUENCE OF ACUTE EXERCISE ON TORQUE DECLINE BETWEEN POSITIONS IN COLLEGIATE FEMALE SOCCER PLAYERS**

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Subject Area: Education

The ability among players to sustain muscular activity following intense bouts of muscular exertion that may frequently occur during soccer match play may play a role in successful performance and injury prevention. Muscular fatigue results in decreased muscular torque production and consequently may hinder playing performance. PURPOSE: To examine the effects of a fatigue inducing bout of isokinetic exercise on peak torque decline for the leg flexor and leg extensor muscle groups between playing positions in Division I collegiate female soccer players. METHODS: Eighteen females participate in the study. Peak torque of the right leg extensors and flexors was assessed on a Biodex. Participants performed 50 consecutive maximal leg extensions and leg flexions in tandem. Peak torque and least torque values across the 50 repetitions for both leg flexors and leg extensors were used to calculate the percent of torque decline. Percent decline values were calculated by taking the highest peak torque minus the least torque divided by peak torque and multiplying by 100. CONCLUSIONS: These findings indicated that there appears to be no difference in leg flexor or leg extensor peak torque decline between playing positions during a repeated bout of fatigue inducing isokinetic exercise in Division I collegiate female soccer players.
Contributing Factors of Alcoholism in the University of Arkansas at Pine Bluff Students

Takeesha Hawkins

Scholar from the University of Arkansas at Pine Bluff
Scholar Symposium Participant
Subject Area: Minority Issues

Alcohol abuse and dependency are serious issues among college students and on college university campuses. When college students experience substance abuse, there are significant consequences that will affect the student, fellow students, the academic institution, and the surrounding community. The study is aimed to benefit the University as a whole by identifying the source of the problem and working proactively to correct the problem. Data was entered into the Statistical Package for the Social Sciences (SPSS) system to determine rather or not selected factors contribute to alcoholism in college students. One-hundred students (59 females and 41 males) attending the University of Arkansas at Pine Bluff participated in a survey with questions concerning gender, mass media, stress, and peer pressure or influence and how they affect the amount of alcohol they consume. Questions considering mass media, stress, and peer influence were narrowed down to different sources within each category. The study showed that students had significantly different reasons why they consumed alcohol. Peer pressure or peer influence had the most impact on student alcohol consumption, more than stress and mass media combined.

Trait Mindfulness as a Protective Factor Against Thwarted Belongingness, Perceived Burdensomeness, and Suicidal Ideation

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Subject Area: Social Sciences

Introduction: The interpersonal psychological theory of suicidal behavior posits two main interpersonal risk factors of suicidal ideation: thwarted belongingness and perceived burdensomeness (Joiner, 2005).

Problem: Although research has indicated that thwarted belongingness and perceived burdensomeness are two robust risk factors for interpersonal suicide risk, little research has been done in understanding protective factors against these suicide risk factors.

Aim: This study investigates the potential protective effects of trait mindfulness against thwarted belongingness, perceived burdensomeness, and suicidal ideation. Mindfulness is defined as observing one's environment in the moment in an accepting and non-judgmental way. It is hypothesized that individuals who are high in trait mindfulness are predicted to have lower levels of thwarted belongingness and perceived burdensomeness, and therefore lower levels of suicidal ideation.

Methods: The current study utilized an undergraduate sample from a large Midwestern university. All participants completed self-report measures of thwarted belongingness, perceived burdensomeness, trait mindfulness, and suicidal ideation.

Results: Data is currently in the last stages of collection. We expect that trait mindfulness will negatively predict thwarted belongingness, perceived burdensomeness, and suicidal ideation.

Implications: This study will provide insight into the possible efficacy of preventative measures against interpersonal suicide risk focused on increasing a client's mindfulness.
Potential Protective Role of Polyphenols on Microglial Cell Function and Neuroinflammation

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Subject Area: Biological Sciences

The risk of developing neuroinflammatory diseases increase with age, and has been attributed to the production of reactive oxygen species produced by dietary components such as excess copper, fatty acids, cholesterol, and iron. Iron is an essential micronutrient, which plays a role in oxygen transport, energy metabolism, and cellular proliferation; but in excess can be toxic due to its sensitivity to redox reactions. It has been reported that iron accumulates in the brain with age, but individuals with neurologic diseases such as Alzheimer’s and Parkinson’s have significantly more iron deposits compared to a healthy individual’s brain. Little however is known about the progression of disease and the implications excess iron has on microglial cells, the innate immune cells of the brain responsible for the removal of degenerating tissue, secretion of cytokines, and expression of growth factors required for normal brain function. Studies have shown that anti-inflammatory ligands are capable of repressing pro-inflammatory genes in response to lipopolysaccharide-induced inflammation in other tissues of the body. Therefore, in this study microglial cells were treated with iron or an iron chelator and subsequently exposed to lipopolysaccharide and an anti-inflammatory ligand to assess the potential protective role of anti-inflammatory ligands on microglial cell function.

Kinetic Model for the Oxidative Mechanism of Aqueous Nano-C₆₀ Aggregates

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Subject Area: Physical Sciences & Technology

Due to wide spread applications and commercialization of fullerene (C₆₀) systems, both human and environmental systems becomes increasingly exposed to these materials. As a result there is concern of the biological and environmental effects of these systems. Even though fullerene has negligible solubility in water, the ability to form stable aqueous C₆₀ colloids (known as nano-C₆₀) and the availability of these in natural systems at environmentally-relevant concentrations led to the studies of its toxicity. Previous studies have indicated that fullerene in colloidal form can induce oxidative stress in living systems. This research is focusing on the kinetic model for oxidation caused by nano-C₆₀. For this work we used nano-C₆₀ prepared by several methods such as solvent exchange and sonication. Fluorescent assays for monitoring oxidative behavior and calibration of the probe molecule dihydrorhodamine123 (DHR123) with a commonly available oxidizing agent potassium permanganate have been investigated. Proposed kinetic models for KMnO₄ and nano-C₆₀ systems suggest that, mechanism may involve a direct oxidation.

Purification and Characterization of Carbonic Anhydrase PA2053 in Pseudomonas aeruginosa

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Subject Area: Biological Sciences

Pseudomonas aeruginosa is an opportunistic pathogen known to cause lethal lung infections in Cystic Fibrosis (CF) patients. Insoluble calcium deposits are commonly found in the lung tissues of late stage CF patients. Earlier we have shown that P. aeruginosa produces calcium deposits when grown in mineral media in the presence of 10 mM calcium (Ca²⁺). Therefore, it is likely that P. aeruginosa infections initiate
calcification. The genome of P. aeruginosa encodes three putative carbonic anhydrases, which are enzymes that catalyze hydration of CO2 into HCO3-. The latter can react with Ca2+ and form CaCO3 deposits. To understand the functional role of PA2053, which is one of the P. aeruginosa carbonic anhydrases, the protein was His-tag purified. In order to test the effect of Ca2+ on the abundance of PA2053, P. aeruginosa cells were grown at different Ca2+ concentrations (0mM, 0.1mM, 1.0mM, 5.0mM, and 10.0mM), and the cell extracts were analyzed using Western Blot. A cross-linking assay and native gel electrophoresis are being used to characterize its tertiary structure. Future experiments will study the effect of different CO2 concentrations (elevated, normal, and low) and growth phases on the abundance of PA2053.

Understanding the role of cyanobacterial inorganic carbon transporters in cyclic electron transport

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Subject Area: Biological Sciences

In cyanobacteria, cyclic electron transport (CET) is an important mechanism photosynthetic organisms use to alleviate oxidative damage and balance energy metabolites (NADP+/NADPH, ADP/ATP). Cyanobacteria also possess a carbon concentrating mechanism (CCM) used to increase the intracellular concentration of inorganic carbon. It is comprised of five protein complexes, two of which use NADPH to power CO2 hydration. This research is aimed at understanding what influence these NDH type 1 transporters exert on CET and metabolite levels.

Using pulse amplitude modulated (PAM) fluorometry and absorbance spectroscopy, the effects of carbon deprivation and CCM induction on CET and metabolite levels were studied. Though direct measurement of CET is not possible, observing the changes in reduction rates and kinetics of photosystems I and II allows inferences to be made.

Understanding the History and Context of Oklahoma's Conservative Movement

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Educational Psychology program
Subject Area: Social Sciences

From statehood in 1907 to 1944, Oklahoma's electoral votes in every Presidential election were unanimously applied to the Democratic presidential candidate. However, between 1948 and 2008, except for one election, all of Oklahoma's electoral votes were applied to the Republican candidate. Oklahoma's drift toward a politically conservative preference is further reflected in the most recent Presidential election. In 2008, Oklahoma was the only state in which the majority of voters in every precinct voted for the Republican candidate.

In what ways might sociological and psychological theories help explain Oklahoma's sudden shift to the right? The present study is a historical and contextual analysis of the ways media, religion, race and party identification factor in to the meanings Oklahomans apply to the label “conservative.” This poster is part of a larger body of ongoing, qualitative inquiry about Oklahoma voters. Specific questions to be asked are: What does it mean to be a conservative in Oklahoma? In what ways has political discourse, media, religion, race and party identifications shaped Oklahomans' perceptions of the “liberal” and "conservative" labels? By exploring Oklahoma voters' perceptions in an historical context, researchers and policy professionals may better understand voter behavior and learn effective ways to educate the public regarding pertinent issues.
What's the story?: Examining the relationship between science autobiographies and images of scientists and science teachers

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School of Teaching and Curriculum Leadership
Subject Area: Education

Science methods courses are not preservice elementary teachers' first encounter with science. Rather, these preservice elementary teachers have taken various science classes throughout their educational careers. What stories can preservice elementary teachers tell about their past science experiences? This study examined the relationship between science autobiographies and images of scientists and science teachers as drawn by preservice elementary teachers enrolled in a science methods course. Analysis of the images of scientists revealed that these preservice elementary teachers held moderately stereotypical images of scientists. Analysis of the images of science teaching revealed that these preservice elementary teachers see themselves teaching hands-on activities with some emphasis on teacher-led instruction, but with student-centered learning as well. Analysis of the science autobiographies revealed multiple types of experiences all throughout the educational careers of these preservice elementary teachers. Based on the results of this study, the past experiences that preservice elementary teachers have of science classes do not relate to the images they have of scientists and science teaching. There appear to be other factors that influence these images that need to be further examined.

