Impact of Different UTVs on the Competitiveness of Contractors in Price-Time Bi-Parameter Bidding in Highway Construction

Saeed Abdollahi Pour, “David” Hyung Seok Jeong, Garold D. Oberlender
Oklahoma State University
Department of Civil and Environmental Engineering
Subject Area: Physical Sciences & Technology

State Highway Agencies have used price-time bi-parameter bidding (A+B bidding) to accelerate projects by incorporating construction time in the bidding competition. Since this method is based on the principle of cost reimbursement to a contractor for contract time reduction, the owner has to calculate unit time value (UTV) before letting projects. Unlike most studies performed in this area that have focused on optimizing the incentive/disincentive (I/D) rates with respect to road user costs, this study investigates impact of different UTVs on the competitiveness of contractors in the A+B bidding process. A full scale study with historical A+B bidding projects completed in Oklahoma clearly shows that different UTVs do change the competitiveness of contractors during the bid process for an A+B project. A new criterion is introduced to assist state highway agencies (SHAs) to determine an optimal UTV and I/D rate to maximize the competition during the bid process. The findings of this study also enable contractors to deploy a more competitive strategy by estimating their competitors' optimal bidding strategies.

Investigating the transformation of dissolved inorganic carbon in karst springs: The role of carbon isotope ratios

Pride Abongwa and Eliot Atekwana
Oklahoma State University
Department of Geology
Subject Area: Physical Sciences & Technology

The evolution of dissolved inorganic carbon (DIC) in karst spring waters to complete transformation by chemical and isotopic effects were assessed to fully understand the processes and mechanisms accompanying the transformation. In this study, we performed laboratory simulations by exposing karst springs water to the atmosphere over time and then, we superimposed field data collected along the flow paths of the karst springs on the laboratory results. The field data showed continuous decrease in its DIC concentration throughout the sampling distance whereas; the laboratory results showed that the DIC decreased over time until a point where the concentrations increased to the end of the experiment. The decreasing DIC were associated with decreasing pCO₂ and δ¹³CDIC enrichment as well as increasing values of the equilibrium saturation indexes of calcite (SIc). We deduced that the DIC transformation in the field samples as well as segment of the laboratory simulations associated with decreasing DIC and increasing SIc values are associated with chemical isotopic effect and that the segments of the laboratory samples with increasing DIC and constant SIc values are associated with equilibrium isotopic effect.
Volume-Translated Peng-Robinson Equation of State for Saturated and Single-Phase Liquid Densities

Agelia Abudour, Sayeed A. Mohammad, Robert L. Robinson, Jr., Khaled A. M. Gasem
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

Cubic equations of state (CEOS) are widely used for process design calculations and reservoir simulations in the oil and gas industry. However, most CEOS yield poor predictions of liquid densities. To remedy this problem, several volume-translation approaches have been presented in the literature. Currently, most of these approaches yield predictions that appear reasonable only in the saturated or the single-phase region. In this work, a volume-translation method is presented that is applicable to both saturated and single-phase regions.

Results indicate that the volume-translation method developed in this work is capable of precise representations of saturated liquid density. Specifically, an overall average absolute percentage deviation (%AAD) of 0.6 was obtained. The model was then generalized, and the generalization predicted the same data set with a %AAD of 0.8. Further, the generalized model was validated by predicting saturated liquid densities of compounds not used in model development and the method provided generalized predictions with 1.0 %AAD. Further, the volume-translation approach was also extended to predict liquid densities in the single-phase region and the generalized model provided predictions with 1.8 %AAD. Thus, this approach was capable of producing accurate predictions for both saturated and compressed liquid densities of diverse classes of molecules.

Identification of male sterile genotypes in interecotypic hybrids and development of advanced inbreds in lowland Switchgrass.

Laxman Adhikari and Yanqi Wu
Oklahoma State University
Department of Plant and Soil Science
Subject Area: Biological Sciences

Switchgrass (Panicum virgatum L.) is a perennial species and a model crop for cellulosic ethanol production. In switchgrass, commercial heterotic hybrid (F1) production requires complementary inbreds with desirable genes, ideally with one parent being male sterile. Objective of this study were to identify cytoplasmic male sterility (CMS) in upland-lowland (interecotypic) crossed progenies and to generate advanced inbreds in lowland switchgrass. Upland and lowland hybrids (F1) were produced from 9 isolated pairs in greenhouse in 2012. For self-pollination, selected lowland plants grown in the field conditions were bagged before anthesis. Putative self-pollinated seeds of third generation (S3) were collected from the S2 progenies of relatively self-compatible NL94/85 lowland switchgrass genotype. Parental origin of interecotypic hybrids and selfed lowland plants were identified using simple sequence repeated markers (SSR) based polymerase chain reaction (PCR). The CMS genotypes will be recognized in F2 of interecotypic hybrid via visual assessment and pollen fertility testing (pollen stainability). If inbred lines and male sterile system are developed it would be valuable to exploit heterosis of two switchgrass parents in a single hybrid.
John and Mary Die: A Mechanical Literary Analysis of Margaret Atwood's “Happy Endings” and Subsequent Feminist Implications

Sarah-Wonder Agbehia
Scholar from Truman State University
Scholar Symposium Participant
Subject Area: Humanities

Canadian writer Margaret Atwood is rarely mentioned in absence of a reference to her 1985 dystopian novel *A Handmaid's Tale*. While Atwood has received a great deal of critical attention for *A Handmaid's Tale*, the book casts a significant shadow over her 1983 collection of short stories titled *Murder in the Dark*. Though exemplary of Atwood's labels in the dialogue of second-wave feminism, insufficient analysis has been given to the short story “Happy Endings.” In the short story, Atwood presents the reader with protagonists who are presumptuous and dull, with all of their exploits and failures presented at face value, leaving little room for postulation through the mechanics of style and plot acceleration. In 2007, Atwood expert Dr. Fiona Tolan indicated in *Margaret Atwood: Feminism and Fiction* that Atwood's work often embraces what-if scenarios, and even explore these scenarios to the worst possible ending in order to explicate the unspoken conventions of human desire present in both genders. Therefore, though promising a happy ending, Atwood's “Happy Endings” is in fact an examination of the reality of choice, and a reflection on endings that, despite their unhappy nature, are still relevant and prospective to literary discussions on second-feminism.

Cryotherapy does not alter passive dorsiflexion range of motion and plantarflexor musculotendinous stiffness

Kazuma Akehi, Blaine C. Long, Eric C. Conchola, Ty B. Palmer
Oklahoma State University
Department of Health and Human Performance
Subject Area: Education

Cryotherapy is commonly used in health care. Its influences on tissue extensibility, elasticity, and joint range of motion (ROM), however, are not well understood. The purpose of the study was to determine if a 20-minute crushed ice bag application to the plantarflexor muscle group influenced passive ankle dorsiflexion ROM and passive musculotendinous stiffness (MTS) at 4 joint angles (θ₁,₂,₃,₄). We used a 2 [a 2-kg crushed ice bag or nothing] x 2 [male and female] x 2 [1st and 2nd] x 5 [pre-treatment, immediate post-, 10, 20, & 30 minutes post-treatment] cross-over measure on all factors. Twenty recreationally active college-aged participants with no known lower extremity injuries in the 6 months prior to data collection volunteered. We assessed maximum passive ankle dorsiflexion ROM and passive MTS at 4 joint angles (θ₁,₁,₄) separated by 5°. Cryotherapy did not influence ROM (Tukey-Kramer, *P* >.85). There was no main effect difference between times for ROM or MTS for each treatment (Tukey-Kramer, *P* >.05). Male, however, had higher MTSθ₁,₄ compared to female (Tukey-Kramer, *P* <.05). Decreasing plantarflexion temperature with a 20-minute crushed ice bag does not appear to influence passive ankle dorsiflexion ROM or passive MTS. Regardless of cryotherapy application, males had greater passive MTS than female.

Laser welding of C1010 steel with Fe-based metallic glass filler

Seyyed Habib Alavi, Hitesh Vora, Narendra Dahotre, Sandip Harimkar
Oklahoma State University
Department of Mechanical and Aerospace Engineering
Subject Area: Physical Sciences & Technology

The Fe-based metallic glass has a good corrosion and excellent mechanical properties. These unique properties make it suitable structural material. Also C1010 steel has wide range of industrial applications. It has been successfully laser welded using Fe-based metallic glass as a filler material. The surface hardness of the weld region was about 1100 HV which is high in comparison of the substrate hardness (150 HV). X-ray diffraction (XRD) and scanning electron microscopy (SEM) analysis indicated that the laser welding...
parameters play an important role on the development of microstructure and phases. XRD patterns of the welding also show the formation of Cr$_7$C$_3$, Fe$_3$C$_7$, Cr$_3$Mo and Fe$_{23}(C, B)_6$ in the welding region of the samples. In this investigation, laser parameters effects on microstructure and mechanical properties will be presented.

**Thickmess measurement of PET bottle base by optical scanner**

Masoud Allahkarami, Sudheer Bandla, and Jay C. Hanan  
Oklahoma State University  
Department of Mechanical and Aerospace Engineering  
Subject Area: Physical Sciences & Technology

A method for thickness measurement of PET bottle base cross section was developed. Sectioned base of PET bottle was scanned using LD435c Lanier optical scanner. In general cross section of a bottle is the area between two non flat curves that its thickness changes continuously. A 2D finite element triangular mesh was assigned to the cross section domain. Upper and lower boundary edges were specified in order to calculate distances later. An efficient algorithm was developed to color each triangle with a proper color of a spectrum that represents the thickness. A histogram of the thickness distribution was obtained using this method. This approach is broadly applicable to many important areas of study where thickness of complex geometry is required. The measurement method could be implemented to look for correlations of physical properties with local thickness.

**Not your Average Woman: The Negotiation between Intimacy and the Academy Among Black and Latina Female PhD Students**

Marbella Allen  
Scholar from the University of California, Los Angeles  
Scholar Symposium Participant  
Subject Area: Diversity Issues

The demographics of institutions of higher education have changed greatly over the last three decades, and as of 2007 women surpassed men in graduate school enrollment and degree completion (Council of Graduate Schools, 1999-2009). Although society has made significant strides toward lessening the gender representation gap in the academy, women continue to be subjected to feelings of isolation and second-class citizenship (Lemert, 2004) that are compounded when race is taken into consideration. Ethnic minority women are marginalized on two fronts: race and gender. Consequently, these women face greater pressures than White women and African American males while in pursuit of their doctoral degrees. Though there is research on the experiences of women of color as graduate students, relatively little work addresses the role of these women as social beings outside of their academic lives. This project will add to existing literature by examining the ways that African American women and Latinas form, navigate, and maintain romantic relationships, while juggling their responsibilities as doctoral students. I am currently conducting in-depth interviews of ten self-identifying African American and Latina women across varying areas of graduate study at UCLA in order to understand the interplay between race, gender, romantic relationships, and graduate study.
Testosterone production in response to aggression in Eastern Bluebirds (Sialia sialis): physiological or behavioral constraint?

Medhavi Ambardar and Jennifer L. Grindstaff
Oklahoma State University
Department of Zoology
Subject Area: Biological Sciences

Testosterone (T) generally promotes territorial aggression while reducing parental care. This is not always the case, however, and in those circumstances, the physiological mechanisms that mediate these relationships are poorly understood. The response of T production following a territorial challenge can be variable; some species increase T production while others do not. In species that do not elevate T in response to a challenge, T levels may already be circulating at maximum levels. Alternatively, males that provide care to young may incur a cost of elevating T because of the suppressive effects of that hormone on parental care. We used a wild population of Eastern bluebirds to examine the response of T production following a simulated territorial intrusion (STI), and how this relates to parental care. We quantified parental care by videotaping feeding behavior by adult bluebirds when nestlings were 5-7 days old. To quantify aggression, we performed STIs using a common nest site competitor when nestlings were 7-9 days old. We then performed gonadotropin releasing hormone challenges to test the capability of bluebirds to produce T. This study will provide insight into T production in response to social interactions, and how this relates to aggressive behavior and parental care.

Mixing Approaches for Thermoplastic Polymer-Graphene Nanocomposites

Sudheer Bandla and Jay C. Hanan
Oklahoma State University
Department of Mechanical and Aerospace Engineering
Subject Area: Physical Sciences & Technology

Polymer nanocomposites are well known for their superior properties (mechanical, electrical and chemical) and find applications in wide-ranging fields. However, large-scale manufacturing of these nanocomposites is constrained because of the limitations associated with attaining good dispersion of the nano-scale reinforcements. Over the past two decades, at least nine mixing approaches have been considered for dispersing nanoreinforcements at the laboratory scale. In the current work, four different mixing techniques were studied for effectiveness in thermoplastic nanocomposites and their process scalability. Polyethylene terephthalate (PET) and graphene nanoplatelets were used as the thermoplastic polymer and nanoreinforcement. Nanocomposites of different graphene weight fractions (0.2% - 5%) were injection molded and tested for mechanical properties. Dispersion of the nanoplatelets, studied using electron microscopy and diffraction, helped in evaluating the effectiveness of each mixing approach in improving properties. This study also aids in understanding the effect of mixing approaches on graphene nanoplatelets and options towards achieving an industry scale production process.


Atanu Banerjee and Dr.Khaled Sallam
Oklahoma State University
Department of Mechanical and Aerospace Engineering
Subject Area: Physical Sciences & Technology

Holography is the technology of storing three-dimensional information on a two-dimensional plane or hologram. In this project holograms are used instead of images for Particle Image Velocimetry analysis of a multiphase flow. The setup uses an in-line holographic microscopy arrangement to analyze a flow consisting of an air bubble rising through stagnant water in a rectangular column. Neutrally buoyant 8 µm sized hollow glass spheres are scattered uniformly in the continuous phase and are used as seed particles for image
Two shots of holograms are taken with a 2K by 2K CCD sensor with a very small instance of time in between, which allows only a small movement of both the particles in the continuous phase and that of the dispersed phase itself. Holograms are reconstructed at different distances to produce images throughout the depth of test section. Each of the image pairs is cross correlated and velocity vectors are obtained for both the dispersed and the continuous phase around it. This system has the ability to produce better velocity data for multiphase flow as it analyses the whole volume in real sense compared to stereo or tomographic approach which averages the flow between the planes of analysis.

Development of a Sustainable Process for the Production of Polymer Grade Lactic Acid

Susmit Bapat, Clint P. Aichele, and Karen High

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

Lactic acid is a commonly occurring substance in nature, ranging from existence in micro-organisms to the human body. Lactic acid has applications in a wide range of industries including food, chemical, pharmaceutical, polymer and textile. In this work, a sustainable process for the production of polymer grade lactic acid (99.8 %) from crude lactic acid was simulated. The simulation was performed using Aspen® Plus version v7.3. The thermodynamic model used for the process was Wilson due to the polar nature of the species involved. The process was carried out in two stages. The first stage consisted of esterification of lactic acid by reactive distillation. A RadFrac column was used for this purpose which also allowed easy separation of methyl lactate from the waste products. Pure methyl lactate obtained from the first stage was then hydrolyzed in the second stage using pure lactic acid as an auto-catalyst to obtain the desired product. Use of pure lactic acid as an auto-catalyst helped to achieve the required purity as it minimized catalyst contamination. The process was optimized using sensitivity analysis and optimization blocks of Aspen® Plus to come up with an energy-efficient process.

Keywords: lactic acid, Aspen® Plus, reactive distillation, RadFrac, auto-catalyst.