THE COMPARISON OF HAMSTRING-TO-QUADRICEPS RATIOS IN NCAA WOMEN'S SOCCER PLAYERS AND HEALTHY CONTROLS.

Oklahoma State University
Health and Human Performance program
Subject Area: Education

The hamstrings-to-quadriceps (H:Q) ratio has traditionally been used as a tool to assess the risk of knee- or hamstring-related injuries. Low H:Q ratios may signify a greater risk of injury. PURPOSE: To assess H:Q ratios in National Collegiate Athletic Association (NCAA) Division I women’s soccer players in comparison to non-athlete controls. METHODS: Eighteen healthy NCAA Division I women’s soccer players (mean age ± SD = 20 ± 1 yrs; height = 168 ± 5 cm; body mass = 65 ± 5 kg) and thirteen healthy female controls (age = 21 ± 2 yrs; height = 163 ± 6 cm; body mass = 64 ± 8 kg) performed voluntary maximal concentric isokinetic leg extension and flexion muscle actions on a Biodex dynamometer at 180°•s⁻¹. The highest peak torque (PT) value from three leg extension and flexion repetitions were used to calculate H:Q ratio. Independent t-tests were used to compare means between the athletes and non-athletes for leg extension peak torque (PTₑ), leg flexion peak torque (PTᵢ), and H:Q ratio. CONCLUSION: The H:Q ratios in the women’s soccer players were greater than the non-athlete controls and were equivalent to the minimum ratio suggested to avoid knee- and hamstring-related injuries (H:Q= 0.60).

Impacts of Grazing (Cattle vs. Bison) and Controlled Burning on Entomopathogenic Nematode (EPN) Prevalence in the Tallgrass Prairie Preserve

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Subject Area: Biological Sciences

Entomopathogenic nematodes (EPN) in the families Steinernematidae and Heterorhabditidae occur naturally in soils worldwide and are obligate parasites of insects. Previous studies indicate relatively high abundance
of EPN in pastureland systems of the southern Great Plains. The Tallgrass Prairie Preserve provided an opportunity to evaluate EPN frequency in a system that emulated a relatively natural condition for this region, which included grazing (by either bison or cattle) and controlled burning interaction. Soil sampled in grazed and non-grazed pastures, burned and unburned, was subjected to bioassay technique, using *Galleria mellonella*, to determine prevalence of EPN. EPN within infected *G. mellonella* cadavers were identified based on cadaver symptoms. Unburned, cattle-grazed systems yielded a 1% prevalence of *Steinernema carpocapsae* (Sc). Unburned, non-grazed systems yielded a 1% prevalence of Sc. Soil physical parameters were measured for each location. EPN identifications will be confirmed through DNA sequencing. Future sampling trips to the Tallgrass Prairie Preserve will aid in determining if burning and grazing land use practices influence the prevalence of EPN in the Tallgrass prairie.

**Social support moderates the relationship between nutritional risk and functional capacity among rural older adults in Oklahoma**

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Oklahoma State University  
Department of Nutritional Sciences  
Subject Area: Social Sciences

The purpose of this study was to evaluate the effect of social support as a moderator between nutritional risk and functional capacity. A total of 171 community-dwelling older adults, 65 years of age and older, from rural counties in Oklahoma completed measures on functional capacity, social support, and nutritional risk. It was hypothesized that (1) a higher level of nutritional risk would predict a lower level of functional capacity (2) a higher level of perceived social support would predict a higher level of functional capacity, and (3) perceived social support would moderate the relation between nutritional risk and functional capacity. Data were analyzed using moderated hierarchical regression. Results indicated a support had a significant moderating effect on relationship between nutritional risk and functional capacity. Results from this study have implications relative to improving programs and services to improve the health and quality of life of older adults residing in rural settings.

**Readiness of Residents in 19 Oklahoma Counties to Adopt Environmental Nutrition and Fitness Changes**

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Department of Nutritional Sciences  
Subject Area: Social Sciences

Background: Health status of Oklahomans recently fell from 46th to 48th compared to other states. This ranking is related to the high prevalence of obesity and diabetes. Possibly, previous efforts were not matched to the readiness of communities to make changes in eating and activity behaviors. The Community Readiness Model (CRM) identifies 9 stages of readiness for addressing health issues. Stages range from “no awareness” to “high level of community ownership.” Readiness is assessed based on 6 dimensions.

Methods: The established CRM protocol was used to assess the readiness of 19 counties in Oklahoma. Surveys were completed by 4-6 key informants per county. Each survey was scored and assigned a score for each dimension. Scores per county were averaged to calculate an overall readiness score. Multiple regression was used to identify the dimension best predicting readiness.

Findings: Overall scores ranged from “no awareness” to “vague awareness” (1.7 to 3.7) for the need to make changes within the county related to healthy eating and active living. Awareness of community efforts was the dimension that best predicted overall readiness.

Discussion: The surveyed counties were at different levels of readiness. Stage appropriate strategies should be used in each county to move residents toward adoption of nutrition and fitness behaviors.
Characterization of Single-walled carbon nanotube reinforced epoxy nanocomposites

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Subject Area: Physical Sciences & Technology

Single-walled carbon nanotubes dispersed in N-methyl-2-pyrrolidone (NMP) were incorporated into epoxy matrix by sonication. The studies involved characterization of the dispersed SWNTs in the NMP and investigation of the improvement of thermal and mechanical properties of the SWNT/epoxy nanocomposites. Dispersion of SWNTs in NMP was characterized using UV-Vis-NIR Spectroscopy. The glass transition temperature ($T_g$) of the epoxy system is increased by 7 °C with the addition of SWNTs up to 0.004 % w/w. Thermal decomposition of the cured sample and the existence of the residual solvent were investigated using thermogravimetric analysis (TGA). Dynamic Mechanical Analysis (DMA) was performed to determine the thermo-mechanical properties of the nanocomposites. The improvement in the glass transition temperature is attributed to good dispersion of SWNTs in the epoxy resin.

RELEASE OF SALMONELLA ENTERICA ONTO DIFFERENT SURFACES BY THE BLOWFLY, PHORMIA REGINA (MEIGEN)

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Subject Area: Biological Sciences

The blowfly has been implicated with the transmission of many human pathogens. In this study, deposition of GFP tagged Salmonella enterica onto three different surfaces by the blowfly was assessed. The number of bacterial cells retained on the blowfly body was also studied. Adult flies were exposed to S. enterica contaminated manure or control manure and then exposed to glass, plastic, or spinach leaves. The number of fluorescent colonies deposited onto the different substrates was assessed. Flies deposited more bacteria onto spinach than plastic. More bacteria was recovered from female fly bodies than male fly bodies. In this experiment the blowfly was able to deposit a large number of bacteria onto a variation of surfaces.

Bone mineral density and vitamin D status in older women with and without metabolic syndrome

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Subject Area: Biomedical Sciences

This study investigated associations between serum 25-hydroxyvitamin D [25(OH)D] and bone mineral density (BMD) in women >50 years of age with and without metabolic syndrome (MetS). MetS as defined by the International Diabetes Foundation was waist >88 cm with two additional factors from elevated blood pressure, serum triglycerides or glucose or decreased HDL-cholesterol. Forty women, half with metabolic syndrome (MetS), had whole body, lumbar spine, hip and forearm BMD assessed by dual-energy X-ray absorptiometry (DEXA) scan. Serum 25(OH)D concentrations were assessed by enzyme-linked immunosorbent assay (Immunodiagnostics Systems Ltd., Fountain Hills, AZ). No women had 25(OH)D <25 nmol/L, 15% were between 25 - <50, 55% were between 50-<75, and 30% had ≥ 75 nmol/L. Mean (SD) for 25(OH)D was 62 (18) for women with MetS and was not significantly different (p<0.10) from the mean of 71 (15) for control women. Z scores for BMD for age were higher in the lumbar spine (p<0.0004) and hip regions (p<.0024) for women in the MetS group and BMD tended to be higher (p<0.06) in the whole body in the MetS group. BMD was not significantly different in the forearm between control and
EFFECTS OF MANGIFERIN ON METABOLIC SYNDROME RISK FACTORS IN MICE FED HIGH FAT DIET

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Subject Area: Biological Sciences

Mango possesses various bioactive compounds which may reduce factors involved in metabolic syndrome. This study compared the effects of freeze-dried mango pulp, mangiferin (major phenolic compound in mango), and rosiglitazone (a glucose-lowering drug) in modulating body composition, plasma glucose, and lipid concentrations in mice fed high fat (HF) diet. Two-month old male C57BL/6J mice were randomly assigned into one of five dietary treatments (n=8/group) for eight weeks: control (4% fat calories), HF (60% fat calories), HF + mangiferin (0.44mg/kg diet), HF +1% (w/w) freeze-dried mango, or HF + rosiglitazone (50mg/kg diet). All HF fed mice had higher body weights compared to the control. However, freeze-dried mango but not mangiferin was able to modulate body weights similar to rosiglitazone but not statistically different from HF diet. Freeze-dried mango but not mangiferin increased % lean mass compared to the HF diet. Similarly, freeze-dried mango but not mangiferin modulated % fat mass, plasma triglycerides, and free fatty acids but not statistically different from the HF diet. There were no significant differences in total liver lipids and glucose tolerance tests. Mangiferin at the dose used is not a major contributor to the positive effects of freeze-dried mango on risk factors of metabolic syndrome.

Quantifying the First Flush in Rooftop Rainwater Harvesting

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Subject Area: Physical Sciences & Technology

Rainwater harvesting, an ancient technology, is gaining interest in low impact development to reduce urban runoff and treated water use. However, a major concern for many is the water quality of the harvest, particularly the first flush. This research tests the hypothesis that a site-specific first flush volume can be quantified in rainwater harvesting based on the roofing material and roof orientation. Data will be collected in two locations, Oklahoma City and Stillwater, OK, from actual and simulated rainfall events, respectively. In Stillwater, eighteen simulated structures have been constructed with new asphalt shingles, new metal sheeting and 60 year-old clay tile roofing. The roofs are oriented either north-south or east-west in order to determine if roof orientation, in relation to the sun and prevailing wind direction, has a significant impact on rooftop runoff water quality. For the Stillwater location, the first flush is characterized by discrete-sample analysis of specific conductance, turbidity, total suspended solids, polycyclic aromatic hydrocarbons (PAHs), flame retardants, metals and nitrate in rooftop runoff collected throughout a simulated storm event. Preliminary results from two simulated rainfall events in the Stillwater location are presented.
The Effect of students' continuance commitment on their overall college persistence

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Subject Area:  Education

The purpose of this research is to seek a possible connection between students' continuance commitment and their overall educational commitment. It attempts to estimate the correlation and predict students' persistence using their continuance commitment level. Fifty subjects selected from a population of 292 students enrolled in an orientation course at a regional college in the United States participated in the study by answering 13 items following a 5-point Likert scale and reflecting their levels of affective, continuance, and normative commitment. Data analyses using a combination of categorical and continuous multiple regressions indicated that 53 percent of the variability in students' overall college commitment was accounted for by gender and continuance commitment. However, males and females did not differ significantly in predicting their overall college commitment. In other words, there is basically no difference between males and females in how continuance commitment was used to predict students' persistence.

Combination of Chitosan and Dextran as a Novel Gene Delivery System

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Scholar from Columbia University
Scholar Symposium Participant
Subject Area:  Biological Sciences

Chitosan is a naturally occurring cationic polymer that is an ideal candidate for drug/gene delivery. However, its transfection efficiency is poor. Our hypothesis is that chitosan binds too strongly to DNA thereby inhibiting its release. Thus, incorporation of an anionic polymer like dextran sulphate can improve its transfection efficiency. In this study we are evaluating if a chitosan and dextran combination is an efficient carrier for DNA. We used pCpG Luciferase (pCpGLuc) as a model plasmid for testing the efficiency of this delivery system. The study was completed in two stages. The first stage involves preparation and characterization of nanocomplexes. Nanocomplexes were prepared using medium molecular weight chitosan (MM-HD) and low molecular weight chitosan (LM-HD) with pCpGLuc. N/P ratios of plasmid DNA: chitosan varying from 10 to 100 were studied to optimize the best delivery system. Size and charge of nanocomplexes were evaluated using a Nano ZS-series zetasizer. In the second stage, the transfection efficiency of nanocomplexes were tested in human embryonic kidney (HEK293) cells. Transfection efficiency was quantified using a luciferase assay. Our results show that an N/P ratio of 25 gave the best transfection. Low molecular weight chitosan was more efficient at delivery than high molecular weight chitosan.
weight chitosan (MM-HD) and low molecular weight chitosan (LM-HD) with pCpGLuc. N/P ratios of plasmid DNA: chitosan varying from 10 to 100 were studied to optimize the best delivery system. Size and charge of nanocomplexes were evaluated using a Nano ZS-series zetasizer. In the second stage, the transfection efficiency of nanocomplexes were tested in human embryonic kidney (HEK293) cells. Transfection efficiency was quantified using a luciferase assay. Our results show that an N/P ratio of 25 gave the best transfection. Low molecular weight chitosan was more efficient at delivery than high molecular weight chitosan.

Prediction of satisfaction with intrinsic job facets based on compensation satisfaction

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Subject Area: Social Sciences

Monetary compensation is often heralded as a limited factor in job satisfaction. In today's difficult economy, where many individuals are underemployed compared to their educational level, the likelihood that an individual will have a salary that only marginally reflects their skill level is greatly increased. Because job satisfaction is neither a "yes or no" question nor based solely on one factor, the extrinsic factor of compensation satisfaction may not be predictive of other intrinsic satisfaction levels. This study explored the intrinsic job satisfaction facets of creativity utilization and ability utilization as predicted by one's satisfaction with compensation. Utilizing Multiple Regression, the researcher determined that compensation was a significant factor in both one’s satisfaction with ability utilization and one’s satisfaction with creativity utilization.

Complex syntax and withdrawn behavior in children

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Subject Area: Education

The development of complex syntactic production is a key aspect of language development. Children with speech and language difficulties have higher levels of withdrawn behavior, which may be related to complex syntactic abilities. This study investigated the complex syntactic production of children with speech and language difficulties and its relationship to their withdrawn behaviors as noted by their parents.

EFFECT OF ETHANOL ON THE ACQUISITION AND PERFORMANCE OF A CONDITIONED RESPONSE IN THE ZEBRAFISH (DANIO RERIO)

Daniel Lizotte
Scholar from the California State University, Eastbay
Scholar Symposium Participant
Subject Area: Social Sciences

Alcoholism and alcohol abuse remain among the major contributors to death and disability worldwide. The mechanisms of this disease, however, are not yet fully understood. This research project used a zebrafish model to study how alcohol might impair learning and memory. Zebrafish are a useful model due to their rapid development, access to genetic manipulation, and large number of genetic mutants, offering the promise of determining the molecular mechanisms of neurobehavioral functions underlying the disease. Specifically, the project examined the effects of alcohol (ethanol) on the acquisition (learning) and performance of a conditioned response, using a “repeated-acquisition” research protocol. The protocol
arranged repeated tests for subjects in which they were exposed to different amounts of alcohol (.25, .5, 1 percent, and no alcohol) either while they were learning a task, or after they have learned the task. This allowed us to discern the effects of alcohol on learning and memory. The task involved presenting the fish with the illumination of a small submerged lamp (the conditioned stimulus) followed by a small quantity of food (the unconditioned stimulus). After several pairings of the conditioned and unconditioned stimuli, the fish approach the conditioned stimulus before the food was presented (conditioned response).

Over the period of one month, we repeatedly trained the conditioned response for several days and then extinguished the conditioned response for several days (extinction involved presenting the conditioned stimulus without the unconditioned stimulus). The effects of ethanol on learning and memory were assessed by exposing the fish during the first trial in training, or during the initial trial of extinction. Results showed that ethanol showed little to no effects in any of the 4 groups during extinction. After extinction, however, the control (no alcohol) group showed an increase in conditioned responding whereas the three ethanol groups did not. In other words, the control group recovered the condition response faster as compared to the groups who were exposed to ethanol.

The results suggest that alcohol impairs learning and memory in zebra fish. Future studies should use zebrafish models to examine the genetic and neural underpinnings of these cognitive effects. A better understanding of these mechanisms has applied significance for humans because alcohol-impaired learning and memory may contribute to substance abuse clients’ inability to recall treatment-related details, which, in turn, might contribute to the high rate of alcoholic recidivism.

**Thermal Properties of Adsorbed Poly(ethylene-co-vinyl acetate)on Silica**

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Department of Chemistry
Subject Area: Physical Sciences & Technology

Poly(ethylene-co-vinyl acetate) is a copolymer with variable properties resulting from different percentages of ethylene and vinyl acetate. The properties of this polymer can be further altered by adsorbing into a surface such as silica. In this study, poly(ethylene-co-vinyl acetate)-silica composites were prepared by adsorbing poly(ethylene-co-vinyl acetate) with varying vinyl acetate percentages to silica. The properties of adsorbed polymer were determined by using thermal analysis and FTIR. Due to the interaction of carbonyl groups in vinyl acetate with surface hydroxyl groups on silica, a shift in carbonyl stretching frequency for bound carbonyls was observed. By analyzing peak intensities of the bound carbonyl and free carbonyl resonances for the composites with same adsorbed amounts, but different vinyl acetate percentages in the polymer, we observed that the fraction of bound carbonyl increases with decreasing vinyl acetate percentage. The behavior of the adsorbed polymer in the glass transition region was also studied using MDSC. The behavior of the polymer composites in the glass transition region is complicated because of the compositional drift, crystallinity and monomer composition. Examination of glass transition region for different adsorbed amounts of the polymer indicated that there is an increase in the glass transition temperature of the adsorbed polymer compared to bulk.

**How CTE Students Monitor Orientation Learning in Desktop Virtual Reality**

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Subject Area: Education

Orientation is the process whereby one becomes aware of objects in a space and the positions of the objects relative to each. Educators in career and technical education (CTE) increasingly use desktop virtual reality (VR) to orient students to complex technical environments such a medical operating rooms. This study examined how affective judgments of confidence and difficulty that CTE students make towards a VR-
based orientation learning activity might help them monitor orientation learning. Fifty-five surgical technology students used a VR system to orient themselves to a complex hospital operating room scene. Students completed an orientation test and rated (1) their confidence in orienting themselves to the operating room orientation and (2) their perceived difficulty in learning the environment. Confident learners performed better on the orientation test, and those who found VR-based learning to be difficult tended to not perform as well. The strength of the relationships between perceived confidence and orientation score, and, to a lesser extent, between perceived difficulty and orientation scores, suggested that CTE students accurately monitored learning through affective judgments. Monitoring affective judgments during VR-based orientation learning may help students to gauge their progress and more effectively manage learning complex environments with VR.