SQu’s: Sustainability Quantified

Joshua Barnes

Scholar from Lamar University
Scholar Symposium Participant
Subject Area: Physical Sciences and Technology

Sustainability is a popular issue with many approaches. It covers the dimensions of people, planet, and profit. One aspect of sustainability is product design. Consumers directly affect product design through supply-and-demand; therefore, consumer purchasing behaviour affects the sustainability of our society. The researcher proceeds to create a system of analyzing consumer products and quantifying their sustainable impact, which is similar in idea to a carbon footprint. The system is a analytical spreadsheet, named SQu's (pronounced “skews”) and is short for Sustainability Quantified, and is a play on the term SKU's, since it also is a labeling system. Various metrics are used to compare products to their base type (the ideal sustainable product in a certain category), and the final result is a single score. This score can then be placed on product labeling. The goal is for consumers to modify their purchasing habits according to the competitive score labeling arising from this new form of analysis, and thereby affect the market, causing industries to make more responsible design decision. Wanting this tool of analysis to fall into popular use, the researcher implemented various forms of media, such as the website http://sustain-q.tk/ and digital distribution.
Causes of the Academic Achievement Gap in African American Students in Central Arkansas
Kanesha Barnes  
Scholar from the University of Arkansas at Little Rock  
Scholar Symposium Participant  
Subject Area: Diversity Issues

What are the factors which contribute to the academic achievement gap in African American students? This research project will examined several factors which have impacted the success of African American students and education. Studies have been conducted on the disparities among achievement levels in elementary students, and this study will address those factors. This study also attempted to find programs and possible solutions to improve the existing disparities. An analysis of existing data for the current status of 6 low performing schools one 4th grade school from a rural, urban or suburban location, and one 8th grade school from a rural, urban, or suburban location will be observed, and used to identify common demographics for the status of the achievement gap in these under performing schools. Results show that schools that had greater instances of low income and high ratios of African American students under performed more frequently. However, one unexpected result found that teacher quality did not have as great of an effect as anticipated.

Use of Nondestructive Sensors to Assess Nitrogen Needs in Two Poinsettia Cultivars
Rania Basyouni and Dr. Bruce Dunn
Oklahoma State University  
Department of Horticulture and Landscape Architecture  
Subject Area: Biological Sciences

Floriculture growers are looking for new methods and technologies to improve crop productivity, enhance competitiveness, and increase sustainability. Nitrogen is an important limiting element that affects plant quality. Current methods quantifying leaf nitrogen content are either destructive, expensive or time consuming. Recently, a new pocket-sized device that generates Normalized Difference Vegetative Index (NDVI) values using GreenSeeker™ technology was released. The device uses optical sensors to measure greenness reflectance from plant leaves and is a quarter of the price of other commonly used sensors. To test the NDVI sensor effectiveness on two cultivars of Poinsettias, five different nitrogen treatment (0, 2.5, 5, 10, and 15 g) of a 15N-9P-12K controlled release fertilizer were applied to 80 pots per treatment. After week two, 40 pots of the treatments with the lowest treatments (0, 2.5, and 5 g) were supplemented with extra fertilizer for a recovery study. All pots were completely randomized. NDVI readings were recorded once a week for four consecutive weeks. Results showed a correlation between sensor readings and nitrogen content measured by leaf analysis. At the end of the experiment, plant quality was assessed by height, width, and salability. The recovery phase showed only marginal improvement in productivity.

The Role of Fusion Protein Cytoplasmic Tail in Respiratory Syncytial Virus Filament Formation
Pradyumna Baviskar and Tom Oomens
Oklahoma State University  
Department of Veterinary Pathobiology  
Subject Area: Biomedical Sciences

Human respiratory syncytiat virus (RSV) is the single largest viral cause of pediatric bronchiolitis and elderly pneumonia worldwide. RSV is a single stranded RNA virus of pneumovirus genus within the Paramyxoviridae family. A vaccine or effective antiviral drug against RSV is still not available in spite of decades of research. Viral fusion protein F considered logical target of research which has a cytoplasmic tail (CT) domain critically important for viral infectivity. Two CT regions with impact on infectious progeny
formation were identified in this study: amino acid residues 557-566 (CT-R1) and 569-572 (CT-R2). Substitutions in CT-R2 abrogated infectious progeny production and impaired viral filament formation. Fluorescence microscopy analysis revealed that substitutions in CT-R2, but not CT-R1, increased the level of syncytium formation and led to accumulation of M and F protein in and around viral inclusion bodies (IB). The accumulation of M and F in and around IBs and coincident strong decrease in filament formation upon CT-R2 mutations, combined with the reported ability of M to self-assemble, suggests that CT residues 569-572 may act as a type of catalyst by facilitating release of M-ribonucleoprotein complexes from IBs. This may lead us to understand the mechanism of RSV infectivity in detail.

**Anti-predatory behavioral consistency in larval túngara frogs (Engystomops pustulosus): Potential trade-offs across predator types**

Lynne Beaty and Ximena E. Bernal  
Oklahoma State University  
Department of Zoology  
Subject Area: Biological Sciences

Within a species, individuals differ in behavioral consistency resulting in differential survival under variable environmental conditions. Little work has been done to elucidate whether anti-predator behaviors are consistent between individuals and across predation threats in aquatic organisms. To examine individual differences in anti-predatory behaviors, we quantified the responses of túngara frog (Engystomops pustulosus) tadpoles to simulated aquatic and aerial predators. We investigated the responses of individual tadpoles to each predator threat three times recording the change in activity and latency to resume activity, which are common tadpole anti-predatory behaviors. Repeatability was high within individuals for all behaviors except for the change in activity in response an aerial predator, which was affected by trial number. Clutch significantly contributed to observed variation for all behavioral parameters, suggesting that tadpole anti-predator responses are influenced by genetic or maternal effects. There was a positive correlation between reduction in activity in response to aquatic predators and latency to resume activity when threatened by aerial predators. These results suggest a trade-off in the strength of anti-predator behaviors in response to different predation threats. Altogether, these findings show consistent individual differences in anti-predatory behavior in túngara frog tadpoles and, previously unsuspected, interactions in responses to different threats.

**Increasing Phosphorus Efficiency: an investigation of phosphorus uptake mechanisms in the rhizosphere of various wheat cultivars**

Patrick Bell, Chad Penn, Brian Arnall, Brett Carver, Art Klatt  
Oklahoma State University  
Department of Plant and Soil Science  
Subject Area: Biological Sciences

Phosphorus (P) is the second most limiting plant nutrient, with 5.7 billion hectares being P deficient worldwide. As the price of P continues to increase, there is a need for more P efficient crops to increase yields on P deficient soils and conserve limited P resources. Most soils have a large amount of total P (100-1500 mg kg^-1), yet only a small portion is plant available, as currently estimated by an agronomic P test such as Mehlich-3 (M3). However, certain varieties of plants have been noted as being “P efficient” with the ability to extract and uptake this relatively “non-labile” pool through a variety of mechanisms. The objective of this project was to identify cultivars that are P-uptake efficient and subsequently analyze their rhizosphere soil to determine what chemical mechanisms are being used to increase P uptake. Twenty-two winter wheat cultivars were screened for P-uptake efficiency in low P acid and calcareous soils. The three most efficient and three least efficient for each soil were then grown in rhizo-cells. Rhizosphere soil was analyzed for pH, organic acids, phosphatase enzymes, and changes in soil P-pools. Traits from the efficient cultivars can be used to increase phosphorus efficiency of breeding programs.
An Examination of Native American Household Food Security in Oklahoma

Jeremy Bennett, Jody Campiche, Brian Whitacre, Barbara Stoecker

Oklahoma State University
Department of Agricultural Economics
Subject Area: Diversity Issues

The hardships faced by citizens of the United States as a result of the recent “Great Recession” and other financial downturns have had the greatest impact upon groups from lower socioeconomic status (Andrews & Nord, 2009). One of the most basic human needs is food and the ability to access it. According to United States Department of Agriculture (USDA) reports, 14.9 percent of U.S. households were considered food insecure in 2011 as compared to fewer than 11 percent in 2007, thus more Americans are relying on some sort of food assistance program. There are multiple factors that contribute to food insecurity. The goal of this study is to understand how different socioeconomic factors affect food security for Native Americans in Oklahoma. The three factors evaluated in this study are geographical location, educational attainment, and employment status. Using data collected from household surveys, the level of food insecurity in Native American households was examined along with underlying problems or factors that may contribute to food insecurity and participation in food assistance programs.

Anabolic growth promotants equally improve cattle performance and production efficiency independent of exposure time


Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

Black-hided heifers (n = 187; 362 kg) were used in a 122 d finishing study to determine the effects of a trenbolone acetate-estradiol implant [Revalor® 200 (200 mg of trenbolone acetate and 20 mg of estradiol)] on feedlot performance and carcass characteristics when administered at specific stages of production. Treatments included 1) no implant (Con); 2) implantation on d 0 (Early); or 3) implantation on d 56 (Late). After d 55, ADG and G:F were improved for Early vs. non-implanted heifers (P<0.05). From d 56 to 122, ADG improved with implantation and was greatest for Late (P<0.05). While, G:F was only improved by Late (P<0.01). Overall, ADG and G:F were improved by implantation (P<0.01), and Early tended to have the greatest ADG (P=0.10). Similar DMI was concluded (P=0.41). Implantation increased HCW, dressing percentage, and REA vs. Con (P<0.05). Back-fat, marbling score, and REA/HCW ratio were unaffected (P>0.18). Treatment affected yield grade (P=0.06), with Late having a lower yield grade than Con or Early (P<0.07). Quality and yield grade distributions were unaffected by treatment (P>0.21). The results of this study suggest that anabolic growth promotants improve cattle performance and production efficiency without altering carcass quality, independent of stage of production.

Comparison of curcumin supplementation vs. subtherapeutic antibiotic on growth performance and immune response of nursery pigs

Megan Bible, Scott D. Carter, HaeJin Kim, Thomas M. Walraven

Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

One experiment utilizing 216 nursery pigs was conducted to determine the effects of turmeric (TUM)/curcumin (CUR) on growth performance and immune response. Turmeric is a spice containing the anti-inflammatory/antimicrobial phytochemical, curcumin. Pigs (20 d; 5.8 kg) were allotted randomly to four dietary treatments in a RCB design (8 reps/trt). Four treatments were a negative control diet (no antibiotic; CNT), a positive control (antibiotic; AB), CNT+2 g/kg TUM, and CNT+80 mg/kg CUR. ADG,
ADFI, and G:F were calculated for d 0-21 and 0-42. On d 20, one pig.pen was challenged with \( E.\ coli \) lipopolysaccharide (LPS; 25 μg/kg BW intraperitoneally). Rectal temperatures (RT) were measured and blood collected for tumor necrosis factor-alpha (TNF-α). Few differences were noted in ADFI. Pigs fed AB had greater (P<0.10) ADG compared with CNT or TUM on d 21/42, with CUR intermediate. However, pigs fed CUR had greater (P<0.10) G:F than CNT pigs, with AB or TUM intermediate. Also, pigs fed CUR had the smallest increase (P<0.05) in RT and TNF-α in response to LPS challenge, with AB intermediate, and CNT or TUM having the greatest increase. In conclusion, pigs fed CUR had similar growth performance to AB, and CUR blunted the response to a LPS challenge.

**Ruminal temperature for prediction of estrus in beef cows**

*Brit Boehmer and R. P. Wettemann*

**Oklahoma State University**  
**Department of Animal Science**  
**Subject Area: Whiteman Award Presentation**

Core body temperature increases at estrus in beef cows. Ruminal temperature (RuT), a measure of core body temperature, may be useful for prediction of estrus. The objective of this experiment was to evaluate the use of RuT in beef cows for the prediction of estrus. Estrus was synchronized in Angus cows (n=60) after ruminal temperature boluses (SmartStock, LLC) were administered. Onset of estrus was predicted as a 0.7°C increase in mean RuT for any 9 h period compared with the mean RuT during the preceding 12 to 84 h. HeatWatch (CowChips, LLC) was used to determine onset of estrus. During the 13 d experimental period, mean daily maximal ambient temperature (Tmax) was 24.8°C. When Tmax was less than 32°C, RuT was greater at estrus \( (P < 0.001, 38.63 \pm 0.09°C) \) compared with 16 to 24 h before \( (37.93 \pm 0.09°C) \) and 24 to 32 h after \( (37.89 \pm 0.09°C) \) onset of estrus. Ruminal temperature increase of 0.7°C correctly identified 79% of estrus cows and 40% of non estrus cows were falsely identified as estrus. These results indicate that RuT increases at estrus in beef cows. Further model development may improve the usefulness of RuT for estrus prediction.

**A Graph Theoretic Analysis of the National Basketball Association**

*Cherlinca Boyd and Dr. James Reid*

**Scholar from the University of Mississippi/Rust College**  
**Scholar Symposium Participant**  
**Subject Area: Physical Sciences and Technology**

The search engine Google is a relatively new tool for extracting information from the web. Google returns searches of keywords and must rank the pages displayed in order of relevance. This research used the same page-ranking algorithm as Google to analyze the results of the 2011-2012 National Basketball Association (NBA) season. The teams were then seeded by these rankings into NBA playoff trees to determine if the PageRanks of the teams could be used to predict success in the playoffs as compared to the actual playoff results. As hoped, the PageRanks did closely follow the actual playoff results and playoff seeding with few discrepancies.

**Gamification: The Effects of Video Games in Education**

*Laura Brothers*

**Abilene Christian University**  
**Department of Info Technology and Computing**  
**Subject Area: Physical Sciences and Technology**

Business and Education are both being affected by the effects of gamification. This breakthrough concept has taken the business world by storm, but what about education? This paper details the effects of
gamification in business and shows how it can improve productivity and interaction with employees as well as customers and customer related programs. Gamification in education is not as widespread. The project of this research paper is to further detail the effects of gamification in college education and to see how they add up to your typical college class.

The Green Corn Rebellion: World War One Draft Resistance in Oklahoma

Billy Brown
Oklahoma State University
Department of History
Subject Area: Social Sciences

The violent event known as the Green Corn Rebellion was an anti-conscription movement in which Socialist influenced Working Class Union members fought against local law enforcement officials with the intent of overthrowing the federal government and ending the Selective Service Act of 1917. Much of the material about this event attempts to blame the revolution’s spontaneous start as its failure. However, many primary resources present an entirely different aspect to this radical movement. The Green Corn Rebellion was a planned event and the farmers failed to achieve their goals due to the lack of dedication of many of the revolutionists.

Religious Orientation and the Affective Modulation of the Startle Response

Erika A. Brown and James W. Grice
Oklahoma State University
Department of Psychology
Subject Area: Social Sciences

The current study integrated research on one’s religious orientation and the affective modulation of the startle response (AMSR), specifically motivational priming theory. The primary goal was to differentiate between individuals in four religious orientations using their autonomic responses to religious images. A secondary aim was to improve upon current protocol for classifying individuals into religious orientations. Autonomic data were collected using the AMSR task, followed by conscious ratings of the images. In counterbalanced order, participants completed the Intrinsic/Extrinsic-Revised Scale (I/E-R), the Religious Orientation Vignettes, and a Religious Affiliation and Behaviors questionnaire. Data were analyzed using Observation Oriented Modeling. The pattern predicted under motivational priming theory was not found in the autonomic data. Consequently, the religious orientation groups could only be differentiated using the conscious ratings. The intrinsic group responded most favorably to the religious images, followed closely by the extrinsic and indiscriminate groups. The nonreligious group responded the least favorably. A pattern analysis revealed a 71% overlap between the I/E-R and the Vignettes in classifying individuals into religious orientations. It is suggested that the Vignettes provide a more straightforward, theoretically sound method of classification than the I/E-R for all four religious orientations, especially the nonreligious group.

Effects of Polyphenol-Rich Cocoa Beverage in Post-Prandial Glucose, Lipids, C-Reactive Protein and Vascular Function in Patients with Type 2 Diabetes

Alecia Bryant, Misti J Leyva, Tawny M Pantoja-Tucker, Nancy M Betts, Timothy J Lyons, Arpita Basu
Oklahoma State University
Department of Nutritional Sciences
Subject Area: Biological Sciences

Cardiovascular disease (CVD) and type 2 diabetes are significant public health problems in the United States. Type 2 diabetes is associated with metabolic events characterized by hyperglycemia, dyslipidemia,
and enhanced oxidative stress. Postprandial excursions in glycemia and lipemia are evidenced to be risk factors for vascular dysfunction and CVD. Cocoa polyphenols are associated with improved cholesterol, reduced blood pressure and increased flow mediated dilation in patients with hypertension and type 2 diabetes. Postprandial studies have not been reported. Thus, we examined the acute effects of cocoa polyphenol consumption in the post-prandial changes of glucose, lipids, C-reactive protein (CRP) & vascular function following ingestion of a high-fat, fast-food style breakfast. Patients with type 2 diabetes (n=15) received cocoa or placebo beverage in a randomized crossover study. We measured glucose, insulin, cholesterol (total, LDL, HDL), triglycerides, CRP, and vascular function (systolic and diastolic blood pressure, small and large artery elasticity) at fasting (0min), 30 minutes, 1-, 2-, 4-, and 6-hours post prandial. Our study participants exhibited significantly elevated BMI [(mean±SE) 35.8±2.1] and CRP [(mean±SE) 5.2±1.1mg/L] values at baseline. Cocoa and placebo beverages were well tolerated by the participants. Funded by the Oklahoma State University Dean's Research Incentive Fund and The Hershey Company.

Fatty acid profiling in Angus cattle: using REML-based methods to estimate genetic parameters in large populations

Justin Buchanan and Raluca G. Mateescu
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

The objective of this study was to estimate genetic parameters for percent intramuscular fatty acids in beef tissue. Longissimus muscle samples were obtained from 2,285 Angus cattle to determine the percent intramuscular fatty acid composition. Percentages were determined for 38 individual lipids classified by structure into saturated (SFA), monounsaturated (MUFA), polyunsaturated (PUFA), omega-3 (n-3), and omega-6 (n-6) fatty acids. The atherogenic index (AI) was also determined as a measure of the unsaturated to SFA ratio. Restricted maximum likelihood methods combined with pedigree data were used to estimate variance components with the WOMBAT software package. Heritability estimates were obtained for the major classes of fatty acids, which ranged from 0.09 to 0.63. The AI was found to be highly heritable, with a heritability estimate of 0.63. Total SFA and MUFA were also found to be highly heritable, with heritability estimates of 0.61 and 0.49, respectively. Total PUFA and n-6 fatty acids were found to be moderately heritable with an estimate of 0.22. The n-3 fatty acids had a lower heritability estimate of 0.09. These results indicate that certain fatty acid classes have the potential to be incorporated into marker-assisted selection programs to improve the fatty acid composition of beef.

Resiliency as a Pathway of Influence for Childhood Trauma on Self-Esteem

Tatavia Butler, Esme Walls, Rekisha Johnson
Langston University
Department of Psychology
Subject Area: Social Sciences

Researchers have noted childhood trauma as associated with multiple adverse outcomes in adulthood. Researchers have also suggested that childhood trauma may lead to the development of antisocial tendencies and aggressive behaviors in adults. Because previous research linked childhood trauma to adverse outcomes in adulthood, but other work suggested resiliency may be a protective factor, the purpose of this study was to determine if resilience would serve as a mediator in the relationship between childhood trauma and self-esteem among college students. A path model was created with direct paths from all three indicators of childhood trauma to self-esteem, a direct path from resiliency to self-esteem, and paths from all three indicators of childhood trauma to resiliency. Only one nonsignificant path was observed, which was from sexual abuse to resilience. All other paths were statistically significant. However, there did not appear to be a mediating effect, as the direct paths from childhood trauma were significant and relatively strong, and the protective hypothesis was not supportive as the total influence of childhood trauma was similar as it was in a
Consumer Privacy

Camille Carpenter

Oklahoma State University
Department of Management Information Systems
Subject Area: Physical Sciences & Technology

In the case Griswold v. Connecticut 1965, the Supreme Court ruled that privacy is a constitutional right. Yet, there have been many recent instances where companies have failed to protect customers' confidential information. So, what are the responsibilities that a company has when dealing with this type of information? According to the CEO of Sun Microsystems, Scott McNealy, “You already have zero privacy. Get over it.” If CEOs of companies feel this way about a basic human right, how can we believe that they are doing all they can to protect our confidential data? There are many laws and regulations that govern how companies handle our information. However, are they adequate, since so many breaches have taken place recently? Also, if companies fail to protect the information of their customers, what are the penalties imposed on them? Most major companies that deal with confidential data already allocate hefty budgets to security. But, how much is enough? It is clear that there are no obvious answers, and it would be impossible to reach a consensus regarding the answers to these questions. Nevertheless, it will be the aim of this paper to examine these issues and explain the current laws and penalties.

Factors Influencing College Attendance in Adopted Children

Jennifer Carpenter

Scholar from Abilene Christian University
School of Social Work
Subject Area: Social Sciences

Adoption has long been thought of as a “second option” for creating a family, but little research is done around the concept of success in higher education settings for adopted children. This study aimed to find factors that influenced adopted children to attend university to pursue a higher education.

Modeling Gas Adsorption-Induced Swelling of Coals

Pongtorn Charoensuppanimit

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

Gas adsorption-induced swelling of coals can impact the recovery of coalbed methane and design of CO2sequestration processes. The swelling of coals can alter the cleat permeability and affect the flow behavior of gas in the coalbed reservoir. Studies have indicated that the cleat permeability is related to coal mechanical properties and changes to permeability can be estimated based on volumetric strain measurements on coals.

Pan and Connell (2007) presented a theoretical model to investigate adsorption-induced swelling of coals. In this study, we implemented the Pan and Connell swelling model through application of the simplified local-density (SLD) adsorption model. The theoretically rigorous SLD model, when combined with the Pan and Connell swelling model, was found capable of representing precisely the swelling behavior of coals due to adsorption of gases such as carbon dioxide, methane and nitrogen. The relation between strain and surface potential was found to be linear for all three gases mentioned above, confirming similar observations in the
literature. An analysis of the literature data on swelling and its treatment with the SLD/Pan-Connell model will be presented. Further, the effect of coal swelling on changes to cleat permeability will also be presented.

Characterization of the lipid droplet-associated protein Lsd2 from Manduca Sexta

Xiao Chen, Stuart Daniel, Sarah Firdaus, Estela Arrese
Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Lipid Droplet (LDs) are intracellular organelles dedicated to the storage and provision of fatty acids. Triacylglycerols (TG) are the predominant energy store in insects. TGs accumulate in the fat body and ovaries of insects in organelles called lipid droplets (LDs). LDs are spherical bodies composed of a core of TG surrounded by a layer of phospholipid and proteins. Insect LDs contain many proteins. However, only two of them Lsd1 and Lsd2, appear to be specific of this organelle. In Manduca sexta, Lsd1 is a modulator of TG mobilization and its activity is regulated by phosphorylation. Lsd2 whose function was studied in the fruit fly is required for normal storage of TG and is also important for the transference of lipids to the embryo. To begin the study of the function of Lsd2 in TG deposition in a Lepidoptera we first cloned and sequenced Manduca sexta Lsd2. We have also profiled the expression of Lsd2 at both mRNA and protein levels in the fat body ovaries and eggs. The biochemical function of Lsd2 remains to be elucidated.

Viscoelastic properties of commercial hard red winter wheat gluten during thermal treatment

Pavalee Chompoorat and Rayas-Duarte, P.
Oklahoma State University
Department of Food Science
Subject Area: Biological Sciences

An effective characterization of wheat gluten during heating using rheological methodology can reveal important practical and basic properties of this important component. Six commercial flour samples (hard red winter type) and one soft red cultivar (Stephens) varying in protein content were studied. Viscoelastic properties of the isolated gluten were measured at 25, 35, 45 and 55°C using a creep and recovery test illustrated in Principal Component Analysis (PCA). The total explained variance of PCA was 88.1% which was mainly contributed by time constant of creep (TCC), %recoverability (RCY) and delta compliance (J-Jr). This suggests that SeP, RCY and TCC can be good candidates for a combined index of viscoelastic properties of gluten. J-Jr and TCC of gluten were highly correlated and were the main contributors of the first principal component explaining 64% of the variance. The gluten at 25 and 35°C were grouped and mainly correlated with RCY; while, the gluten samples at 45 and 55°C were strongly associated to SeP. Stephens separated from the hard red winter wheat and was highly correlated to TCR when exposed to 25 and 35°C. Creep and recovery could be a potential tool for quantitative evaluation of processing quality performance of flour samples.
Protective Effect of Dietary Supplementation with Tart Cherry on Age-related Bone Loss

Pitipa Chongwatpol, Elizabeth Rendina, Jennifer L. Graef, Stephen L. Clarke, Edralin A. Lucas, Brenda J. Smith

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

Osteoporosis continues to be a major health problem and new prevention strategies are needed. This study was designed to determine the efficacy of dietary supplementation with tart cherry on age-related bone loss using female (5 mo) C57BL/6 mice (n=44) assigned to a baseline group or groups receiving 0, 1, 5, or 10% cherry for 90 days. Mice were weighed weekly and bone density, trabecular and cortical bone microarchitecture were assessed at the end of the study. The data showed no difference in body weight due to treatments. The groups receiving 5 and 10% cherry diet had higher (P<0.05) whole body and tibia bone density than the control (0) and baseline groups. The age-related decrease in trabecular bone volume (BV/TV) of the distal femur metaphysis was prevented with cherry supplementation (5 and 10%) and vertebral BV/TV was increased (P<0.05) compared to the baseline group. Femoral cortical area and thickness were increased in the 5 and 10% groups beyond that of the baseline cohort. These findings suggest that tart cherry not only prevented age-related bone loss, but increased cortical and trabecular bone at some sites consistent with an anabolic response. (Supported by Cherry Research Committee)

Sexist Affective Characterizations through Young Adult Romance Literature

Yvonne Clark

Scholar from Westminster College
Scholar Symposium Participant
Subject Area: Social Sciences

Popular literature is commonly neglected in both media and psychological studies, and as such, adolescent novels have not been analyzed for the effects of sexist sexual content. However, there is increasing interest in young adult literature with the rapid rise in popularity of supernatural and romance themed novels. The current research measured how sexist narrative in young adult novels can subsequently affect gender characterizations in readers. The experimental participants read a passage containing sexist gendered content: a control group read a neutral passage by the same popular author. Each group of participants then selected five words from a word bank containing sexist, non-sexist and gender neutral words in order to characterize gender traits for females, males and themselves in general. Results showed that females in the experimental group endorsed increased sexist gender characterizations towards other females in general, as compared to females in the control group.

From soil ecology to grain quality: Linking arbuscular mycorrhiza to human nutrition

Adam Cobb and Dr. Gail Wilson

Oklahoma State University
Department of Natural Resource Ecology and Management
Subject Area: Biological Sciences

Low levels of phosphorus and nitrogen limit crop yields in most tropical soils. Arbuscular mycorrhizal (AM) fungi are providers of P, N, and other trace minerals in many ecosystems. Enhancing this symbiosis in food crops will likely improve production and food nutritional quality. Our study assesses mycorrhizal responsiveness in three modern and three African sorghum cultivars. Modern and African cultivars were grown in low-nutrient soil in the greenhouse. Fertilizers and fungicide were used as treatments designed to assess the role of AM symbiosis compared to the control. We measured AM root colonization, vegetative production, grain biomass, and grain quality (protein content and mineral concentrations). When grown in
non-amended low nutrient soil, with AM fungi present, all African cultivars had greater production, compared to the modern cultivars (vegetative biomass: 60.5% higher, grain biomass: 64.25% higher) and produced higher quality grain (protein content: 44.43% higher). This may be attributed to a greater AM responsiveness, as the African cultivars had an average AM colonization of 50.17% of root area compared to an average 21.83% for modern cultivars. Assessing the mycorrhizal dependence of sorghum cultivars could be essential in ensuring improved grain production and nutritional quality while optimizing sustainability in low-input agricultural systems.

**Effects of Neuromuscular Fatigue on Electromechanical Delay of the Leg Extensors and Flexors in Young and Old men**

**Eric Conchola, Brennan J. Thompson, and Doug B. Smith**

Oklahoma State University
Department of Health and Human Performance
Subject Area: Education

**PURPOSE:** To examine the effects of a fatigue inducing bout of intermittent submaximal isometric contractions on the electromechanical delay (EMD) of the leg extensors and flexors in young and old men.

**METHODS:** Twenty young (mean±SD age=25±2.8 years) and sixteen old (age=70.8±3.8) men performed two maximal voluntary contractions (MVCs) followed by intermittent isometric contractions of the leg extensors and flexors using a .6 duty cycle at 60% (MVC) until volitional fatigue. MVCs were then performed at 0, 7, 15, and 30 min post fatigue.

**RESULTS:** There was no three-way interaction (muscle x age x time), (P=0.755). There were two-way interactions for muscle x time (P=0.039) and muscle x age (P=0.009). Electromechanical-delay was greater for the flexors (P=0.001-0.034) across all time points, but was only significant immediately post fatigue for the extensors (P=0.001) compared to pre EMD. For muscle x age, EMD was greater for the extensors for the old (P=0.003) compared to the young men but not different for the flexors (P=0.506).

**CONCLUSIONS:** These findings suggest differential EMD recovery patterns between leg extensors and flexors with flexors being slower to recover. The longer EMD of the flexors during recovery may have important injury and performance implications in a variety of settings.

**Things Don't Always Fall Apart: Contributing Factors in Benin's Stability, 1991-Present**

**Brad Crofford**

Southern Nazarene University
Department of History, Politics and Geography
Subject Area: Social Sciences

Benin is a surprising example of democracy in Africa. A former French colony, it experienced at least six military coups in the twelve years following independence in 1960. Marxism-Leninism was declared the state ideology in 1975 and remained such until 1989. Starting in 1989, Benin underwent a period of liberalization leading to democratic presidential elections in 1991. Since then, democracy has thrived with over two decades of stability and five presidential elections unmarred by significant violence.

Benin's unlikely success begs the question, “Why did Benin succeed when others failed?” This paper finds that there are numerous factors contributing to its success. It first explores international and domestic factors that have been expounded upon in existing scholarly literature. Then, it examines the role of Vodoun. It suggests that Vodoun may play a stabilizing role in two different ways and presents areas for further study. Finally, it briefly describes potential challenges to Beninese democracy.
Generalized Non-linear QSPR Models for Surface Tension
Younas Dadmohammadi, K. M. Yerramsetty, B. J. Neely and K. A. M. Gasem
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

Surface tension (ST) is of importance for many processes and phenomena, such as mass and heat transfer, gas injection displacement and flow through porous media. At low values, ST is the dominant fluid property which determines relative permeabilities and residual liquid saturations in gas condensate systems. The correlations available in the literature for predicting ST currently have a limited range of applicability or poor suitability for generalization. Therefore, there exists a need for generalized models capable of providing a priori predictions.

The modeling approach involves use of scaled-variable-reduced-coordinates (SVRC) to develop the behavior model, and a quantitative structure-property relationship (QSPR) model to generalize the SVRC model parameters. This approach, in the past, has proven to be more effective than the typical efforts to develop generalized models directly using QSPR techniques. In this work, we extend the SVRC model to correlate ST values and generalize the model parameters using structure-property modeling. A database of 2,417 data points involving 180 fluids was used in the development of this model. When applied to an external dataset containing 922 data points involving 71 fluids, the ST model predictions were, on average, within 2.6% of the reported values.