The Relevance of Retention Programs in Higher Education: A Case Study of the Cooper Woodson College Enhancement Program

Jeraniqua Martin
Scholar from the California State University, Sacramento
Scholar Symposium Participant
Subject Area: Education

Programs designed to improve student retention lead to improved learning outcomes for all students. Students enrolled in the Cooper Woodson College Enhancement Program (CWC), a retention program at a metropolitan university in Northern California, have increased graduation rates, higher satisfaction with their undergraduate experiences, and increased participation in campus activities. The current research uses CWC as a case study to explore the aspects of retention programs that lead to successful undergraduates, and to create a model for other diverse institutions to use.

Computer Assisted predictions of Chemical and Biological Properties from Vibrational Spectra

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Subject Area: Physical Sciences & Technology

Using the wavelet packet transform and a genetic algorithm for feature selection, a two step procedure for analyzing complex near and mid infrared multivariate calibration data sets has been developed. The wavelet packet tree is used to denoise and deconvolute NIR spectra by decomposing each spectrum into wavelet coefficients, which represent the samples constituent frequencies. A genetic algorithm for multivariate calibration is then used to identify the coefficients, whose PC or PLS subspace possesses the following property: points in the subspace are distributed according to the value of the dependent variable. A study on the analysis of API concentrations in pharmaceutical tablets illustrating the advantages of this approach is discussed.

Effects of selenium supplementation and chronic inflammation on bone microarchitecture and strength in mice

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Subject Area: Biomedical Sciences

Timed-pregnant C57BL6 mice were fed a Torula yeast selenium-depletion diet from the final days of gestation through lactation. At 23 days of age, pups were weaned and randomly assigned to the depletion
diet or to diets supplemented with 0.2, 2 or 4 mg/kg diet of Se added as sodium selenate for 14 weeks. At 96-98 days of age mice were randomly assigned to placebo or to lipopolysaccharide (E. coli Serotype 0127:B8) treatment to produce chronic inflammation. Time release pellets (0 or 0.1 ¿g/g body weight/d) were implanted subcutaneously. Body weight was reduced by LPS 14 days after implantation but differences were no longer significant by 28 days. Bone microarchitecture was evaluated in tibia and 4th lumbar vertebra (L4) and force to compress was estimated on trabecular cores using finite element analysis (Scanco ¿CT40). Bone volume/total volume, connectivity density, and trabecular number were significantly reduced by LPS treatment while trabecular separation was increased by LPS treatment in both bones. In spine significant interactions affected size-independent stiffness and von Mises stresses. Overall, chronic inflammation at a level that does not produce severe body weight loss still significantly impaired measures of bone microarchitecture and strength.

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**Email's effect on personal opinions of others**  
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Department of Psychology  
Subject Area: Social Sciences

E-mail is a common communication tool. Email studies have found that the nature of an e-mail can lead to varied perceptions of the sender (Epley, Kruger, Parker, Ng, 2005; Anderson & Jessmer, 2002). Other research has shown that relationships can be damaged by stress due to negative-sounding emails (Mano & Mesch, 2010). Studies have also shown that certain relationships can be solidified through positive interaction in emails (Sheer & Fung, 2007). No study to the researchers' knowledge has examined whether an individual's opinion of someone can be manipulated based upon emails from that person. We investigated the hypothesis that the opinion a recipient has about an email's sender will persist despite the nature of the e-mail. Two hundred forty undergraduates participated in an online survey. They completed questions about a professor (friendly or unfriendly), and answered questions about a hypothetical email (positive, negative, or neutral) from that professor. Results indicated that more positive scores were not dependent upon the gender of the professor for any question. Friendly professors always received the highest ratings, and those professors in the positive email group received higher ratings than the negative or neutral email group. Implications for workplace and university email interactions are discussed.
Do Juvenile Justice Workers' Theories of Intelligence and Causal Attribution for Delinquent Youth Achievement Matter for Worker Efficacy?

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Subject Area: Social Sciences

The purpose of this study is to examine relationships between juvenile justice workers’ efficacy, workers’ implicit theories of intelligence (entity versus incremental), and workers’ attribution for adjudicated delinquent youths’ achievement (success versus failure). Community probation and parole counselors, reintegration specialist and juvenile support workers in treatment facilities throughout Oklahoma participated in this study. Hierarchical multiple regression analysis will be used to examine how workers’ beliefs of intelligence and their attribution for youths’ success and failure predict worker efficacy.

Implicit theories of intelligence may affect the workers’ efficacy regarding their impact on youth development and behavior management. Workers ascribing to an incremental theory may have a high level of efficacy since they may believe they are able to enhance youths’ abilities and influence youth learning. Workers ascribing to an entity theory may have low levels of efficacy since they may feel they have little to offer poor performing youth (Leroy, Bressoux, Sarrazin, & Trouilloud, 2007).

This study will provide empirical evidence regarding workers’ beliefs about the stability of youths’ abilities and causal interpretations of how youths’ achievement influences workers’ sense of efficacy and affect the extent to which workers’ take responsibility for the success and failure of youths’ treatment and rehabilitation.

The Role of Iron Status in Modulating Microglial Cell Activity

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Subject Area: Biological Sciences

Iron, an essential micronutrient, has many biological roles including oxygen transport, energy metabolism, and cellular differentiation. The redox property of iron allows it to play an integral role in electron transfer. However, excessive accumulation of iron in cells increases the potential for iron to function as a pro-oxidant. Interestingly, iron accumulation in tissues such as the liver, brain and pancreas increases with age and it has been suggested to contribute in the development of chronic diseases such as cardiovascular, neurodegenerative, and metabolic diseases. In particular, the iron storage protein ferritin is significantly increased in brains of individuals with neurodegenerative disease, suggesting iron may be involved in the pathology of neuroinflammation. One of the key cell types involved in the neuroinflammatory pathway is the microglial cell. Microglia are resident macrophages in the brain that aid in the removal of degenerating tissue in addition to secreting cytokines and growth factors. In the present studies, the BV2 microglial cell line were cultured in the presence of iron or in the presence of an iron chelator and subsequently exposed to lipopolysaccharide. The expression genes encoding proteins for pro-inflammatory cytokines or cellular iron metabolism were assessed.

Bird Wing Design and Its Application to UAVs

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Subject Area: Physical Sciences & Technology

Several unmanned aerial vehicles specifically micro aerial vehicles have been designed to resemble birds so that they can blend in with nature when seen from a distance. This project seeks to learn how the natural
design of birds' wings can be applied to make more realistic and efficient bird-shaped aircraft wings. This was done by comparing various wing designs to a control wing to observe the improvements and losses. Computer simulations using X-foil were performed to determine expected results and then wings were designed and constructed to perform wind-tunnel tests and obtain experimental performance data. Wings were built in a standard rectangular configuration (the control), a bird wing shape, and a bird wing shape coated with carbon fiber feathers; these wings also featured an interchangeable plate on the tip to test the effect of the wing slots (feathers that project from the tips). Wind tunnel tests were performed to determine lift and drag of the configurations. Particle image velocimetry tests were then performed to observe the flow changes caused by wing shape, carbon fiber feathers, etc. The results were then compared to determine the most effective combination of performance and realistic look to create a bird-mimicking MAV.

Low-Temperature Approach to the Synthesis of Lead Vanadate

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Subject Area: Physical Sciences & Technology

Metal oxides are an important class of materials due to their wide range of applications. Nanoscale oxides have attracted great attention because of their interesting physical and chemical properties. This poster will cover the investigation of simple and low-temperature method to prepare ternary oxides using generic and abundant inorganic chemicals. Suspensions of lead vanadate PbV2O6 nanoparticles were prepared at room temperature by the reaction of dilute aqueous solution of V2O5 with dilute aqueous solution of Pb(NO3)2. Particle size measurements using Nanoparticle Tracking Analysis (NTA) showed that the particles in the stable suspension are in the nanometric size range. The prepared materials were characterized additionally by microscopic and spectroscopic techniques.

Pluralist Socio-Economic Model for a Postmodern Society

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Subject Area: Social Sciences

As a direct reaction to the modernist movement in Architecture, this research proposes a conceptual model to aid in developing architecture that maximizes pluralistic values of functional, contextual, and social utility. These pluralist values are taken from the humanist code of ethics which upholds universal democratic ideals. A humane approach to architecture will balance its functional, contextual, and social utility for a given time and place. The proposed conceptual model graphically represents functional, contextual, and social dimensions and illustrates where architecture maximizes its benefit to society. A full derivation and appropriate descriptions for each step of the process is included in this project. The entire derivation is developed with variables that represent real values within these functional, contextual, and social dimensions since currently there is no empirical data to measure or scale these values. While the research theoretically maximizes the utility function of an architectural project, it concludes that there needs to be greater awareness of the more complex function for architecture does exists in reality. This awareness may help architects produce architecture that most greatly benefits society.
Aleeks as a Personal Math Tutor for College Students

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Scholar Symposium Participant  
Subject Area: Education

Math instructors have been longing for a tutoring system to improve students' mathematical skills. Implementing technology in the classroom could serve as a solution to this problem. ALEKS is a mathematical intelligent tutoring system designed to zero in on the strengths and weaknesses of a student's mathematical knowledge (McGraw Hill Higher Education, 2008). A survey was given to nine participants about the usability of the ALEKS program. Seven out of nine students responded that they felt engaged during each session with the program. The primary aim of this study was to examine how implementing intelligent tutoring systems in the classroom of math courses can increase student's engagement with the course and how students interact with the system.

Can Intrinsic Religiosity Protect People with an Acquired Capability for Suicidal Behavior?

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Department of Psychology  
Subject Area: Social Sciences

Intrinsic religiosity has been found to be negatively associated with suicidal ideation as well as suicide attempts (Nonnemaker, McNeely, & Blum, 2003). Joiner (2005) posited that an individual experiencing suicidal ideation must also have an acquired capability to engage in self-injury in order to engage in suicidal behavior. This acquired capability can develop following repeated exposure to painful experiences, which can then lead to a reduced fear of pain and harm. The current study examines the ability of intrinsic religiosity to act as a moderator of the acquired capability to engage in self-injury. Participants were 381 university students who completed a series of questionnaires assessing intrinsic religiosity, acquired capability, and suicidal behavior. It is hypothesized that intrinsic religiosity will moderate the effects of acquired capability to engage in self-injury in predicting suicidal behavior, such that individuals with high acquired capability will be less likely to have engaged in suicidal behavior if they also have high levels of intrinsic religiosity.