Conversion of biomass into biofuels with the assistance of GH61 enzymes
Cynthia Dobbs
Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Cellulose is the most abundant Organic compound on our planet. Inefficient conversion of cellulosic biomass to usable sugars has been a bottleneck in the biofuel industry. Enzymes that can convert these non-nutritive polysaccharides offer great promise to relieve this problem and have been the focus of extensive research in recent years. GH61/CBM33 family of enzymes belong to such group of enzymes. This recently discovered group has a common endoglucanase motif in their structures, but have little, or no, endoglucanase activity. They do however have a monooxygenase activity that introduces chain breaks in crystalline cellulose thus providing new ends for cellulases to work on. This exciting property is viable even before extracting cellulose from its crystalline matrix. Previous work done in our lab has helped us identify several GH61 enzymes as candidates for close scrutiny. Microarray and proteomic analyses corroborate that at least eight GH61 enzymes are abundantly expressed by Aspergillus nidulans when it is growing on biomass. We plan to clone these enzymes into a high expression pExpyr vector and transform A.nidulans to produce them in copious amounts. We will isolate the enzymes and characterize their activity towards cellulose digestion hoping to find a novel solution that will alleviate the 'lignocellulose to sugars' bottleneck. We are specifically interested in their cooperative interactions with hydrolytic enzymes. We hope to find an easier, faster and more affordable solution for the conversion of lignocellulose into biofuels. Despite the applications in the biofuel industry, liberating polysaccharides that are shackled in non-nutritive forms, thereby converting them into nutritive monosaccharides can offer cheap and accessible food source to impoverished regions.
The Study of Vocational Training in the FaithWorks of Abilene Program

Justin Dugger
Abilene Christian University
Department of Psychology
Subject Area: Social Sciences

With the current (circa May 2012) United States unemployment rate resting at 8.3% and the underemployment rate at a staggering 15%, this country is in a major dilemma. Other than government intervention there seems to be no clear solution to this problem; or is there? This research tests the effectiveness of education in a vocational training program called Faithworks of Abilene. This program emphasizes the importance of becoming a productive member of the modern workforce through counseling and the teaching and re-teaching of skills needed to gain steady employment. The research reviewed 10 class years of this program through self-reported surveys. The results of the study establish the credibility of the tools taught by Faithworks of Abilene for attaining employment and achieving independence from federal aid, drugs, and alcohol. The program, therefore, represents a viable option for helping to solve the nation's unemployment crisis.

The Peoples' Poets of Texas: Literature Born within the Singer/Songwriter Tradition of the Last Forty Years

Phyllis Dunham
Scholar from Sul Ross State University
Scholar Symposium Participant
Subject Area: Humanities

The People’s Poets of Texas: Literature Born Within the Singer/Songwriter Tradition of the Last Forty Years is a creative nonfiction exploration of the poetry found within the songs of multiple generations of modern Texas singer/songwriters and a case for the consideration of their work as a genuine regional literature. Studying the roots of Texas music, the musicality of Texan manners of speech and storytelling, and re-examining the Austin, Texas, music scene of the 1970s that brought a national focus to the organic, reciprocal manner in which Texas music is traditionally experienced and which radically altered the ways in which the songs were recorded and marketed, allows us to understand that, first, a proliferation of Texas singer/songwriters of unprecedented quality has emerged in recent decades and that, second, a legitimate people's literature is emerging from their song-craft.

Outsiders: Effects of Peer Labeling on Juvenile Development

Kristina Durham and Michael L. Birzer, Ph.D.
Scholar from Wichita State University
Scholar Symposium Participant
Subject Area: Social Sciences

Labeling theory proposes the idea that labeling a person as deviant leads to engagement in unacceptable behavior. Such labeling by parental and authority figures, such as teachers and law enforcement, has long served as a prominent factor in the behavior of juveniles. This research looks to explore and provide a broader view of an overlooked aspect that can also influence juvenile behavior- peer labeling. In order to investigate the influence of peer labeling on juvenile delinquency, as well as the development of the juvenile self-identity, interviews were conducted with a small group of counselors and staff involved with the local Boys & Girls Club of America. Those interviewed included staff members who work with children in grades six through twelve. The interview consisted of questions measuring numerous variables such as the establishment of rules and understanding of social norms, as well as the effect of peer influence on personal opinion. The purpose of this study is to examine if relationship between peer labeling and engagement in juvenile acts, as well as the impact of peer labeling on self-concept and identity.
Short Term Load Forecasting Using a Neural Network Based Time Series Approach
Suci Dwijayanti and Dr. Martin Hagan
Oklahoma State University
Department of Electrical and Computer Engineering
Subject Area: Physical Sciences & Technology

The accuracy of short-term load forecasting (STLF) is important to maintain optimal performance in the day-to-day operation of electric utility systems. The autoregressive moving-average (ARMA) model has been used for STLF. However, it has a weakness. It assumes a linear relationship between current and future values of load and between weather variables and load usage. Neural Networks can be used as a robust method for nonlinear prediction; they have the ability to model complex and nonlinear relationships, and they can be trained with historical hourly load data. The purpose of this work is to describe how Neural Networks can transform linear ARMA models to create short term load prediction tools. First, we make linear predictions of the daily load using ARMA models. Then, we develop a nonlinear predictor from the ARMA model to be implemented with Neural Networks. This dynamic Neural Network consists of three layers and two outputs. The nonlinear predictor is tested using load data (from 2009-2011) from Batam, Indonesia. We consider temperature data as a potential input to the predictor, but demonstrate that this provides no additional improvements to the predictor, because, in this area, temperature does not have any significant impact on the load usage.

Nutrients Effect on Arbuscular Mycorrhizal Fungi and Switchgrass Biomass
Ma Lourdes Edano, Yesuf Mohammed, Michael Reinert, Apurba Sutradhar, Muaid Ali, Hailin Zhang, Gail W.T. Wilson and Kefyalew Girma
Oklahoma State University
Department of Plant and Soil Science
Subject Area: Biological Sciences

Switchgrass is a promising native, low-input biofuel feedstock. Sustainable switchgrass production must consider both above- and belowground processes. This field study was conducted to determine the role of arbuscular mycorrhizal fungi (AMF) in biomass production across different nutrient amendments. The experimental design was in randomized complete block with four replications. Samples were collected in spring and fall 2011 and 2012 from sandy loam and silt loam soils, both cropped to the cultivar “Alamo”. Soil microbial communities, microbial biomass, organic carbon, NO3, plant-available P, and AM root colonization were assessed following applications of cattle manure, poultry litter, inter-seeded legumes, or inorganic fertilizers. A non-fertilized control was included. At the sandy loam site, amendments with cattle manure or poultry litter resulted in greater overall microbial biomass, compared to the control or inorganic fertilizer. At the silt loam site, microbial biomass did not differ between treatments. Total microbial biomass was lower in spring, compared to fall sampling. This may be a reflection of microbial activity following growth activity of the plant. Arbuscular mycorrhizal fungi biomass was reduced following fertilizer amendments. Application of fertilizers or inter-seeded legumes did not consistently increase yield. Unexpectedly, three consecutive years of organic fertilizer application did not increase soil organic carbon.

Non-traditional students' perceptions of the role of grammar in learning English as a second language
Soha Elfeel and Dr. Lucy Bailey
Oklahoma State University
Department of School of Teaching and Curriculum Leadership
Subject Area: Education

This qualitative research study explores adult non-traditional students' perceptions of literacy practices involved in learning English as a second language at a university center. I observed 20 participants from diverse cultural backgrounds and interviewed eight of these participants using semi-structured interviews.
Drawing on Firth and Wagner (2007), I focused on “the participant-as-language-user” (p. 758) in everyday informal communication due to the paucity of research on learners in informal settings. The research pursued the participants' emic interpretation of their experiences, employed inductive and thematic data analysis, and used socio-cultural theories for interpretation. The findings reflected the participants' different perspectives of viable literacy practices. First, the majority of participants emphasized the importance of explicit teaching of grammar. Second, some perceived it as counterproductive. Third, others believed that the integration of explicit teaching of grammar and communicative approaches helped their progress in language learning. All participants referred to explicit instruction, primarily the grammar-translation method, as the primary method used in their previous learning experiences in their home countries. The significance of the diverse responses for English language learning is that it furthers our understanding of how cultural background and previous normative teaching methods contribute to adults' perceptions and preferences of teaching methods.

Peer Deviancy Training in the Development of Antisocial Behavior

Jamie Farrelly and James Snyder, Ph.D.
Scholar from Wichita State University
Scholar Symposium Participant
Subject Area: Social Sciences

Based on previous studies conducted by Dr. James Snyder, our research we conducted investigated the influence of peers on the development of problem behavior in elementary school children. These children were categorized by socio-metric status groups, which included popular, rejected, and controversial children. The hypothesis was that children with the controversial social status will engage in more deviant talk (a common form of problem behavior) than children with a popular social status. Peer deviancy training, where students often learn deviant talk, was measured by observations between children from fall to spring of their kindergarten year. Deviant talk among children was coded using Antisocial Content Code (ACC, Oeser & Schrepferman, 2002). Furthermore, classmate social preference ratings were privately obtained from each child. Additionally, we obtained teacher ratings of conduct problems not only in kindergarten, but also in first grade. Despite theorizing that the controversial students would engage in more deviant talk, the results showed a consistent level in all three groups. Since a sizable mean difference in delinquency and aggressive behavior between controversial children and the popular children is present, but not between controversial and rejected children, the data suggests deviant talk had a stronger impact on the adjustment of controversial children than on the adjustment of popular and rejected children.

Adipose triglyceride lipase in Manduca Sexta (MsATGL): cloning, developmental expression and subcellular localization

Sarah Firdaus, Zhiyan Fu, Jose L Soulages, Jorge Zamora and Estela L Arrese
Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Triglycerides (TG) stored in lipid droplets (LDs) are the main energy reserve in all animals. The mobilization of TG stores is mediated by the action of lipases, the enzymes that catalyze TG hydrolysis. Adipose triglyceride lipase (ATGL) is an evolutionary conserved lipase that was shown to play a major role in the mobilization of fatty acids in human adipose tissue in conjunction with hormone sensitive lipase, HSL. The importance of ATGL in insects was shown in Drosophila where the loss of Brummer lipase (ATGL homolog) causes accumulation of TG, whereas its over-expression renders lean flies. In Manduca fat body we found three forms of the enzyme -64, 41 and 30 kDa- by immunoblot analysis. These proteins are mostly associated to the lipid droplet fraction of the cells.

The goal of this study was to gain insights into the role of MsATGL on TG mobilization by determining the subcellular localization of the enzyme and investigating the protein and transcript levels during different developmental stages in the insect’s life cycle. For comparison, the expression level of TGL-the major fat
body cytosolic lipase- was also determined. The investigation of MsATGL from fat body of larval and adult insects showed marked distinctions depending on the nutrition state of the insect. The protein appears to be up-regulated during physiological non-feeding periods but lower than TGL, with the exception of 3rd day-pre-pupal insects. We also investigated the effect of starvation in a time-dependent manner in the feeding larvae insects. Both levels of transcripts and expression were dramatically up-regulated indicating that ATGL is highly sensitive to the nutritional status and the rate of degradation increases during feeding. These observations indicate that the expression of ATGL is highly sensitive to the nutritional status of insects and may play a key role under starvation conditions.

**Differences in Men and Women's Self-Esteem: Influences of Childhood Trauma and Parental Devaluation**

Kaiya Fletcher and Dontavius Robinson  
Langston University  
Department of Psychology  
Subject Area: Social Sciences

Self-esteem among women is a problem of practical and theoretical concern. Some causes of lower self-esteem may be relational. The purpose of the present study was to investigate the relationship between parental devaluation and self-esteem among college students, and the role childhood trauma may play in this relationship. Of particular interest was the differential pattern of these associations among men and women. A path model was constructed with paths from childhood trauma (emotional abuse, sexual abuse, and emotional neglect) to self-esteem and parent devaluation, and a path from parent devaluation to self-esteem. The model for men and women was significantly different, so different path coefficients were calculated for each group. In the emerging area of perceived devaluation, the results demonstrated that parental devaluation directly influenced self-esteem. Additionally, childhood trauma influenced perceptions of devaluation and self-esteem. However, there were differences between men and women in these relationships. Physical trauma, in this case sexual abuse, had a stronger effect for men, while emotional trauma, in this case emotional abuse, had a stronger effect for women, representing a pattern reversal. The reasons that women's perceptions were influenced more by emotional abuse while men's were influenced more by sexual abuse need to be explored in future research.

**Targeted Adenoviral Gene Delivery to a Macrophage Cell Line**

Nicholas Flynn and Joshua Ramsey  
Oklahoma State University  
Department of Chemical Engineering  
Subject Area: Biomedical Sciences

One of the main challenges in gene delivery is targeting the gene vector to a cell type of interest. Adenoviral vectors show promise in delivering genetic material efficiently but suffer the drawback of infecting a broad range of cell types. Reducing the tropism of an adenoviral vector to only a specific cell type will have the benefit of avoiding potential complications associated with delivering a therapeutic gene to healthy cells, thereby increasing the safety and therapeutic potential of the vector. Macrophages play a negative role in disease progression of many illnesses and it is of interest to be able to regulate their activity using gene therapy. In this study, targeted gene delivery was demonstrated in vitro to murine macrophage RAW 264.7 cells. The capsid of adenovirus was chemically modified with polyethylene glycol (PEG) bearing mannose at its distal end. The combination of mannose and PEG was found to improve selective uptake of the virus by RAW 264.7 cells.
Contributions of Students Perceived Instructional Practices in Predicting Value in STEM Courses by Instructor Gender

Carol Fowlkes
Oklahoma State University
Department of Higher Education
Subject Area: Education

Research has shown that opportunities for hands-on learning are beneficial to students, especially in science, technology, engineering, and mathematics (STEM) courses. Research has also shown that instructor encouraging contributions is crucial in student's motivation to learn. The purpose of this study was to investigate the relationship of these two instructional practices and student's value of the course. Furthermore, the differences in this relationship were explored by instructor gender. Results demonstrated that both hands-on learning and encouragement were significant predictors of student's value. While hands-on learning was shown to predict value at the same rate across instructor gender groups, encouragement was more significant if the instructor was female. The instructor gender group was also a significant predictor, indicating that student's value of the course is significantly higher for the male instructor than the female instructor in STEM courses.

Quantitative structure-property relationship (QSPR) generalized NRTL model parameters for LLE mixture property predictions

Solomon Gebreyohannes, Krishna M. Yerramsetty, Brian J. Neely and Khaled A. M. Gasem
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

A thorough understanding of phase behavior properties of chemicals is essential for designing and optimizing processes involving separation of components from a mixture. The non-random two, liquid (NRTL) model is an activity coefficient model used widely in phase equilibria calculations, which has three adjustable parameters that are determined through regression of experimental data for a specific system. This work focuses on application of a theory-framed quantitative structure-property relationship (QSPR) modeling approach. A theoretical framework is employed to develop the behavior models, and the QSPR model is used to generalize the substance-specific parameters.

A database of 342 binary low temperature liquid-liquid equilibrium data was employed in this work. A regression analysis yielded percent absolute average deviations (%AADs) of 2, 13 and 14 for mole fractions of component 1 in phase 2 (component 1 rich) and phase 1 (component 2 rich) and partition coefficient predictions, respectively. The newly developed QSPR model yielded predictions with 8, 37 and 42 %AAD for the mole fractions and partition coefficient, respectively. These errors are approximately 2 to 3 times the errors found from the regression analysis, as compared to 3 to 7 times the errors resulting from the application of the UNIFAC model.

Modeling Liver Metabolism

Carrie German and Dr. Sundar Madihally
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biomedical Sciences

Controlled trials are used to test the efficiency and safety of new medicines and treatments. Due to the liver's vital role in the breakdown of medicinal drugs, liver cells are grown outside the body for experimentation. Cultured cells are placed inside a scaffold, a porous structure which houses cells and allows growth. The scaffold is placed inside a bioreactor, a manufactured environment meant to mimic conditions inside the
body. Media is introduced to the cells providing nutrients for survival and growth. Cells are subjected to initial drug concentrations to determine toxicity levels. Drug development, including culturing, testing, and analyzing cells, is costly. A liver metabolism model would make drug development more efficient by reducing lab experimentation. The objective of this study was to use a simulator to model liver metabolism and obtain theoretical, time-dependent concentrations. Initial concentrations, rate laws, and diffusion constants were used to determine concentrations of oxygen, estrogen, and urea in the media over time. Overall concentrations in the bioreactor were determined through multiple point analysis at nodes throughout the three dimensional structure. Models of concentration distributions were tracked as scaffold thickness, elevation, and porosity were varied.

The Effect of Local Concentration Gradients of Monocyte Chemotactic Protein-1 on Monocyte Adhesion and Transendothelial Migration

Neda Ghousifam and Heather Gappa-Fahlenkamp
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biological Sciences

Atherosclerosis is known as an inflammatory disease which is initiated by the accumulation of lipid substances in the subendothelial layer of major arteries, followed by transmigration of monocytes to the extracellular matrix (ECM). Monocyte migration is directed and possibly controlled by local concentration gradient of monocyte chemoattractant protein-1 (MCP-1). Many studies use 2D cell culture models to study the effect of soluble MCP-1 on monocyte migration. A 2D model lacks the third dimension needed for the creation of diffusive concentration gradients. To better mimic in vivo conditions, a 3D vascular tissue model consisting of a collagen matrix to represent the ECM was created. The goal of this research is to examine the effect of MCP-1 haptotactic concentration gradient on monocyte migration. It is shown that the static gradient of MCP-1 have the same effect on monocyte migration as the soluble + static gradient. Therefore, the effect of the static MCP-1 concentration gradient on monocyte transmigration is stronger than the soluble concentration gradient. The results of this research will provide new information about the relationship between MCP-1 concentration gradients and monocyte migration, and will lead to the development of an improved model to study transendothelial monocyte migration associated with inflammation.

Sex-specific variation in body phosphorus in two species of freshwater amphipod

Jared Goos, Beverly French, Rickey Cothran, Rick Relyea, Puni Jeyasingh
Oklahoma State University
Department of Zoology
Subject Area: Biological Sciences

Understanding the evolution of sexually dimorphic traits requires knowledge of the genetic and environmental sources of variation. However, we know surprisingly little about how the sexes differ in their demand for biologically important elements used to build sexually dimorphic traits. Here, we investigated how phosphorus (P) availability affects body composition in each sex of two Hyalella amphipod species and whether differences in food preferences underlie this variation. We discovered environmentally driven changes in body P that were dependent on both species and sex. In the species that continues to invest in P-demanding growth at larger size classes, males were more sensitive to low P availability than females, whereas no sex differences were observed in the species that invests little in growth at larger size classes. In both species, males were less P-rich when reared in a low P environment but this difference was greater in the species that has larger, P-rich sexual traits and higher growth rates. Variation in P content is likely not attributed to differences in acquisition of P because both sexes prefer high P food and consume it at a similar rate. Collectively, these results suggest that sexual dimorphism is evident at the elemental level and is sensitive to the P available in the environment.
Organic foods and loyalty: A bidimensional study on consumer attitudes
Cynthia Goudeau and Hyun-Joo Lee, Ph.D.
Oklahoma State University
Department of Design, Housing, and Merchandising
Subject Area: Social Sciences

The global organic food market represents a multi-billion dollar industry that has continuously grown over the last few decades. Although the organic food market has seen a steady increase in sales over the years, it is still considered relatively small in comparison to the international food market overall. Thus, there is a high level of rivalry between organic food retailers which can partially be attributed to the lack of customer loyalty in the organic food sector. The purpose of this study was to investigate how consumer attitudes influence loyalty to organic foods. Unlike previous research on organic foods, this study considered both the utilitarian and hedonic aspects of attitude. The sample was drawn from a consumer panel that was organized and maintained by a market research firm and data were collected through a web-based survey. A total of 1474 emails were distributed and 725 usable surveys were obtained after eliminating non-qualified and incomplete responses. The results confirmed that consumers developed attitudes toward organic foods based on both utilitarian and hedonic aspects, with utilitarian being slightly higher in terms of relative importance. The results also showed that attitudes positively affect attitudinal loyalty, which leads to behavioral loyalty.

Cascaded Process Model Based Controller on a Packed Absorption Column
Anand Govindarajan, Suresh Kumar Jayaraman, Vijayalakshmi Sethuraman, Pramod R. Raul, R. Russell Rhinehart
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

A cascaded process model based control (PMBC) technique is experimentally demonstrated on a pilot scale packed absorption column. PMBC offers certain advantages such as the ability to adapt the model, tuning factors valid over wide operating ranges, feed forward and feedback action. This work is an extension of the work of[1] where control of pressure drop across a packed absorption column was demonstrated. Improvements were made to the model used by integrating the pressure drop across the length of the absorption column and the discharge tubing. Conventionally the signal is sent from the PMBC to a PI controller. But, flow applications are inherently nonlinear [2] and a PI controller, based on a linear model, is only locally valid. Therefore in this work, the signal from the primary PMBC is sent to a secondary PMBC that controls air flow rate to the absorber. This work also demonstrates the ability of the cascaded controller in tracking the process, handling constraints, rejecting disturbances, simplicity of understanding and implementation, and also model adaptation to process conditions.


Dried Plum Supplementation has a Biphasic Effect on Bone Metabolism in Male C57BL/6 Mice and Prevents Age-related Bone Loss
Jennifer Graef, TJ Wronski, E Rendina, KA Clark, SL Clarke, EA Lucas, BP Halloran, BJ Smith
Oklahoma State University
Department of Nutritional Sciences
Subject Area: Biomedical Sciences

Age-related osteoporosis is a significant public health problem. Despite advances in therapeutic options over the past two decades, the search continues for more effective, low-cost treatment strategies. Dietary
supplementation with dried plums (DP) has been shown to prevent and reverse age-related bone loss, but the underlying alterations in bone metabolism have remained in question. The purpose of this study was to determine the effects of DP consumption on bone metabolic activity over time. Adult (6 mo) male C57BL/6 mice (n = 40) were assigned to the control (CON) or 25% (w/w) DP diets for 4 or 12 wks. Bone densitometry and microCT analyses indicate as early as 4 wks, animals consuming the DP-supplemented diet had a higher whole body bone mineral density (BMD) and vertebral trabecular bone volume (BV/TV) compared to CON. Bone histomorphometry and gene expression analyses suggest that supplementing the diet with 25% DP initially suppresses bone formation and mineralization in the distal femur metaphysis, but a rebound effect is observed by 12 weeks. Further investigation is warranted to understand the mechanisms involved in DP's alterations in osteoblast activity.

Are invasive warm-season grasses utilizing allelopathic chemicals to invade the prairies of the central and southern Great Plains? A story of chemical warfare in nature.

Mitchell Greer, Shana Lancaster, Gail W. T. Wilson, Karen R. Hickman
Oklahoma State University
Department of Natural Resource Ecology and Management
Subject Area: Biological Sciences

Bothriochloa ischaemum is an invasive warm-season perennial grass of Eurasian origin that is a threat to native prairies of the southern and central Great Plains. B. ischaemum and dominant native warm-season grasses are of the same functional group, which makes management and control difficult. One hypothesis for B. ischaemum's success is the production of allelopathic compounds that reduce native grass germination or establishment. To assess this hypothesis we examined germination and survivorship of native and exotic grasses following applications of leachate or leaf litter collected from B. ischaemum. Leachate and leaf litter collected from A. gerardii acted as controls. Our results indicate that applications of B. ischaemum leachate or litter reduced native grass seedling survival to <5% compared to >85% survival of B. ischaemum seedlings under the same treatments. However, results from the native grass leachate and litter treatments were very different as 100% survival was observed from all study species. We also examined the effects of exotic and native leachate on seed germination of these species. Similar results were observed, with B. ischaemum leachate greatly reducing germination of native species, but not itself. Our results indicate that allelopathic effects may be a driving factor in the invasive success of B. ischaemum.

Calcium homeostasis in Pseudomonas aeruginosa requires ATPases and gradient-driven ion exchangers

Manita Guragain, Dirk L. Lenaburg, Frank S. Moore, Ian Reutlinger, and Marianna A. Patrauchan
Oklahoma State University
Department of Microbiology and Molecular Genetics
Subject Area: Biological Sciences

Calcium (Ca$^{2+}$) homeostasis is tightly regulated in eukaryotes, where Ca$^{2+}$ regulates a number of essential cellular processes. Although bacteria are also capable of maintaining Ca$^{2+}$ homeostasis, little is known about the underlying mechanisms. Pseudomonas aeruginosa PA01, a facultative human pathogen causing severe acute and chronic infections, responds to elevated Ca$^{2+}$ by enhancing biofilm formation and production of virulence factors. By using Ca$^{2+}$-binding photoprotein aequorin, we have determined the concentration of free intracellular Ca$^{2+}$ ([Ca$^{2+}$]$_{in}$) in PAO1, 0.14±0.05 µM, which increased 13 fold upon adding Ca$^{2+}$ and declined. Growth at elevated Ca$^{2+}$ increased the efflux rate of [Ca$^{2+}$]$_{in}$. Treatment with inhibitors of: channel (LaCl$_3$), ion exchanger (gramicidin D), ATP synthase (2,4-dinitrophenol), or P-type ATPase (vanadate) impaired [Ca$^{2+}$]$_{in}$ response, suggesting the importance of such transporters in Ca$^{2+}$ homeostasis. To identify Ca$^{2+}$ transporters in PA01, LC-MS/MS peptide counting was used. Seven Ca$^{2+}$-induced and 11 bioinformatically predicted transporters were targeted for monitoring [Ca$^{2+}$]$_{in}$ by using eighteen transposon
insertion mutants (UW Genome Center). 13 mutants showed significantly impaired Ca\textsuperscript{2+} homeostasis, suggesting that both ATPases and ion exchangers are involved in maintaining cytosolic Ca\textsuperscript{2+} homeostasis in \textit{P. aeruginosa}. The apparent redundancy indicates the importance of Ca\textsuperscript{2+} homeostasis in \textit{P. aeruginosa} physiology and requires further studies.

**Development of a Productivity-Based Economic-Energy-Environmental (E3) Model for Heavy Duty Diesel (HDD) Construction Equipment**

Apif Hajji and Dr. Phil Lewis

Oklahoma State University
Department of Civil and Environmental Engineering
Subject Area: Physical Sciences & Technology

Earthwork is one of the fundamental activities of infrastructure projects, which are completed by heavy duty diesel construction equipment, and consumes mass quantities of energy (diesel fuel) and subsequently emits large quantities of air pollutants and greenhouse gases. Although recent engine technology has greatly improved emission rates for new equipment, this technology has not addressed fuel use and greenhouse gas emissions. It is necessary to accurately estimate production rates of construction equipment for economic, energy, and environmental purposes. The objective of this research is to develop 'Economic-Energy-Environmental' (E3) model; a model for estimating construction cost, fuel use and emission rates of air pollutants including nitrogen oxides (NOx), particulate matter (PM), hydrocarbons (HC), carbon monoxide (CO), and greenhouse gases including carbon dioxide (CO2) based on the equipment production rate for earthwork activities. This model will utilize new fuel use and emission factors based on units of production, such as gallons of fuel consumed per cubic yard of earth moved and grams of pollutant emitted per cubic yard of earth moved. This productivity-based fuel use and emission factors can be used with construction plans and specification to estimate the fuel use and emissions footprint for a construction activity or an overall project.

**Toward a Sense of Belonging: The Empowering Potential of Virtual Worlds**

Janet Handwerk and Lucy E. Bailey Ph.D.

Oklahoma State University
Department of School of Teaching and Curriculum Leadership
Subject Area: Education

Virtual world (Internet) research reveals that meaningful experiences in virtual world places have the potential to transfer to corporeal world activities and thus raises the qualitative question of how virtual world identities and experiences offer potential empowerment for groups who don't feel they 'fit in' in physical world classrooms. Research on corporeal world activities of adolescents indicates that adolescents who verbalize feelings of not 'fitting in' due to gender, race, learning disability, sexuality, or other characteristics are ostracized from social peer groups, targets of peer-taunting, bullying, and physical violence at higher rates than their peers. Youth who endure these experiences have lower academic outcomes, higher rates of absenteeism, depression, and suicide when compared to similar non-marginalized students (NEA, 2009). This bipartite study analyzes adult participant's (avatars) sense of belonging as it is experienced in meaningful relationship(s) in Second Life. Drawing on findings from this exploration of adult Second Life participants, I juxtapose virtual with corporeal belonging and investigate virtual experience as potential empowerment for marginalized corporeal world adolescents.
Evaluation of commercially available near-infrared reflectance spectroscopy for nutrient prediction of CDDGS

Andrew Harding¹, C. F. O’Neill¹, M. L. May², L. O. Burciaga-Robles², and C. R. Krehbiel¹
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

Corn dried distiller’s grains plus solubles (CDDGS) are a common feedstuff in feedlot production due to their high energy and CP content. Near-infrared reflectance spectroscopy (NIRS) can be used to quantify nutrient composition of feedstuffs real time. CDDGS samples (n=27) were delivered to one feedlot in Western Canada and scanned using NIRS technology (InfraXact™, FOSS North America) to predict CP and ADF. These results were compared to laboratory analysis values. Samples were ranked independently by laboratory CP (min = 21.43%, max = 26.08%) and laboratory ADF (min = 13.74%, max = 19.74%) and evaluated in low (n=9), medium (n=9) and high (n=9) ranges. Regression analysis of each parameter and group was performed using WinISI Software (FOSS North America). Coefficient of determination (R²) was found to decrease as CP increased (0.818, 0.492 and 0.305, for each group respectively), with an overall relationship of R² = 0.774. R² increased as ADF content increased (0.032, 0.072 and 0.492, for each group respectively), with an overall relationship of R² = 0.021. Commercially available NIRS technology can accurately predict CP of CDDGS with increased accuracy at lower CP levels. Current NIRS models are poor predictors of ADF but improvements are seen as ADF content increases.

¹Department of Animal Science, Oklahoma State University, Stillwater, USA
²Feedlot Health Management Services Ltd, Okotoks, Alberta, Canada

Removing coliforms and E. coli in contaminated drinking water using biosand filtration

Michelle Henry, Dr. Ed Wilson, and Dr. Steve Moore
Scholar from Harding University
Scholar Symposium Participant
Subject Area: Biological Sciences

Biosand filters are cost effective and are designed to provide clean drinking water for small families. They can be made with local materials: sand and gravel in a concrete container that work like an aquifer to remove bacteria, parasites and some viruses. This research consisted of building the filters, making modifications to the layers and testing the water for various contaminants. The research questions were: Do biosand filters effectively remove harmful coliforms and E. coli? How do biosand filters effect pH and turbidity of creek water? Does adding additional layers of charcoal and iron oxide improve effectiveness?

The main contaminants tested were E. coli and coliform because they are indicator organisms. When ingested, they will likely cause dehydration induced by diarrhea, the second leading cause of death worldwide in children under age 5. The filters removed an average of 97.06% of coliforms and 97.68% of E. coli. The turbidity improved and the flow rate averaged 150.2 mL per minute. The filter that removed the bacteria the best and had the fastest flow rate was the original design. We hope the results of this research could be used to improve water quality and health status of people living in developing countries.
The Evaluation of a Position-Specific Task in NCAA Division I Linemen
Garrett Hester, Bert H. Jacobson, Ty B. Palmer, Matt J. Hawkey, Doug B. Smith, Matthew S. O'Brien, Zach D. Ruedy
Oklahoma State University
Department of Health and Human Performance
Subject Area: Education

It is essential that strength and conditioning professionals have access to an evaluative tool that provides a practical, position-specific assessment of playing ability in collegiate linemen. The purpose of this study was to compare the performance of a position-specific task on the MAXX Football Sled Device (MFSD) between NCAA Division I offensive linemen (OL) and defensive linemen (DL). Twenty-six NCAA Division I OL (n=12) and DL (n=14) (age 20.11± 1.49yrs) performed ten “fire-and-drive” repetitions on the MFSD. Upon an auditory signal rendered from the MFSD, subjects exploded out of a three point stance contacting the breast plate region of the dummy as forcefully and rapidly as possible. Timing between repetitions was an automatically randomized duration of 6 to 10 seconds during which subjects reset themselves in a three point stance. The MFSD measured movement time, the time from the auditory signal to initial contact on the dummy, for each of the ten repetitions. Test-retest reliability demonstrated strong reliability with the device (ICC = .828; SEM = .022). DL were found to produce significantly lower movement times when compared to OL (p = 0.032). Results of this study indicate that DL accelerate out of a three point stance quicker than OL.