EXPRESSION OF ALTERNATE FORMS OF PSBA2 GENE IN PARALLEL TO STUDY THE D1 TURNOVER PROCESS IN SYNECHOCYSTIS SP. PCC 6803

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Subject Area: Biological Sciences

Photosystem II (PSII) a membrane protein complex is recognized as the main site for high light induced damage during the water oxidation process. One of the core subunits of PSII, D1 protein encoded by the psbA gene, is identified as a high turnover protein that undergoes degradation and replacement as a part of the repair process in PSII. It is believed that during repair damaged D1 is replaced by newly synthesized D1. Although, it has not been shown if this process is targeted towards damaged D1 subunits only or generalized towards all D1s’. An attempt is being made to address this question of targeted versus generalized repair using a dual D1 expression system. A strain expressing two psbA2 genes from native and ectopic location was constructed using chemical synthesis, fusion PCR and traditional cloning. The D1 ectopic strain was constructed at first by transforming a triple psbA deletion strain with a chimeric psbA2. Dual D1 strain was constructed by introducing second psbA2 into the D1 ectopic strain. Evaluation of the PSII activity of these
strains shows similar levels of PSII. These results and others collectively provide early indications that D1 degradation might be targeted towards damaged D1 only.

Schematic representation of dual D1 expression system developed to address targeted versus generalized D1 repair

Cloning, Expression, Purification and Partial Characterization of Two Aspergillus clavatus NRRL1 1,4-β-Mannosidases

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Plant cell wall polysaccharides are a source of renewable energy such as biofuels owing to the fact that they are the most abundant carbon reserves. It can be conveniently divided into three groups namely cellulose, hemicellulose and pectin. Hemicellulose, composed of xylan, arabinan, mannan, glucomannan, galactomannan and glucogalactomannan, is the second most abundant biopolymer component of plant cell walls. Due to its complex composition, a large set of enzyme is necessary to degrade the plant cell wall. One of the key enzymes that catalyze the random hydrolysis of β-1,4-mannosidic linkages in these polysaccharides is the endo-β-1,4-mannosidase (endo-β-1,4-mannanase). As commonly found in other glycoside hydrolases that attack plant cell-wall structural polysaccharides, endo-β-1,4-mannosidases often display modular architecture that include non-catalytic modules known as carbohydrate-binding modules (CBMs), that bind to plant polysaccharides and help enzymes to act on their target. In this work we report the cloning, overexpression, purification and partial characterization of two endo-β-1,4-mannosidases from A. clavatus, where one of these presented a CBM. We used our Aspergillus nidulans expression system and the recombinant enzymes were highly expressed and secreted in to the culture medium. The properties of the recombinant enzymes are also reported, and our results demonstrate that recombinant endo-1, 4-β-mannosidases from A. clavatus are thermo- and alkali-stable, and thus suitable for various industrial applications.

Support: United States Department of Energy and United States Department of Agriculture
Methods of Genome Association Mapping with Rare Variants for Nominal Responses

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Subject Area: Physical Sciences & Technology

An allele with a minor allele frequency of 5% or less is termed a rare variant. It has been shown for case control designs that usual association methods lack adequate statistical power to detect a true association with a rare variant. Within the last five years published methods for including rare variants in analyses have mostly been for case control designs. The few published methods that can be used for data with a nominal response having more than two categories have not been adequately evaluated. The properties of these methods need to be statistically assessed with simulations. In this study, we propose a nonparametric method of association for rare variants when the response is nominal by extending a published method by Madsen and Browning (2009) where only case control data were considered. The performance of our proposed method is evaluated and compared with existing methods for nominal responses.

Development and characterization of novel 3D ECM mimicking electrospun scaffolds for vascular tissue engineering

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Subject Area: Biomedical Sciences

One of the natural scaffold models in the human body is the extracellular matrix (ECM), which supports cells and their growth locally. Then again, formation of new blood capillaries is impossible without extracellular matrix degradation so therefore the ECM plays an important role for completing vessel formation and maturation. To mimic specific physical properties of the extracellular matrix we have focused on tailoring the physical properties of Ethylene-Co-Acrylic acid (EAA), Polycaprolactone (PCL) and Polyethylene Oxide (PEO) scaffolds formed from electrospinning. To evaluate the vascularization of these novel scaffolds we have begun to test the in vitro cytotoxicity of scaffolds and design a method for in vitro and in vivo angiogenesis quantification. Endothelial cells in culture and spheroids have been used for angiogenesis studies. Finally, we aim to develop a novel ECM mimicking scaffold that stimulates and supports angiogenesis to accelerate wound healing and vascularization.

The effects of live chat on users’ impressions of the art museum website and the artworks displayed through it

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Scholar Symposium Participant
Subject Area: Social Sciences

Currently, many websites provide the function to chat with other users while browsing a website, especially entertaining websites such as Hulu. Live chatting enables users to share their thoughts and emotions about the content while they are exploring a website. Previous studies found that live chatting enhances positive attitudes toward a website by giving users feelings of sociability and human warmth on a website. Thus, this study explores whether live chatting with others in an art museum website can potentially heighten their impression of the site as well as allow them to engage in the website content. This study will give a better understanding of the importance of message interactivity on a website.
Management Styles in Higher Education

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School of Health, Leisure & Human Performance
Subject Area: Education

The purpose of this study was to examine the conflict management style preferences and personality traits of unit leaders in baccalaureate programs within the field of recreation, parks and leisure studies curricula. Four questions guided this study. Research question one sought to investigate if relationships existed between conflict management styles and demographic variables, whereas research question two sought to investigate if relationships existed between personality traits and demographic variables. Research question three explored if personality traits and demographic variables could explain any amount of variance in conflict management style preferences. Finally, research question four examined if relationships existed between the conflict management styles and the personality traits. An electronic self-administered survey was developed to collect data. Two hundred sixty unit leaders which accounted for all the population of unit leaders. Findings of this study led the researcher to conclude that there is evidence to support a relationship between conflict management style preferences and personality traits, which supports previous research that concluded that personality does play an important role in determining conflict behaviors (Terhune, 1970a). This study was a snapshot investigation of the relationship between demographic variables, conflict management styles preferences and personality traits of one administrative group in higher education.

Electromyographic Analysis of Conventional and Rubber-Based Band Squats

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Health and Human Performance program
Subject Area: Biomedical Sciences

PURPOSE: To compare the electromyographic (EMG) activity of the vastus lateralis (VL) muscle amongst 3 resistance conditions on the back squat exercise. The no band (NB) condition used only the barbell plus weighted-plates. The bottom band (BB) and top band (TB) conditions combined weighted-plates with bands attached to the barbell originating from the bottom and tops of the power rack, respectively. METHODS: Twenty-two healthy, physically active collegiate males volunteered to participate (age = 22.4 ± 2.6 yr; height = 177.8 ± 9.7 cm; weight = 87.0 ± 19.0 kg). Both the eccentric and concentric phases of movement were divided into percent (%) intervals based upon the time it took each subject to complete the measured repetition. A pair of disposable bipolar surface electrodes (2-cm interelectrode distance, 1-cm² circular conductive area) was placed on the belly of the VL to measure the electrical activity of the muscle. RESULTS: At the 90% interval there was significantly greater VL EMG activity in both the BB and TB conditions than the NB condition (p < 0.05). CONCLUSION: The BB and TB conditions elicited greater VL EMG activity at the top of the range of motion when compared with the NB condition.

Inducing Conformational Changes in Shigella Invasion Plasmid Antigen B (IpaB) Upon Interaction with Chaperone Protein IpgC

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Abstract not submitted.
Accentuating Change with FAPST (Foreign Accent Perception and Sensitivity Training)

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Scholar from Cleveland State University
Scholar Symposium Participant
Subject Area: Social Sciences

Nonnative speakers of English carry the burden of adaptation to the mainstream native population. Native listeners, however, have not been expected to change or adapt their listening patterns to accommodate nonnative speakers. Working with Dr. Amee Shah, we administered an innovative pilot training program to study and adapt listeners' perception and sensitivity to accented speech. The training program is called "Foreign-Accent Perception & Sensitivity Training (FAPST)." It combines educational training about foreign accents, exposure to foreign accents, and systematic adaption of native listeners' perception in listening to foreign-accented speech samples. FAPST uses forty-six different accent samples (representative of various parts of the world) displayed with four to five accent answer options. In a randomized controlled study, this training was presented in the form of a quiz where the listener hears the accent, selects an answer choice, and receives feedback. Feedback includes the correct answer, the location of where the accent can be found on the world map, and a picture of an icon from that place. A randomized version of the quiz was taken once a week for eight weeks by the group of participating students. Once tested for efficacy, it will be used as a model to adapt and apply to classroom situations in future research proposals to determine if such an accent sensitivity and perception training will transfer to students' improved listening of their nominative class professor/instructor.