Steady State and Transient State Identification in an Industrial Process
Ting Huang, R. Russell Rinehart, Anand Vennavelli, Mike Resetarits
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

A computationally simple method is demonstrated for automated identification of steady state and transient state in noisy process signals of an industrial-scale, single or multi-variable process. This SSID and TSID method uses the R-statistic method, which is a ratio of estimated variances, and independent of the process variance. It has been implemented for automated identification of steady state of a single variable water flow rate to an absorption column in the Unit Operations Lab and the multi-variable commercial scale distillation process in FRI. When there is an upset in the process the steady state identifier indicates so. Most often the visual identification of steady state agrees with the statistic-based method of identification of steady state. At the process where the noise is pronounced and confounds identification of steady state, the steady state identifier helps operators to interpret the data.
The Predictive Validity of Mental Toughness in the Context of Learning a Complex Task

Ruth Imose and Eric Day, Ph.D.

Scholar from the University of Oklahoma
Scholar Symposium Participant
Subject Area: Social Sciences

Although often discussed and referenced through news media, scholarly journals and everyday conversation, mental toughness is arguably the most ambiguous construct in the field of sport, exercise, and performance psychology. Mental toughness is cited as a necessary attribute for success by coaches, athletes and sport scientists alike. An examination of the current literature shows several points of disagreement among scholars, such as how many and what specific facets comprise mental toughness and whether it is a generic trait or a more situationally specific construct. Little empirical research has demonstrated, or even attempted to demonstrate, the extent to which mental toughness predicts performance.

This study will examine the predictive validity of mental toughness scores in the context of learning a complex task, specifically a computer game that involves strong cognitive and perceptual-motor demands. The predictive validity of a generic, trait-based measure will be compared to that of a domain-specific scale. The extent to which mental toughness explains variance across a variety of cognitive, affective, and skill-based learning outcomes above and beyond that explained by other established determinants of learning and performance (e.g., ability, experience, goal orientation, and self-efficacy) will be examined.

Concept of Viscous Heating to Reinvent the Toilet

Md. Islam, Jagdeep T. Podichetty, David Van, Gary L. Foutch, A. H. Johannes and Mason Reichard

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

Highly viscous substance such as feces produces significant amounts of heat if layer deformation is allowed to occur. The main goal of the project was to establish a mechanism using viscous heating principle to destroy microorganisms and whipworms in feces using a small amount of power. Viscous heating of feces through an extruder was proved effective for disinfection. The extruder consists of a rotating central core and a space with a shell wall. Data were obtained over a range of operating conditions with simulant materials having similar viscosity as human feces. Baboon feces were tested to determine parasite destruction data. Experiments with simulants with the smallest spacing achieved closely to 200°C. Baboon feces processed through the system showed a 99% destruction of Trichuris Trichiura only with shear stress. Vegetable dye passed through the space demonstrated the reactor plug flow. Alternative geometries such as two rotating parallel disks, one solid sphere inside a hollow sphere could be considered for high-volume sludge processing. A possible design variation includes spreading the mass into a thin layer for water evaporation. Integrations with other treatment technologies may completely sterilize the fecal mass.

Nonlinear Friction Estimation in an Elastic Drive System Using a Dynamic Neural Network-Based Observer

Amir Hossein Jafari

Oklahoma State University
Department of Electrical and Computer Engineering
Subject Area: Physical Sciences & Technology

Elastic drive systems are extensively used in industrial applications as well as in many research labs. Some of these applications include: rolling mills, elastic belt drives, flexible joint manipulators, and conveyor systems. These systems usually include the combination of many mechanical components: actuators,
couplings, gears and shafts. The shafts and couplings play a critical role in the dynamics of the system. Due to un-modeled dynamics the estimation of state variables will not be easy but Neural Networks can be a useful tool in this regard.

Neural networks can be divided into feed-forward and recurrent categories. Recurrent networks are powerful and have significantly more applications in system identification. The proposed nonlinear observer uses a Recurrent Neural Network (RNN) combined with the dynamics of a linear Electric Drive System. The nonlinear characteristics of the system, such as Coulomb and nonlinear viscous friction torques are identified. The theoretical analysis of the proposed neural network based observer including the neural network structure and training algorithm are discussed.

Performance Comparison of Structured Packing Liquid Holdup Correlations
Anil Krishna Jammula, Dr. James R. Whiteley, Dr. Tony J. Cai and Michael R. Resetarits
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

This paper presents an analysis and comparison of popular liquid holdup correlations developed for structured packing. Correlation performance was analyzed using a screened database containing the literature liquid holdup data. The screening process excludes data points from very high pressure test runs and flooding data. The full database consists of 368 liquid holdup data points obtained from 7 different sources. A total of 24 different structured packings are present in this database. This database consists of data from both hydrocarbon and aqueous system.


All-optical Production of a Sodium Bose-Einstein Condensate
Jie Jiang, Lichao Zhao, Micah Webb, Yingmei Liu
Oklahoma State University
Department of Physics
Subject Area: Physical Sciences & Technology

We present the production of sodium Bose-Einstein condensates via direct evaporation in various far off-resonant optical dipole traps. These optical traps are derived from a high power laser at 1064 nm through different methods, such as by a single tightly-focused laser beam, by the intersection of two orthogonal laser beams, and by a single compressible laser beam achieved via a zoom lens telescope. Sodium atoms are first collected in a magneto-optical trap and cooled to 50 microKelvin through polarization gradient cooling. The cold dense atomic cloud is then transferred to an optical dipole trap. By reducing the optical trap depth, sodium Bose-Einstein condensates are generated from evaporation and rethermalization in the optical trap. We also demonstrate how to optimize the efficiency of evaporative cooling in the aforementioned three different optical traps.
Energy Dissipation in Eighteen-Foot Drop Broken-Back Culvert under Open Channel Flow Conditions

Nicholas Johnson, Abdelfatah Ali, Dr. Avdhesh Tyagi
Oklahoma State University
Department of Civil and Environmental Engineering
Subject Area: Physical Sciences & Technology

This paper investigates the reduction in scour downstream of a broken-back culvert by forming a hydraulic jump inside the culvert. A broken-back culvert model was built in the laboratory consisting of a 1 (vertical) to 2 (horizontal) slope after the upstream inlet that continues with a flat section from the break point to the downstream outlet. This study focuses on a drop between inlet and outlet of 18 feet. Three flow conditions were simulated, consisting of 0.8, 1.0 and 1.2 times the culvert depth.

The hydraulic jump created in the flat part of the culvert is an “oscillating jump” type, as indicated by the Froude number range of 2.5 to 4.1. In order to get the jump near the toe, different sill heights and locations, as well as friction block arrangements were tested in the flat section of the culvert. The results showed that the best option to maximize energy dissipation under open channel flow conditions is to use one sill 5.0 feet high located 43 feet from the outlet. The maximum length of culvert can be reduced between 40 to 43 feet. Such a scenario is important where right-of-way problems exist for culvert construction.

Climbing the Steps toward a Successful Cooperating Teacher/Student Teacher Mentoring Relationship

Cameron Jones, Kathleen Kelsey, Nick Brown
Oklahoma State University
Department of Agricultural Education, Communications, and Leadership
Subject Area: Education

Agricultural education cooperating teachers (mentors) are idealized as seasoned professionals, proficient in their craft, and able to transmit tacit knowledge to pre-service teachers (mentees) through demonstration, conversation, and coaching. When the relationship is successful, both parties experience positive outcomes that may last a lifetime. Agricultural educators report that cooperating teachers are one of the most important influences on the development of new teachers. An instrumental case study identified three steps that underpin successful mentoring relationships between cooperating teachers and student teachers in school-based agricultural education; personality; community and access; trust and communication. Personality included compatibility, similar values, mutual interest in growth, successful conflict resolution, and appreciation of differences. Community and access included feelings of belonging and having access to cooperating teachers. Trust and communication were based on delegating responsibility, providing accurate feedback, and supporting student teachers to assume the role of teacher. Based on the findings, it is recommended that university-based teacher educators increase opportunities for informal mentoring pairs to emerge. Future research could explore the impact of informal pairing on the development of new teachers compared to formal pairings.

The Neural Correlates of Impaired Attentional Control in Social Anxiety

Matt R. Judah, Adam C. Mills, William V. Lechner, and DeMond M. Grant
Oklahoma State University
Department of Psychology
Subject Area: Social Sciences

Cognitive models of Social Anxiety Disorder posit that maladaptive thought processes play an etiological role in symptoms. Theories predict that self-focused attention, consisting of focus on aspects of the self that are feared to elicit negative evaluation, preoccupies attention and reduces processing of non-threatening information, thereby maintaining social fears. The current study tested whether socially anxious individuals (SAs) demonstrated impaired processing efficiency at the neural (i.e., ERPs) and behavioral (i.e., saccadic
control) level, and whether this was exacerbated by self-focused attention. Thirty-two (16 SA, 16 non-anxious controls) subjects completed a mixed-antisaccade task with 20% of trials manipulated to increase self-focused attention via pseudo heart rate feedback. SAs displayed delayed onset of correct saccades, $F(1,30)=6.63, p=.015, \eta^2=.18$. They also had lower P3b amplitude compared to controls, $F(1,30)=5.56, p=.025, \eta^2=.16$, suggesting reduced attentional deployment toward discriminating cues, as well as delayed P3b for self-focus trials, $F(1,27)=8.63, p=.007, \eta^2=.24$, suggesting delayed cue categorization. SAs also showed greater CNV negativity compared to controls, $F(1,30)=4.87, p=.035, \eta^2=.14$, suggesting greater effort in response preparation, but this negativity was reduced during self-focus trials. These results support and expand cognitive theories by documenting impaired executive function in social anxiety and the role of self-focused attention in these deficits.

Mapping the Extent and Assessing the Kinematics of the Aswa Shear Zone in East Africa

Andrew Katumwehe, Estella Atekwana and Mohamed Abdelsalam

Oklahoma State University
Department of Geology
Subject Area: Physical Sciences & Technology

The Aswa Shear zone (ASZ) is a fundamental Precambrian lithospheric structure playing an important role in the evolution, segmentation, propagation of the East African Rift System (EARS), the volcanic centres of Mt Kilimanjaro and Mt Elgon, re-organization of the White Nile, and the distribution of recent seismicity in South Sudan. ASZ extends in a NW-SE direction from South Sudan through Uganda, Tanzania and possibly into Madagascar. Nonetheless, the kinematics and extents of the ASZ have not been fully understood because of limited exposure. We use recent high resolution geophysical data over Uganda integrated with 30 m spatial resolution Shuttle Radar Topography Mission (SRTM), Digital Elevation Model (DEM) and Shear wave tomography to elucidate the kinematics and ascertain the significance of ASZ in the development of the EARS and the tectonic architecture of east and central Africa. The geophysical data from Uganda suggest that ASZ is characterised by a 50-300 km wide corridor of ductile deformation associated with NW strike-slip shearing.

The EARS bifurcates into the Eastern and Western branches south of the ASZ while the western branch terminates at the ASZ. Tanzanian craton together with ASZ played an important role in strain localization during, propagation and segmentation of the EARS.

Bioinformatics Approaches to Deciphering Genome-wide Host-Pathogen Protein Interaction Networks

Robyn Kelley

Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Protein-Protein Interactions (PPIs) are an important aspect of initiating pathogenesis and maintaining infection. These PPIs control interchanges between plant host-pathogen systems on the molecular level, which play a vital role in the success of the plant's defense or of the pathogenesis. Here we report the first comprehensive study to predicting genome-wide host-pathogen networks in any plant-pathogen interaction system. Experimentally proven genomic data and protein features from the Arabidopsis thaliana - Pseudomonas syringae pv tomato strain DC3000 model interaction system are combined into a Support Vector Machine (SVM), developing computational models for predicting genome-wide HPIs. Several models are constructed using similarity-search, machine learning, and a series of combinatorial approaches. These models have been used to test the performance on independent sequences giving results as high as 100% accuracy in predicting positive Arabidopsis thaliana - Pseudomonas syringae independent test sequences using a physiochemical based model. Independent trials have also been run using data from the
Host-Pathogen Interaction Database. Prediction for this diverse dataset shows an accuracy of ~20% for the same model. The best models have been implemented as a web-based prediction tool for public use.

**Triaxial Electrospinning to form Core-Shell Hollow Fibers of Biomaterials**

Abdurizzagh Khalf and Sundararajan V Madihally  
Oklahoma State University  
Department of Chemical Engineering  
Subject Area: Physical Sciences & Technology

Electrospinning is a versatile polymer processing technique for production of micro and nanosize fibers through an electrically charged jet of polymer solution. Since fibers of sizes mimicking in vivo matrix configuration can be formed, electrospinning has gained significant attention in tissue regeneration and drug delivery. Co-axial and triaxial electrospinning are modifications to the spinneret design to prepare multi-layered or hollow fibers. These modifications are made to increase the surface area to deliver important molecules, improving the mechanical properties, and enhancing the structural morphology. In triaxial electrospinning three different polymers solutions are supplied into a compound Taylor cone (three flow streams) through a spinneret and charged liquid at the nozzle orifice is drawn out by electric field to form a liquid jet. In this study, we tested the effect of solvent conditions on the fabrication of core shell hollow nanofibers made of polycaprolactone (PCL), cellulose acetate (CA), and polyvinyl alcohol (PVA). We formed hollow fibers of PCL-CA, CA-PCL and PCL-PVA by triaxial electrospinning. To form these fibers, it is important to have a solvent system in the outer shell that has a boiling point less than that in the inner shell.

**Comparing the Effectiveness of Three Types of Modeling with Toddlers**

Sada Knowles, Ellen J. Harwell, Robert E. Larzelere, and Jasmine Bigler  
Oklahoma State University  
Department of Human Development Family Science  
Subject Area: Social Sciences

Modeling has been widely recommended in parenting literature as an effective child rearing tactic. The current study compares the effectiveness of three types of modeling with toddlers: direct modeling, passive modeling, and helpful modeling. Researchers observed 105 mother-toddler pairs in a 5-minute cleanup task in a university laboratory. The interaction was video recorded and later coded to account for the types of modeling used in response to noncompliance and the number of toys put away. Data were organized into 5-second intervals and analyzed as intensive longitudinal data using hierarchical linear modeling. According to the multi-level analysis, direct and passive modeling were not predictive of subsequent compliance. Helpful modeling and the quality of the helpful modeling behavior significantly predicted the number of toys a toddler put away in the following 5-second interval. The child's age in months and their initial cooperation (measured by the number of toys put away in the first minute) were also significantly associated with the number of toys put away during each interval. Overall, older toddlers appeared to be more compliant with the mother's request to pick up toys, but the mother's use of helpful modeling was an effective tool in eliciting a toddler's cooperation.
Structure and Function Analysis of H7, a Vaccinia Viral Protein

Venkata Swapna Kolli, Junpeng Deng, Xiang Y
Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Vaccinia virus is a member of orthopoxvirus family, which includes variola virus the causative agent for smallpox. H7 is a late-stage viral protein, which plays a role in poxvirus morphogenesis, such as formation of crescent membranes and immature virions. The structure and mechanisms by which H7 functions are not known. H7 is conserved in all vertebrate poxviruses, but it has no homologue outside poxviruses and bears no sequence motif that would suggest any possible structural fold or functioning mechanism. Here we report the crystal structure of H7 at 2.0 Ångstrom resolution. The structure of H7 displays a unique fold consisting a two-stranded antiparallel beta sheet flanked by six alpha helices. Our preliminary studies imply a possible role of H7 in lipid binding, which might be linked to membrane trafficking. Further detailed functional studies are in progress.

Effect of temperature and pH on fiberless adenovirus and identification of potential stabilizers

Grit Kupgan and Joshua Ramsey
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biomedical Sciences

Through genetic modification, fiberless adenovirus was designed with the aim of producing an improved version of the native adenovirus, serotype 5, for gene delivery. The expected benefits of this modification include a reduction of the promiscuous tropism and immunogenicity of the vector. However, our previous results showed that deletion of the fiber protein also compromised the stability of the virus. This instability may poorly affect transduction efficiency and, therefore, could prevent the utilization of fiberless adenovirus in clinical settings. To overcome this problem, the temperature and pH effects were investigated to determine the optimal storage and delivery conditions of the virus. Additionally, several pharmaceutical excipients were screened to identify potential stabilizers, which were hoped to restore fully the stability of the fiberless adenovirus and its potential use as a therapeutic agent.