Analysis of Vanillin Extract Using Reversed Phase Liquid Chromatography with Water Rich Mobile Phases

Undugodage Don Nuwan Perera, Barry K. Lavine

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Subject Area: Physical Sciences & Technology

Vanillin (4-hydroxy-3-methoxybenzaldehyde) is the major constituent of vanilla extract. Natural vanilla extract prepared from the bean of a tropical orchid is expensive due to the limited supply of the bean. For this reason, synthetic vanilla extracts are widely used. Synthetic vanilla extracts are less complex and usually contain vanillin, ethyl vanillin, and other related compounds that are prepared from inexpensive starting materials. Several liquid chromatographic methods have been developed to quantitate coumarin, vanillin, and ethylvanillin in vanilla extracts. The use of water rich mobile phases in reversed phase liquid chromatography (RPLC), e.g., 1% butanol in water with 0.2% acetic acid with C18, C8, and cyanopropyl columns, has been investigated as a potential method to characterize the composition of synthetic vanilla extracts. Better resolution is achieved in the separation of vanillin compounds when hydrophobic alcohols are used as organic modifiers in RPLC, can be attributed to butanol partitioning into the bonded phase which provides a more extended ordered surface increasing the contact surface area of the stationary phase. Using water rich mobile phases, it is possible to quantitate the various constituents comprising synthetic vanilla extracts at lower concentrations and to identify constituents of vanilla extracts that have not been previously reported.
Resilient Thinking Styles

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Subject Area: Social Sciences

The present research investigated the relationship between thinking styles and resilience. Prior research has suggested that cognitive factors, such as coping strategies, play an important role in resilience (Eliott, Sahakian, & Charney, 2010) and that cognitive problem solving can mediate the effects of stress and promote resilience (Shure & Aberson, 2005). We report the results of a study involving 81 community college students in which we measured thinking styles using the Thinking Styles Inventory Revised II (TSI-R2; Sternberg, Wagner, & Zhang, 2007), which identifies a total of 13 distinct thinking styles, and resilience using the Resilience Scale for Adults (RSA, Friborg, Hjemdal, Martinussen, Rosenvinge, 2009), which assesses six aspects of resilience. The results of a multiple regression analysis revealed that only two of the 13 possible thinking styles significantly predicted resilience. The two resilient thinking styles were a) executive, which is characterized by a preference to follow established rules and be productive and b) external, which is characterized by an emphasis on the social relationship and collaboration. The results suggested that having either an executive or external thinking style may lead to greater resilience. Implications for educational settings will be discussed.

Phosphate remediation using iron oxyhydroxide in aqueous systems

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Subject Area: Physical Sciences & Technology

Phosphate is normally the limiting reagent for eutrophication of natural waters so that entry of phosphate into waters from sewage or agriculture run-off can have a strong negative influence on water quality. Due to this the remediation of phosphate from waste water from commercial uses is of great concern. Furthermore, phosphate is a natural resource that would ideally be captured and used as a fertilizer. High surface area nanocrystalline iron oxyhydroxide is easily synthesized from the calcination of iron pyruvate acid oxime at low temperature. This precursor is designed to decompose at relatively low temperature to small volatile fragments (acetonitrile, carbon dioxide, and water) while depositing reactive metal oxides. In this study the uptake of aqueous phosphates by the iron oxyhydroxide thus produced will be discussed.

A Meta-Analytic Literary Review of Sexual Abuse and Eating Disorder Correlates as Reported in Peer-reviewed Journals

Noel Reynolds
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Scholar Symposium Participant
Subject Area: Social Sciences

The purpose of this analysis is to examine the peer-reviewed journal literature in regards to sexual abuse and eating disorders. This analysis will assess the methodologies and measurements used in various studies, the conclusions drawn, and the implications of the research in correlating different variables with the onset of eating disorders (ED's). In order to obtain a common frame of reference while reviewing the results and conclusions offered by the various studies, the paper begins with a brief assessment of sexual abuse and ED's.

Finally, this analysis will conclude with a discussion of conclusions and inferences offered by the authors of the aforementioned studies.
Examining the influence of beverages on vocal quality: a pilot study

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Subject Area: Social Sciences

This single-subject pilot study utilized the Kay Computerized Speech Lab (CSL) Multidimensional Voice Program to measure the fundamental frequency (Fo), jitter, and shimmer in the voice of a 20-year-old female following ingestion of the following beverages: water, grapefruit juice, milk, and Coca Cola. The total study duration was five weeks. Sixteen ounces of each beverage were consumed over a one hour span on five consecutive mornings following a one week baseline establishment (i.e. no beverage consumed). Voice data were collected immediately following consumption. Vocal jitter was observed to be significantly elevated from baseline following water consumption, only. The study protocol required abstinence from other substances (e.g. caffeine, anti-inflammatories, diuretics, antihistamines, calcium, and magnesium) that could also alter vocal quality for twelve hours prior to data collection; therefore, the validity of the findings is not questioned for this participant. In addition, menstrual cycle phase was tracked and will be discussed. The investigators intend to expand the study to determine if the interesting and unexpected trend is observed in a participant cohort.

This study was funded by the National Science Foundation REU SMA 1063091, The Biological Basis for Human and Animal Behavior.

The Relationship of Personality Styles to Reassurance Seeking

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Excessive reassurance seeking (ERS) is a maladaptive interpersonal behavior which conveys risk for anxiety disorders (Rector et. al., 2011) and depression (Joiner & Metalsky, 2001). ERS may play a role in Beck’s (1983) model of depression, which suggests that hypersensitivity to depleted relationships (sociotropy) or goal-attainment (autonomy) conveys vulnerability to depression. Research has found a relationship between sociotropy and ERS (Beck et. al., 2001), but has not clarified whether autonomy is related to ERS or which components of sociotropy and autonomy are associated with ERS. The current study tests these hypotheses using two regression models. A sample of 269 undergraduates (71% female) at a large Midwestern university completed self-report measures of ERS, sociotropy, and autonomy. Sociotropy predicted ERS scores (β=.31, p=.002), but autonomy did not. Dependency predicted ERS (β=.28, p=.01), but the other sociotropy subscales did not. Interpersonal dependency accounted for 13.3% of the variance in ERS scores. Consistent with previous findings, this study suggested that sociotropy, but not autonomy, predicts ERS. Furthermore, interpersonal dependency was the only aspect of sociotropy which predicted ERS scores. These data suggest that individuals high in dependency are more likely to engage in ERS and may be at greater risk for depression.

A state wide survey of Entomopathogenic nematodes (EPN) across Oklahoma's ecoregions and between two agricultural practices

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Subject Area: Biological Sciences

Entomopathogenic nematodes in the families Steinernematidae and Heterorhabditidae are obligate parasites of arthropods, exist naturally in soils worldwide, and have been used to suppress soil-dwelling insect pests. Little has been done to catalogue EPN diversity within Oklahoma. Ranging from east to west, Oklahoma is...
home to 11 different ecoregions, 9 precipitation zones and 7 soil orders. This study aims to characterize EPN communities throughout these diverse habitats. An additional objective of this study will be to compare EPN communities in organic versus conventional beef and wheat production systems within the same ecoregion. A combination of bioassay technique and molecular identification will be used to identify species at all sites. Preliminary soil samples from paired landscapes of organic and conventionally managed wheat fields and pastureland were subjected to bioassay using G. mellonella to ascertain infection rates by EPN. EPN were identified, initially by G. mellonella symptoms, and then confirmed using DNA sequencing. Based on symptomatic indications at least three species and two different genera were represented. Molecular identification is pending. Overall infection rates were 7.70% (n=384) in organic wheat, 2.80% (n=378) in conventional wheat, 10.50% (n=186) in organic cow pasture, and 8.30% (n=192) in conventional cow pasture.

Male Students' Attitudes toward Women's Studies Courses

Cornell Roberts, Deborah Gordon, Ph.D.
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Scholar Symposium Participant
Subject Area: Social Sciences

Among the many research studies that have interviewed college students, few have dealt with the issue of the male students' attitudes toward women's studies courses. Because of the lack of information published on this topic, it is difficult to say whether those attitudes might be positive or negative. This research explores the feelings of male peers toward women's studies courses. The study also hopes to address misconceptions regarding men's notions about women's studies courses and whom they benefit. In addition, the study hopes to dismiss some of the negative myths concerning women's studies courses with the possibility of increasing the interest of men in these courses. Future research will consist of asking male college students at a mid-sized university in the Midwest to complete a survey about their attitudes, to explore their views about women's studies courses.

Role of Autophagy Proteins in Control of Murine Norovirus (MNV)-Replication by IFN-γ

Nicholas Scanlon, Seungmin Hwang, Herbert "Skip" Virgin
Scholar from Harding University
Scholar Symposium Participant
Subject Area: Biological Sciences

Understanding the role of viral and host genes in various disease processes is an important component in the development of novel anti-viral strategies. Murine norovirus (MNV) is a model system to study the biology and pathogenesis of human noroviruses, which account for the majority of non-bacterial gastroenteritis worldwide. In contrast to human norovirus, MNV can be cultured in vitro. Furthermore, it can infect normal laboratory mice, allowing for the study of the molecular mechanism of norovirus interaction with its host both in vitro and in vivo. Recently, it was discovered that the cellular degradative autophagy pathway, especially the essential autophagy gene ATG5, plays a critical role in the IFN-γ-mediated control of MNV replication. In wild-type bone marrow derived macrophages (BMDMs), MNV replication was suppressed upon stimulation with IFN-γ. However, in ATG5-deficient BMDMs, MNV replication was not controlled by IFN-γ. In relation to this novel finding, our intention was to study the role of other autophagy proteins in IFN-γ-mediated control of MNV replication. Many proteins function in the autophagy pathway, but other than the ATG5-ATG12-ATG16L1 autophagosome elongation complex, it is not known whether other autophagy proteins and/or the entire autophagy pathway are involved in IFN-γ-mediated control of MNV. Better understanding the role of these autophagy proteins in IFN-γ-mediated control of MNV replication will give insight into the autophagy pathway and the host anti-viral response.
Elder Abuse in Indian Country

Janie Schroeder, Dr. Paula Carter and Dr. Jacqueline S. Gray

Scholar from the University of North Dakota
Scholar Symposium Participant
Subject Area: Minority Issues

Native American elder abuse is an issue that is beginning to get a lot of attention throughout Indian Country. Throughout the literature there are different definitions that summarize the construct of abuse. The terms that define elder abuse range from disrespect, neglect, mistreatment, exploitation, and physical abuse. It is important when researching and providing services that there is a consensus or a standard type definition to utilize. When assessing for abuse, many respondents will respond with a self-serving bias, where they will not acknowledge that abuse or neglect occurs due to the negative consequences that they fear. When researching the different tribal elder abuse codes there is a variety of wording utilized. Some tribes do not acknowledge the preventative aspect of elder abuse; rather they address just legal consequences. Yet some tribes address both the preventative and restorative aspect of elder abuse. The restorative piece of elder abuse is a very critical component to the prevention of further abuse and for moving Native American families and communities back into healthy balance.

Atomic force microscopy (AFM) images to a 3D model using a Matlab code

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Subject Area: Physical Sciences & Technology

Finite element analysis is an advanced tool used to model and predict material performance in various engineering applications. To perform any complex finite element analysis, model geometry needs to be created. Simple geometries are modeled directly in FE software or imported from CAD software. Our objective of this work is to create a solid model that has surface morphology like atomic force microscopy (AFM) images. AFM image of a typical surface was imported to matlab workspace as 256x256 matrix then a customized code was developed to create surface nodes from AFM image matrix. The solid model was meshed from top surface to bottom with cubical C3D4 elements. To import the model to a typical FEA software like Abaqus a text input file with “.inp” extension was created using a customized matlab code. This method is general and could be implemented to create 3D solid models from any input data of 3D surface geometry.

Microcrustacean Diversity in Ponds of Kern County, CA, that are infested with the Amphibian Pathogen Batrachochytrium Dendrobatidis (Bd).

Natasha Shroff and Dr. Antje Lauer

Scholar from the California State University, Bakersfield
Scholar Symposium Participant
Subject Area: Biological Sciences

The fungal pathogen Batrachochytrium dendrobatidis (Bd) causes the disease chytridiomycosis which has been associated with rapid population declines of amphibians in California and worldwide. The pathogen works by taking the form of a skin infection making them more susceptible to diseases. In this project, water and sediment samples were taken in each season from five ponds around Kern County, CA, in (2011) to detect the pathogen. The water samples were also tested for the presence of microcrustaceans which naturally feed off of Bd zoospores, and therefore may act as a method of eradicating the amphibian disease. Bd specific primers were used in PCR reactions to detect the pathogen, and it was found that the pond waters were positive for the pathogen in most seasons. Upon microscopy of pond samples it became evident that most locations contained members of the Ostracods (e.g. Seed Shrimp) and Copepods (e.g. Cyclops). Some pond waters contained Cladocerans (e.g. Daphnia) also. Since microcrustaceans were
present at all locations during each season tested, it can be assumed that the consumption of \( Bd \) by microcrustaceans could be an effective way of preventing or reducing the risk of chytridiomycosis outbreaks in amphibians.

### A Guide to Oklahoma Lawn and Landscape Water Conservation

**Courtney Sidwell, Justin Q. Moss, Dr. Dennis Martin, Dr. Mike Schnelle, Dr. Kathleen Kelsey**

**Oklahoma State University**  
**Department of Horticulture and Landscape Architecture**  
**Subject Area: Education**

With growing concern for water conservation across the United States and in Oklahoma, there is a need to educate citizens of proper methods to conserve water resources in the home landscape. Oklahoma is especially in need of this because of the increasing extremity of drought every year, the constant windy state, increasing population, and the fact that 50-60% of residential water use goes toward the lawn and landscape. In order to address this need to educate the public, the objective of this project was to create an Oklahoma lawn and landscape water conservation guide that will be developed, published, and freely available on the Oklahoma State University turfgrass website (http://turf.okstate.edu). The guide covers areas such as landscape design, plant selection, material selection, watering equipment, watering methods, and use of non-potable water.

### Sustainability Analysis using Aspen and Microsoft Excel

**Zach Sheffert**

**Oklahoma State University**  
**Department of Chemical Engineering**  
**Subject Area: Physical Sciences & Technology**

Increasing stress on our world’s natural resources means higher demand for more sustainable technologies in chemical process analysis and design. Engineers and scientists are patenting new “sustainable” technologies by the dozens, but many of these sacrifice important performance aspects in favor of lowering a few targeted metrics. Thus, it is important to develop an easy, comprehensive, and universal way to judge process sustainability. This project builds upon the sustainable design methodology using the SUSTAINABILITY EVALUATOR©, an Excel based tool which uses inputs from AspenTech simulation software. The software uses economic, health, environmental, social, and a variety of other criterion to formally define sustainability and achieve uniform analysis throughout the industry. Specifically, this project will be a detailed simulation of two Ibuprofen synthesis methods currently used to produce the drug today. It is hoped that this demonstrates the success of this new methodology as well as provides a detailed analysis of these two ibuprofen synthesis paths.

### The Influence of Stress on the Appetitive Nature of Drug Cues in a Nicotine Dependent Sample

**Sheridan Smith, Lechner, W.V., Mills, A.C., Judah, M.R., Grant, D.M.**

**Oklahoma State University**  
**Department of Psychology**  
**Subject Area: Social Sciences**

The affective modulation of the startle response has been utilized to examine the motivational valence of nicotine cues. A recent study reconfirming that nicotine cues are appetitive in nature promotes this paradigm as a potentially valuable tool for elucidating mechanisms involved in nicotine addiction. The current study examined the influence of stress, a negative affective state intimately linked with nicotine use, on the
affective modulation of the startle response to smoking cues. Twenty-nine nicotine dependent participants were randomly assigned to a stress or control condition directly before administration of the affective modulation of the startle response paradigm. Both groups evinced significantly diminished startle magnitudes in response to nicotine cues as compared to threat images. A pattern indicating a greater decrease in startle magnitude means while viewing nicotine images for individuals in the stress condition was observed, however the cue by group interaction was not significant.

**Effects of mango and its combination with rosiglitazone on clinical parameters in mice fed high fat diet**

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Subject Area: Biological Sciences

This study examined the effects of freeze-dried mango, a fruit rich in vitamins A and C as well as phenolic compounds, in modulating clinical parameters of mice fed high fat (HF) diet. The study also compared the effects of mango to rosiglitazone, a glucose-lowering drug, and determined if addition of mango to lower dose of rosiglitazone will have similar effects. Eight week-old male C57BL/6 mice were randomly assigned to one of the dietary treatment groups (n=8/group) for two months: control (10% fat calories), HF (60% fat calories), HF+1% or 10%mango, HF+50ppm rosiglitazone, HF+1%mango or 10%mango+25ppm rosiglitazone. As expected, body weight increased after consumption of HF diet. Both doses of mango had similar effect on body weight to the rosiglitazone group albeit not statistically different from the HF group. Plasma free fatty acid was modulated by 1% mango but not quite to the level of rosiglitazone. There were no significant differences in plasma lipids, glucose, and fructosamine among the HF-fed groups. The rosiglitazone group had the lowest glucose area under the curve after a glucose tolerance test. The combination of both doses of mango to a lower dose of rosiglitazone was not beneficial in modulating the assessed clinical parameters.

**Development and application of a rapid system for site-directed mutagenesis of photoactive yellow protein**

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Subject Area: Biological Sciences

Photoactive yellow protein (PYP) is found in the extremely halophilic Proteobacterium Halorhodospira halophila. This photoreceptor is a model system for understanding protein dynamics. Photoisomerization of the p-courmaric acid (pCA) chromophore in PYP triggers a photocycle. This involves transient protonation of the pCA, which in turn causes a conformational change that generates a biological signal. The mechanism by which pCA photoisomerization causes its subsequent protonation is not understood. This research aimed at obtaining and using a plasmid for the rapid and convenient site-directed mutagenesis of PYP. Using PCR-based approaches the pyp gene was cloned into a small bluescript vector ideal for Quickchange mutagenesis. Currently, this plasmid is being utilized to generate PYP mutants lacking most of its five Tyr side chains to allow future spectroscopic studies of the Tyr side chain at the PYP active site. The long-term goals of the project are to provide a highly convenient mutagensis system for PYP, and to determine what causes pCA protonation during the PYP photocycle. By producing multiple Tyr to Phe substitution mutants of PYP, vibrational spectroscopy promises to reveal changes in active site hydrogen bonding between Tyr42 and the pCA.
Dietary Iron Deficiency Alters Hepatic miRNA Expression: Implications for Regulation of Cellular Iron Metabolism

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Subject Area: Biological Sciences

Iron deficiency remains the most common single nutrient deficiency in the United States, affecting as much as 20% of the population. Lack of adequate dietary iron can result in iron deficiency anemia leading to decreased work capacity and impaired motor and cognitive development. Worldwide, millions of individuals experience negative health consequences due to iron deficiency, primarily due to altered iron metabolism in skeletal muscle. Surprisingly, the liver appears to be relatively resistant to the effects of iron deficiency and little is known about the relationship between the iron status of skeletal muscle and liver. One intriguing observation is that iron-sulfur cluster biogenesis and cluster stability between these two tissues is different. Recently, small regulatory RNA molecules called miRNAs have been identified as an important mechanism for regulating various cellular processes. Therefore, to begin to investigate potential causes for this difference, we first characterized the expression of miRNA in the livers of iron-sufficient and iron-deficient animals using a deep-sequencing approach. Initial results compiled from three different analyses indicate that at least six miRNAs are differentially expressed in the liver of iron-deficient rats. Ongoing studies include differential miRNA expression validation by quantitative real-time PCR, and potential miRNA target identification using bioinformatics.

Predicting ODWC Wildlife Expo Visitor Satisfaction

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Subject Area: Social Sciences

The Oklahoma Wildlife Expo is presented by the Oklahoma Department of Wildlife Conservation (ODWC) and a coalition of conservation organizations, agencies and sponsors. The Expo celebrates Oklahoma's natural diversity and opportunities for the sporting enthusiasts and newcomers. In September (23-25) of 2011, the Lazy E Arena was transformed into the state's largest indoor and outdoor recreation event - Oklahoma Wildlife Expo. Visitor feedback plays a vital role in future recommendations and alterations to the event and possibly other similar events.