Comparison between the Permanent-Jump and Transitory-Diffusion Model and the ARIMA Model with Permanent and Transitory shocks

Yoonsuk Lee
Oklahoma State University
Department of Agricultural Economics
Subject Area: Social Sciences

Many researchers have modeled permanent shocks and transitory shocks in time series analysis. The permanent-jump and transitory-diffusion model is developed as a new stochastic time-series model in the paper. The developed model could bridge the gap between permanent shocks and transitory shocks by formulating a mixed process where the long-run impact of basis prices in agricultural commodities is explained by a Poisson process and the short-run impact of the basis prices is expressed by a first-order moving average process. In addition to the development of a stochastic time series model, this paper estimates the existing ARIMA model with level-shift in mean (permanent effects) and temporary changes. The ARIMA (0, 1, 1) model with permanent and transitory shocks is compared with the developed model by using nonnested tests.
Penalized Maximum Likelihood Method for QTL Mapping

Xuesong Li and Lan Zhu

Oklahoma State University
Department of Statistics
Subject Area: Biological Sciences

Association mapping is a promising approach in detecting QTL (Quantitative Trait Locus) from genetic markers. However, the association study is confronted with the problem of genetic relatedness among individuals, including animals, plants, and human beings. In this study, we propose a novel penalized maximum likelihood method to estimate parameters in a mixed model that involves the pedigree structure as the polygenic random effect. We apply this method in association mapping, especially in the case that the number of markers is larger than the sample size. The robustness of the proposed method under several common scenarios is evaluated. Specifically, we explore the effect of several main factors on the performance of the proposed method. These factors include sample size, trait heritability, magnitude of the additive effect, and pedigree structures. Results from the simulation study demonstrate that our proposed method has high power in detecting QTL among all markers and can precisely estimate the additive effects of QTL.

Effects of mannan oligosaccharide on beef cow performance and passive immunity transfer to calves

Sara Linneen, G.M. Mourer, J.D. Sparks, and D.L. Lalman

Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

The objective of this experiment was to determine whether feeding mannan oligosaccharide (MOS) to beef cows during late gestation through early lactation would improve cow and calf growth performance and passive immunity transfer to the calf. Cows (n = 74; BW = 569 ± 68 kg) were allotted by BW and age in a completely randomized design. Cows were individually fed 1 of 2 treatments: 1) 1.36 kg/d during gestation of a cottonseed meal-based 30% CP supplement and 1.81 kg/d during lactation of a cottonseed meal-based 38% CP supplement (Control); 2) Control plus 10 g/d MOS (Bio-Mos®; Alltech, Inc.). Data were analyzed using Mixed Models in SAS 9.3. MOS treated cows tended to maintain more BW from calving through the end of the feeding period (P=0.07). Similarly, cows consuming MOS were better able to maintain BCS from initiation of the study through weaning (P=0.05). At parturition, significant differences for IgG1 concentrations in colostrum (P=0.36; CV = 96), cow serum (P=0.55; CV=39) or calf serum (P=0.11; CV=93) were not detected. Similarly, parturition calf serum IgG2, IgA, or IgM concentrations were not significantly different (P>0.14). Adding MOS to winter supplement may limit BCS loss following parturition in spring calving beef cows.

Key Words: Calves, Cows, Immunity, Mannan Oligosaccharide

Quantifying the Influence of Vegetation Roots on the Erodibility of Streambanks

Whitney Lisenbee

Oklahoma State University
Department of Biosystems and Agricultural Engineering
Subject Area: Physical Sciences & Technology

Vegetation increases streambank stability by increasing the strength of the soil with roots to prevent both fluvial erosion and geotechnical failure. Relationships that predict the influence of root cohesion on increasing the soil's resistance to fluvial erosion are not currently available, although vegetation and biostabilization techniques are common practices in stream stabilization and restoration. This research measured the erodibility of a silt loam soil along Cow Creek in Stillwater, OK, by performing Jet Erosion Tests (JET) with and without the presence of roots. The JET impinges a jet of water on the soil and the scour
depth over time is measured to derive an erodibility coefficient and critical shear stress. These two parameters are used in the excess shear stress model for predicting fluvial erosion. The JETs were conducted adjacent to identified Sprangletop (Leptochloa dubia) plants growing on the Cow Creek streambank. After the JETs, soil cores were extracted at the JET location and root characteristics were quantified, such as the root density, length, and diameters. Relationships were derived between the erodibility coefficient, critical shear stress, and the root characteristics. As more tests are conducted and the relationships improved, they can then be used in streambank stability models to help improve designs of streambank stabilization practices.

Feature-based Sentiment Analysis on Android App Reviews Using SAS® Text Miner and SAS® Sentiment Analysis Studio

Jiawen Liu, Mantosh Kumar Sarkar, Dr. Goutam Chakraborty
Oklahoma State University
Department of Management Information Systems
Subject Area: Education

Sentiment analysis is a popular technique for summarizing and analyzing consumers' textual reviews about products and services. There are two major approaches for performing sentiment analysis; statistical model based approaches and Natural Language Processing (NLP) based approaches to create rules. In this study, we first apply text mining to summarize users' reviews of Android Apps and extract features of the apps mentioned in the reviews. We then use NLP approach for writing rules. We use reviews of two recent apps; a widget app from Brain& Puzzle category and a game app from Personalization category. We extracted six hundred textual reviews for each app from Google Play Android App Store. SAS Text Miner 7.1 is used for summarizing reviews and pulling out features, and SAS Sentiment Analysis Studio 12.1 is used for performing sentiment analysis. Our results show that for both apps, carefully designed NLP rule-based models outperform the default statistical models in SAS Sentiment Analysis Studio 12.1 for predicting sentiments in test data. NLP rule based models also provide deeper insights than statistical models in understanding consumers' sentiments.
Production of “drop-in” biofuels from syngas using Alkalibaculum bacchi

Kan Liu¹, Hasan K. Atiyeh¹, Ralph S. Tanner², Mark R. Wilkins¹ and Raymond L. Huhnke¹

Oklahoma State University
Department of Biosystems and Agricultural Engineering
Subject Area: Biological Sciences

Hybrid thermochemical-biochemical process is a novel technology for the conversion of renewable feedstocks such as biomass into “drop-in” biofuels, e.g. butanol, which are compatible with existing engines and petroleum infrastructure. The biomass is gasified to synthesis gas (syngas) containing CO, H₂ and CO₂, which are then fed to fermentor and converted into butanol and other alcohols via microbial catalysts. Recently, we discovered that Alkalibaculum bacchi strain CP15 has a better potential for ethanol production from syngas, compared to A. bacchi strains CP11 and CP13 previously studied in our laboratory. However, strain CP15 was not examined for its ability to make higher alcohols. In the present study, we designed a medium that contained corn steep liquor (CSL) that produced n-propanol and n-butanol and was 94% less expensive than the yeast extract (YE) medium used to make ethanol. Moreover, CSL medium produced twofold more ethanol compared to YE medium in batch fermentation. Continuous syngas fermentation using strain CP15 was successfully operated for over 1,000 h in a 7-L fermentor with a cell retention system. Depending on the operating conditions, about 6 g/L n-propanol and 1 g/L n-butanol were produced. Further investigation is ongoing to increase the titers of these two alcohols.

Keywords: Alkalibaculum bacchi, ethanol, n-propanol, n-butanol, continuous syngas fermentation; cell retention

¹ Biosystems and Agricultural Engineering Department, Oklahoma State University, Stillwater, OK
² Department of Microbiology and Plant Biology, University of Oklahoma, Norman, OK

In search of cold hardy bermudagrass for golf greens

Wenwen Liu
Oklahoma State University
Department of Horticulture and Landscape Architecture
Subject Area: Biological Sciences

Bermudagrass is experiencing increased use on golf course putting surfaces in Oklahoma and other transition zone states. Compared to creeping bentgrass greens, bermudagrass offers a more economical playing surface for lower budget golf courses. Benefits of bermudagrass include higher drought resistance, less incidence of diseases such as large brown patch, dollar spot, basal anthracnose, pythium root and crown rot, and less summer stand loss due to anaerobic soil conditions. The golf industry demands further improvements in bermudagrasses' late-season color retention, winter hardiness, and a reduction in the use of protective winter covers. During the last 10 years we selected for over 30 bermudagrass lines that tolerated 6.4 mm mowing while remaining unprotected by covers during winter. The purpose of this study was to evaluate seven of our promising final stage experimental bermudagrass lines against the golf industry standards 'Champion Dwarf', 'Mini-Verde', 'TifEagle' and 'Tifgreen' for performance under putting green conditions at Stillwater, OK. Statistical differences in putting surface establishment rate, visual quality, Stimmeter green speed, and late-season color retention were found in the trial. An improved OSU line was identified to advance to 2013 testing in the National Turfgrass Evaluation Program putting green trial to be conducted across the southern U.S.
Characterization of two functional β-carbonic anhydrases from *P. aeruginosa* PAO1

Shalaka Lotlikar, Shane Hnatusko, Nicholas E. Dickenson, Shyamal P. Choudhari, Wendy L. Picking, and Marianna A. Patrauchan*

Oklahoma State University
Department of Microbiology and Molecular Genetics
Subject Area: Biological Sciences

*Pseudomonas aeruginosa* is an opportunistic human pathogen and a leading cause of life threatening infections. It is resistant to most available antimicrobial drugs, and requires identification of new antimicrobial targets. Bacterial β-class carbonic anhydrases (CAs) are zinc metalloenzymes catalyzing reversible hydration of CO2. They represent a new group of antimicrobial drug targets. Sequence analysis of *P. aeruginosa* PAO1 genome identified three genes PA0102, PA2053, PA4676 encoding putative β-CAs that share 28-45% amino acid sequence identity, and belong to two clades. Immunoblot analysis confirmed that all three proteins are expressed in PAO1 cells. Transposon mutants growth studies showed that the disruption of PA0102 impaired PAO1 growth. The CAs were cloned, heterologously expressed and purified. Metal analysis confirmed that the proteins contain Zn2+. Circular dichroism spectroscopy indicated the differences in their secondary structure contents and showed pH-dependent changes for PA4676. PA0102 showed specific CA activity at both pH 7.5 and 8.3, whereas PA4676 was active only at pH 8.3. The data suggest that PA0102 may belong to type I, and PA4676 to type II β-CAs. Thus, *P. aeruginosa* expresses at least two functional CAs, with PA0102 required for growth in ambient air.

Improved Initialization in Leapfrogging Optimization

Upasana Manimegalai Sridhar, Anand Govindarajan, R. Russell Rhinehart

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

Leapfrogging is a novel optimization technique that starts with a set of randomly placed players in feasible spots within the decision variable space. The player with the worst objective function (OF) value “leaps over” the player with the best OF value into the reflected hyper-volume until all the players converge. It has already been established that leapfrogging has several advantages over other optimization techniques in terms of computational efficiency, handling surface aberrations, and high probability of reaching the global optimum. This work focusses on improving the leapfrogging initialization so that it finds the global optimum with fewer function evaluations and with a higher probability. In this improvisation the surface is initially explored with a large number of players, the players are sorted in ascending order of their OF values and the top few players are selected to continue with the optimization technique. This improvement is found to increase the probability of finding the global optimum as one of the initial players is placed in the vicinity of the global optimum and thus draws all the players towards it. This work presents the mathematical analysis to determine the number of initializations, demonstrates the benefits, and critiques the limitations of this improvisation.

An Examination of the Portrayals of African American Women in Motion Pictures and Television.

Taja Marshall and Dr. Donald Bristow

Scholar from the University of Central Oklahoma
Scholar Symposium Participant
Subject Area: Humanities

The purpose of this research project is to examine the representation of African American women in motion pictures and scripted television programs when compared with their non African-American counterparts. This is to ascertain whether African-American audience members detect stereotypical characteristics in the portrayal of female African-American characters and recognize a need for more positive representations of
such characters. This research will study what stereotypes audience members have come across and compare them to have been viewed. There will be an online survey administered to participants of the study. There will also be a character analysis of 10 major films spanning 40 years, 1970-2010, along with a look of the amount of African-American sitcoms, with an emphasis on sitcoms containing African-American women, during the same time span. Through this research there was an understanding of what stereotypes viewers actually saw and those stereotypes listed were found in majority of the motion pictures studied showing that there is a negative portrayal of African American women on film and a lack of representation of African American women on television.

Comparing relative abundance measures of short-horned grasshoppers (Orthoptera: Acrididae) between two sampling methods across a western Oklahoma grassland habitat gradient.

Kenneth Masloski, Dr. Michael Reiskind, Dr. Carmen Greenwood
Oklahoma State University
Department of Entomology and Plant Pathology

The abundance and density of grasshoppers is most commonly determined by using two methods simultaneously: counting the number of grasshoppers present in a number of 0.1 m² rings and collecting sweep-net samples. A novel method of collecting grasshoppers was developed that combined both standard sampling methods into one. It was hypothesized that the rate of grasshoppers caught per minute and the relative abundance of grasshopper taxa determined by the novel sampling method were similar to the density and relative abundance measures determined by the standard methods, respectively. If these measurements are similar, it could be possible to replace the standard methods of sampling grasshoppers with this novel, simplified method. Previous reports address how grasshopper density as measured by the standard density ring method and this novel method compare. Results regarding how the relative abundance of eight grasshopper taxa as determined by the novel sampling method compare to relative abundance measures as determined by the standard sweep-net sampling will be presented. All sampling occurred in Beaver, Oklahoma along a habitat gradient from May 19th to August 15th, 2012. The data were analyzed using “test of effect slices” to examine habitat- and time-based interactions on relative abundance measures in both sampling methods.

Effects of conventional and natural production programs on winter annual pasture, feedlot performance, carcass characteristics, and profitability

Casey Maxwell, B. K. Wilson, B. T. Johnson, B. C. Bernhard, D. L. VanOverbeke, C. J. Richards, and C. R. Krehbiel
Oklahoma State University
Department of Animal Science

The objective of this experiment was to evaluate conventional and natural production programs on annual pasture and feedlot performance, carcass characteristics, and economic differentiation. Beef steers (n = 180; initial BW = 250 ± 19.1 kg) were randomized to one of two treatments in the pasture phase. Steers were implanted with 40 mg of trenbolone acetate, 8 mg estradiol, and 29 mg tylosin tartrate (Conventional; CONV) or received no implant (Natural; NAT). During pasture grazing, CONV steers had an 18.5% improvement in ADG (P < 0.01) compared with NAT steers. During the feedlot phase CONV gained 28.4% faster (P < 0.01) and were 24.2% more efficient (P < 0.01) compared with NAT. Hot carcass weight was increased by 62 kg for CONV compared with NAT. Natural steers had a higher marbling score, a higher percentage of USDA Yield Grade 4 and 5, and a higher percentage of abscessed livers (P < 0.01) compared with CONV. Conventional cattle had lower feedlot cost of gains, resulting in $202.29/steer greater net returns (P < 0.01) compared with NAT. The results of these data show that the technologies used in CONV production result in an increase in efficiency, performance and profitability.
Android Application Development Techniques: Native vs. Web

Lawrence Mcclendon and Dr. Dawn Wilkins
Scholar from the University of Mississippi/Tougaloo College
Scholar Symposium Participant
Subject Area: Physical Sciences and Technology

The smartphone market has boomed over the past few years and the use of mobile applications has now become a part of everyday life. The purpose of this study is to determine what characteristics must be present in order to decide whether a mobile native or web application is more suitable for developers and consumers as it relates to the recent native versus web application debate. Over the course of this study, the advantages, disadvantages, and development methods of Android mobile applications were explored in order to determine under what circumstances developers should create a native application as opposed to a web application and in what instances users should use a web application versus a native one.