During the expo the researchers employed the services of student volunteers to conduct exit interviews of visitors of the Oklahoma Wildlife Expo. Based on the results the researchers presented four overall experience satisfaction models: activity interest, experience, viewpoint related to children involvement in outdoor activities, and demographic attributes. Based on these models recommendations are presented to the Oklahoma Department of Wildlife Conservation regarding programming and offerings to increase overall satisfaction of specific target populations.

Fly Transfer of Human Pathogens to Fruit

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Subject Area: Biomedical Sciences

Since 2006, 14 Salmonella outbreaks have been reported in the US associated with plant products including fruits, nuts, and vegetables. Filth flies may have been mechanical vectors of human pathogens to plant derived foods. In order to determine whether flies common to farms can transfer Salmonella to fresh fruits, Calliphorid (blow) flies were exposed to manure containing Green Fluorescent Protein (GFP)-tagged strains of S. enterica for five hours. The flies were then exposed to fruit (strawberries, cherry tomatoes, blueberries,
grapes, and raspberries) for twenty four hours. The GFP-tag was used to identify S. enterica colonies cultured on Lysogeny Broth-ampicillin agar plates from the fruit surface. Preliminary results show fly transfer of S. enterica was found in 60% of the cherry tomatoes, 36.7% of the grapes, 70% of the blueberries, and 10% of the strawberries. These initial results indicate that fly transfer of Salmonella to fruit is possible and could be the source of bacterial contamination leading to human infection. This is important when considering the sources of Salmonella outbreaks related to fruits, vegetables and other plant products.

Sodium Bose-Einstein condensates generated in hybrid magnetic quadrupole and optical traps

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We present the design and construction of a novel apparatus to rapidly and simply generate 23Na Bose-Einstein condensates in hybrid magnetic and optical traps. Sodium atoms are collected in a magnetic-optical trap, captured in a magnetic quadrupole trap, and then cooled through forced radio-frequency evaporation. To avoid Majorana spin-flip losses at the center of the magnetic quadrupole trap, the cold dense atomic cloud is transferred to a crossed red-detuned optical dipole trap. By reducing the optical trap depth, sodium Bose-Einstein condensates are generated from forced evaporation and re-thermalization in the crossed optical trap. This hybrid approach combines the advantages of both magnetic quadrupole and optical traps.

Biomedical Experience in West Africa: The Gambia and Senegal

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Subject Area: Biomedical Sciences

West Africa is one of the most ethnically diverse regions in the world. It is home to over 300 different ethnic groups. There is a dire need for medical, environmental, and education programs. Langston University, a historically Black University, began study abroad programs in 1960 to several parts of the world. However, the study abroad program to West Africa commenced in 1999 and has remained uninterrupted for 12 years. This program allows an opportunity for students to earn college credits while attending classes and doing volunteer work. Students are able to perform volunteer work for several weeks in Lamtoro Clinic, National Agriculture Institute, New Eden International Nursery School, Albion Lower Basic School, Access Bank, Magistrate Court, Supreme Court of The Gambia, Immigration Post, Local Newspapers, Radio Station, S.O.S. Orphanages, Four Star Hotels in The Gambia, The Methodist School for Children with Needs and many more.

This project is the experience of one student during the 2011 Summer Study Abroad Trip to West Africa visiting The Gambia and Senegal. The project began in The Gambia and concluded in Dakar, Senegal. The purpose of this trip was to provided students with a theoretical framework for understanding Africa in a historical perspective, allowed students to examine and discuss African institutions such as The Family, Education (formal and informal), Religion, Industry, Economics, and Government, allowed students to differentiate between Afro-centric and Euro-centric systems of practices, and expose students to the history of the The Gambia and Senegal.
Structure-Activity Relationship Studies of Tetralin and Indane Musks
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147 tetralin and indane-like compounds was compiled from the literature for the purpose of investigating the relationship between molecular structure and musk odor. Each compound in the data set was represented by 374 CODESSA and 970 TAE derived descriptors. A genetic algorithm for pattern recognition analysis was used to identify a set of molecular descriptors that could differentiate musks from nonmusks in a plot of the two largest principal components (PCs) of the data. A PC map of the 110 training set compound and 45 molecular descriptors identified by the pattern recognition GA revealed an asymmetric data structure. Tetralin and indane musks occupied a small but well defined region of the PC (descriptor) space with the nonmusks randomly distributed in the PC plot. A 3-layer feed forward neural network trained by back propagation was used to develop a discriminant that correctly classified all of the compounds in the training set as musk or nonmusk. The neural network was successfully validated using an external prediction of 37 compounds.

Why is the crime/recidivism rate level high in the United States? A case study of criminal approaches and theories
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Subject Area: Social Sciences

Courthouses are the location that criminal and civil proceedings take place. Until recently, courthouses have been seen as the main mediator in deterrence of criminal behavior. However, recent statistics have shown that deterrence (incarceration and fines) is not decreasing the recidivism rate and while determinate sentences are still being used, the recidivism rate is increasing. With career criminals becoming more common in society, criminologists seek to understand the fundamental reasoning behind these findings. I will analyze and compare various theories, such as the classical theory, conflict theory, labeling theory, positivist theory, social disorganization theory, strain theory and rational choice theory.

To better understand the cause of crime I will review criminal statistics from affluent societies as well as communities that are stricken with high levels of poverty. In an attempt to understand the courts position on crime and punishment, I will address whether the United States Criminal Justice system represents a assembly-line model or a criminal funnel model and the effect each model has on the high recidivism rate. The examination results will display whether the United States should address crime from a social problems approach vs. a social responsibility approach.

Determining megakaryocyte numbers and size in hibernating and non-hibernating ground squirrels
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Subject Area: Biomedical Sciences

This study examined the rate at which megakaryocyte numbers changed from hibernating to non-hibernating ground squirrels. Thirteen-lined ground squirrels (Ictidomys tridecemlineatus) have developed profound physiological adaptations in order to survive during hibernation. The hibernation process induces a state of thrombocytopenia in which bone marrow no longer produces platelets. Congenital Amegakaryocytic Thrombocytopenia, a rare autosomal recessive disorder which causes bone marrow failure in young children, shares striking similarities to the bone marrow found in hibernating ground squirrels. By counting
Dietary Intakes of Iron of Female Collegiate Athletes: A Pilot Study  

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Subject Area: Biological Sciences  

Iron deficiency is a common nutrition-related issue among female athletes (Gropper et al., 2005; Auersperger et al., 2011). Prolonged iron deficiency may not only negatively influence performance but it may lead to iron deficiency anemia (Auersperger et al., 2011). The main purpose of this study was to assess dietary intakes of iron and examine the iron intakes in relation to energy intakes. The study utilized descriptive statistics, Pearson's correlations, and independent t-test with the level of significance p<0.05. Thirty four athletes participated in the study and completed a 3 day food record and 24- hour dietary recall. There was a significant positive correlation between energy intakes and dietary intakes of iron (below the RDA of 18mg daily average) p = .016, r = .56 . Only 4 out of the total 34 athletes (12%) consumed greater than 18mg of iron on an average. Nineteen of the total 34 athletes (56%) consumed supplements and 2 athletes consumed an iron supplement only. There was no significant correlation between iron intake and energy intakes. In conclusion, this group of female athletes did not meet their energy needs or their iron needs and only 55% of the athletes recorded intake of a vitamin/ mineral supplement.

Child nutritional status and cognitive performance in Hawassa Town, Southern Ethiopia  

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Subject Area: Biological Sciences  

Relationships between anthropometry, diet diversity and cognitive performance were assessed in a cross-sectional study of school children (n=116) aged 7-9 years. Participants were selected by two stage random sampling. Socioeconomic characteristics, dietary patterns, and anthropometrics were measured. The Raven's Colored Progressive Matrices (CPM board version) and selected tests from the Kaufman Assessment Battery for Children (KABCII) were used to assess cognitive performance. Mean (SD) weight-for-age (WAZ), height-for-age (HAZ) and BMI-for-age Z scores were -0.85 (0.94), -0.68 (1.13) and -0.62 (0.80) respectively. Mean (SD) diet diversity score was 3.8 (1.1). Stunted (HAZ < -2 Z) children had significantly (p<0.05) lower cognitive test scores compared to children not stunted for Raven's CPM, Number Recall and Pattern Reasoning. Underweight children (WAZ < -2 Z) had significantly lower CPM scores compared to children not underweight. Children who consumed meat, poultry, fish or eggs in the 24 hrs preceding the survey had significantly higher scores for Number Recall, Word Order and Triangles. Height-for-age and maternal education were significant predictors of Pattern Reasoning test scores (Adj. R2=0.182). Child diet diversity and anthropometric status and maternal education support cognitive function.
Effect of Silica Surface on Crystalline Structure of Cetyl Trimethylammonium Bromide

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Temperature modulated differential scanning calorimetry (MDSC), thermogravimetric analysis (TGA), Fourier transform infrared spectroscopy (FTIR) and powder XRD were used to probe the structure of cetyltrimethylammonium bromide (CTAB) in the presence of fumed silica nano-particles. It is found that two types of CTAB molecules were present in the adsorbed samples, which we interpret as due to tightly-bound and loosely-bound structures. The silica surface is found to affect both melting and crystallization of the tails of CTAB. Higher decomposition temperatures were also observed in the surface structures. The enthalpy change for CTAB during the melting and crystallization indicates that the CTAB undergoes a significant structural transition from a tightly-bound structure to a loosely-bound structure. Powder XRD shows that both structures have lamellar order, but the absence of the reflection from the rigid CTAB tails was observed in tightly-bound structure, i.e., it becomes more amorphous but also maintains some lamellar order.