Nutritional supplementation influences cow performance and postnatal growth of calves

Kyle Mclean, B. H. Boehmer, C. L. Maxwell, G. W. Horn and R. P. Wettermann
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

Fall calving cows grazing native grass pasture were used to evaluate effects of nutritional supplementation during breeding and the first trimester of gestation on postnatal growth and carcass characteristics of calves. Cows were individually fed control (C, 1.82 kg/d of 38% CP) or low (L, 0.2 kg/d of 8% CP) supplement from Nov 15 to March 17. During lactation the subsequent year, half of the cows on C and L prenatal treatments was assigned to C and the others to L. Control cows lost less BW compared with L cows (37.8 ± 3.1 and 59.2 ± 3.1 kg, respectively, \( P < 0.001 \)). Birth weight of calves was not influenced \( (P = 0.63) \) by prenatal treatment. Weaning weight (205 d) was greater for calves on postnatal C compared with L (200 ± 5 and 184 ± 5 kg, respectively, \( P = 0.02 \)). Postnatal C calves had greater HCW (23 kg; \( P = 0.02 \)) compared with L calves. Marbling score and ribeye area were not influenced \( (P > 0.15) \) by prenatal or postnatal treatment. Protein supplementation of cows resulted in less BW loss and heavier calves at weaning, but did not influence carcass quality of calves.

Correlation in plant available water and subsequent rainfall in Oklahoma

Theresa Medsker, Ma Lourdes Edano, Tyson Ochsner
Oklahoma State University
Department of Plant and Soil Science
Subject Area: Physical Sciences & Technology

Soil moisture has been shown to affect subsequent precipitation in transition zones between wet and dry climates, including the Great Plains region of North America. We hypothesized that soil moisture is positively correlated with the 21-d subsequent precipitation. Precipitation and soil moisture data were compiled from 110 Mesonet sites across Oklahoma. We calculated the plant available water (PAW) in the soil at three depths (0-10 cm, 0-40 cm, and 0-80 cm) to determine the strength of correlation between PAW and the subsequent 21-d precipitation. A positive correlation existed between PAW and subsequent 21-day precipitation during June-July, with \( r^2 = 0.33 \) (0-10 cm), 0.29 (0-40 cm) and 0.29 (0-80 cm). Results suggest Oklahoma has a weaker relationship than previous studies in Illinois between soil moisture and subsequent 21-d rainfall. We also discovered significant negative correlations between PAW and subsequent rainfall outside the growing season. The correlations suggest that real-time PAW observations may be used in the prediction of short-term drought or flood probabilities in Oklahoma assisting farmers in crop management. Further studies will include temporal and spatial variability that will be reported later.
Changes in Smokeless Tobacco Use over Four Years Following a Campus Wide Anti-Tobacco Intervention.

Ellen Meier, William V. Lechner, Mary Beth Miller, Joshua Wiener
Oklahoma State University
Department of Psychology
Subject Area: Social Sciences

Purpose
The current study examined the effectiveness of an institutional intervention aimed at decreasing prevalence of tobacco use over a four year period.

Methods
Participants were undergraduate students (N = 2293) enrolled at a large mid-western university between 2007 and 2010. In 2008, tobacco use was banned on campus. Additionally, campus-wide tobacco cessation services and information were provided to all students. A self-report measure assessing demographics and tobacco use prevalence was administered at baseline and at three time points over the following three years.

Results
Results indicated that smokeless tobacco use decreased significantly after the ban. Members of fraternities (a high risk group) reported significant decreases in smokeless tobacco use for the first two years following the ban; however, this trend did not persist during the third year of assessment. Off-campus residents displayed similar trends as fraternities.

Conclusions
It appears that a campus-wide tobacco ban is an effective prevention method for decreasing smokeless tobacco use. However, initial decreases in smokeless tobacco use may not persist for some at risk groups, namely members of fraternities and students living off-campus. Future studies should examine prevalence of use over longer periods of time with a particular focus on at risk groups.

Investigating processes that control the water chemistry of the newly form Lake Ngami, northwest Botswana

Scott Meier, Joseph Wes Rutelonis, Eliot A. Atekwana, Loago N. Molwalefhe, Eryk Z. Mokganedi, Karabo Kauhanda, Sheri Gares
Oklahoma State University
Department of Geology
Subject Area: Physical Sciences & Technology

Lake Ngami is an endorheic system in the southeast distal region of the Okavango Delta. The lake was dry until 2010, but is now refilling with water. We documented the physical and chemical parameters of Lake Ngami in order to assess controls on water chemistry and to provide a baseline for future temporal and spatial comparisons. A survey was conducted along a longitudinal transect from the mouth to the distal end of the lake, where we measured temperature, total dissolved solids (TDS), and major ion concentrations. Solute concentrations (e.g., Cl-, Na+) increased continuously from the mouth to the distal end of Lake Ngami and were segmented into three distinct regions. The segmentation is interpreted as influx water from three past flood events from 2010 to 2012. Because the lake's inflow shows little variation, we suggest that the changing chemistry along the longitudinal transect is due to internal chemical processes within the lake. Stable isotope ratios of oxygen and total dissolved solids concentrations, support the conclusion that the increasing concentrations of solutes along the transect, is due to length of the residence time, which is linked to greater evaporation.
Academic Success: Relationships between Study Habits, Demographics, and Classroom Performance

Sara Mendez

Scholar from Purdue University Calumet
Scholar Symposium Participant
Subject Area: Social Sciences

Past research tells us that students with good study habits tend to perform better in classes as opposed to those individuals that have poorer study habits (Lin, 1970). Females seem to do better academically because they have more self-discipline, are more responsible, as well as less compulsive (Aluja, 2004). The present survey was conducted to explore the relationship between selected student demographic characteristics, their study habits and academic achievement. The participants, ages eighteen and older, consisted of an available sample of 103 volunteer students enrolled in Purdue University Calumet’s on-campus classes, during the summer of 2012. After obtaining their informed consent the volunteer participants anonymously responded to two-page survey. Males generally reported higher GPAs, longer study hours and responded to family interference with increased study effort. There was no relationship between female respondent GPA and family interference. However, females reported higher levels of test anxiety and post-test depression.

Anticipatory Processing Influences Attentional Focus and Negative Interpretations in Social Anxiety

Adam Mills, Matt R. Judah, William V. Lechner, DeMond M. Grant

Oklahoma State University
Department of Psychology
Subject Area: Social Sciences

Cognitive models of social anxiety disorder (SAD) have implicated cognitive processes, such as attentional and interpretation biases, in the maintenance of social anxiety (SA) (e.g., Clark & Wells, 1995). Clark and Wells (1995) argued that, prior to a social interaction, individuals with SA experience distressing recollections of previous social failures and catastrophic predictions about the upcoming social situation. They called this anticipatory processing (AP). Very little research has examined AP, even though it may interact with other cognitive processes. In the current study, individuals high (HSA, N = 56) and low (LSA, N = 66) in SA symptoms engaged in an anticipation or distraction task prior to an upcoming social interaction. Those in the Anticipation condition endorsed negative interpretations more than those in the Distraction condition, (p = .02), regardless of SA level. A significant interaction (p = .003) indicated that HSA in the Anticipation condition had higher internal focus than HSA in the Distraction condition, but there was no difference between LSAs in either condition. These results suggest that AP may interact with processes that have been previously established as maintaining mechanisms of SA and future research should further explore AP to determine its role in the anxiety process.

Toxicity of Strobilurin Fungicides to Hyalella azteca

Shane Morrison, Scott McMurry, Loren Smith, Jason Belden

Oklahoma State University
Department of Zoology
Subject Area: Biological Sciences

Fungicide application rates on row crop agriculture have increased across the United States. Contamination of adjacent aquatic systems can potentially occur through spray drift, unintentional direct spraying, or field runoff. To investigate toxicity of fungicides, the amphipod Hyalella azteca was exposed to two fungicide formulations Headline® and Stratego® and their active strobilurin ingredients (ASIs). Water-only exposures resulted in similar LC50 values between formulations and ASIs, suggesting that toxicity is primarily due to the ASIs. When the fungicides were added to the overlying water of sediment/water microcosms, toxicity was reduced for both Headline® and Stratego® as compared to water-only exposures, based on the total
amount of fungicide added to the systems. When fungicides were added to the sediment prior to the addition of water, the reduction in toxicity was even greater, with no toxicity occurring at levels that would be environmentally relevant. Although aquatic based LC$_{50}$ values are below environmental concentrations that would likely occur following a direct overspray event into water (150 and 74 µg/L for Headline® and Stratego® respectively), the presence of sediment in the system is likely to ameliorate some of the toxicity of fungicide formulations, especially if exposure to the wetland occurs prior to an inundation event.

**Awareness and Usage of the Tulsa Zoo Outreach Program by First and Second Grade Public School Teachers**

Emily Mortimer  
Oklahoma State University  
Department of Education  
Subject Area: Education

Education is composed of a mosaic of our experiences. Our educational experiences may originate from curriculum presented in a formal classroom or free-choice education where the learner initiates the learning (Falk, 2010). Whether through traditional learning such as a school or free-choice learning such as a zoo or museum, the experience stays with us and helps develop our cultural capital, literacy and citizenship. This study examined the relationship between three different school districts and a free-choice educational institution, the Tulsa Zoo. Teacher participants where surveyed and interviewed about their awareness and usage of the Tulsa Zoo Outreach Program. This presentation offers insight into the relationship between free-choice and formal school education by the means of highlighting the methodology, theoretical framework and findings of this study. The application of this research will also be discussed to help shed light on the educational possibilities for students and how free-choice and formal educational research can help frame the future of our educational mosaic.

**Remainder Linear Systematic Sampling with Multiple Random Starts**

Sayed Mostafa Abdelmegeed and Ibrahim Ahmad  
Oklahoma State University  
Department of Statistics  
Subject Area: Social Sciences

“Systematic sampling, either by itself or in combination with some other method, may be the most widely used method of sampling” (Levy (2008) p.83). This fact is due to the simplicity and operational convenience of this technique. However, this technique has two main statistical problems. First, if the sampling interval, $k = N/n$, is not an integer, the actual sample size will not be fixed and the sample mean, $\bar{y}$, will not be unbiased estimator for $\bar{Y}$, the population mean. Second, and regardless of the sampling interval, the sampling variance of the estimator $\bar{Y}$ cannot be consistently estimated on the basis of a single systematic sample. In this study we introduce a new generalized systematic sampling design that can handle these two issues simultaneously. The proposed design is a generalization of the remainder linear systematic sampling design of Chang and Huang (2000) which handles only the problem of non-integer sampling intervals. Unbiased estimators for both $\bar{Y}$ and the sampling variance are derived under the proposed design. The performance of the proposed design is evaluated relative to simple random sampling, remainder linear systematic sampling, circular systematic sampling, new partially systematic sampling and mixed random systematic sampling under different supperpopulation models. It is found that our proposed design performs well compared to the other designs in most cases.
The Alcohol Separation Unit at Oklahoma State University: Small-scale Bioethanol Distillation

Anuradha Mukherjee, James R. Whiteley, Danielle Bellmer
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

Among a variety of feedstocks used in biofuel production, sugar rich sweet sorghum juice can be fermented and processed for ethanol and is being investigated at OSU. This demonstration unit is expected to be a prototype small-scale ethanol manufacturing facility to highlight the feasibility of the on-farm ethanol process. The ASU has been designed as a fully equipped, state-of-the-art research facility, capable of advanced process monitoring, control, and data collection. Experiments conducted at the OSU research and demonstration facility will not only establish the feasibility of a small-scale on-farm ethanol model, and bring to attention any process related technical issues, but will also provide lesser known albeit vital bioethanol production information related to operation and maintenance.

The construction of this ethanol separation unit, part of a small-scale bio-refinery, using sweet sorghum feedstock, is underway. The facility is equipped with stainless steel distillation columns 1 ft in diameter and 40+ ft tall. Other equipment in the process includes an air-cooled condenser, feed heaters, pumps, and two 6000+ gal storage tanks. Design features, specifically related to energy efficiency, process control, research related data measurement, and safety will be highlighted. The design to construction highlights and future operation plans will also be shared.

Combining movement and composition for alternative education high school students

Sonya Munsell
Oklahoma State University
Department of Educational Psychology
Subject Area: Education

The purpose of this study was to determine the process and effect for students and teachers participating in a curriculum unit that combined creative movement and English composition for high school alternative education students. Using qualitative and quantitative methods over a four month period, data included observations, interviews, journal entries, and student pre and post test scores on a writing assessment and a modified version of a creativity assessment instrument. Results indicate that participation in creative movement activities has the potential to increase social and academic outcomes of high school students in the alternative education setting. Additionally, evidence suggests that collaboration between teachers and arts educators can result in teachers’ sense of satisfaction for collaborative teaching. It is likely that findings will produce suggestions for professional development for collaboration, infusion of arts composition, and likely student outcomes.

A Male’s Profession: Masculinity and Elementary Teaching

Timothy Neller and Lucy E. Bailey
Oklahoma State University
Department of Education
Subject Area: Education

The purpose of this qualitative research study is to investigate the experiences of men who constitute a small percentage of elementary teachers. This qualitative research study will explore the life of one individual male teacher who has chosen to dedicate himself to the profession of teaching at the elementary level in a public school system. Informed by the feminist perspective, the research will attempt to determine to what degree the individual teacher conforms to the characteristics regarded as masculine, and in which ways he deviates from the expected norms. The data collected for this study will be the result of a series of
interviews over a four month period of time, as well as observations of the teacher performing his duties during the course of the day. It is hoped that the knowledge acquired through this research project will provide a unique and individual perspective of the importance of a male teacher’s role at the elementary grade level. The research may also help to dispel myths and stereotypes commonly ascribed to elementary male teachers and serve as a source of encouragement for those who are considering entering the educational profession.

Culture of Honor and the Perception of Emotional Facial Expressions

Christopher Nguyen and Ryan P. Brown, Ph.D.

Scholar from the University of Oklahoma
Scholar Symposium Participant
Subject Area: Social Sciences

Based on emotional facial expressions, we are able to infer information about people, including their personality traits, their attitudes, and their immediate feelings. Different facial expressions elicit different reactions, but studies have shown that in some people, these reactions may be heightened due to different factors. In cultures of honor, these reactions may be offset by the view of outgroup members as threats. Do those who endorse the culture of honor ideology perceive the emotions on unfamiliar faces differently than others? This study looks at how culture of honor may influence how individuals rate neutral faces in terms of five different measurements: happiness, anger, threat, dominance, and trustworthiness. We expect to find that culture of honor ideology will drive peoples’ impressions of the faces, causing some people to infer greater negativity than others do, especially in unfamiliar faces.

Experimental investigation about fidelity of ultra cold atoms

Jiating Ni, Rajendra Shrestha, Wa Kun Lam, Gil Summy

Oklahoma State University
Department of Physics
Subject Area: Physical Sciences & Technology

A Bose–Einstein condensate (BEC) is a state of matter of a dilute gas of bosons cooled to temperatures very near absolute zero. Under such conditions, a large fraction of the bosons occupy the lowest quantum state, at which point quantum effects become apparent on a macroscopic scale. The technique to get BEC uses laser light and magnetic field to first cool and hold the atoms, and then these atoms were further cooled by evaporative cooling where the most energetic atoms are allowed to escape from the magneto-optical trapping (MOT). The main research method used in lab is exposing BEC to a sequence of pulses from a standing light wave. One application could be the high precision gravity measurement by performing a measurement of the fidelity or overlap of the atomic state with a reference state.

Genetic and Chemical Modification of Adenovirus for the Development of a Safe and Effective Gene Therapy Vector

Adane Nigatu, Grit Kupgan, Josh Ramsey

Oklahoma State University
Department of Chemical Engineering
Subject Area: Biomedical Sciences

Recombinant adenovirus is an effective and relatively safe gene therapy vector. The capsid and fiber/knob proteins of adenovirus, however, are involved in initiating an innate inflammatory immune response and may be recognized by neutralizing antibodies, which results in clearance from the body. In addition, adenovirus transduction is largely dependent on the interaction of fiber/knob protein of the virus and cellular receptors called coxsackie virus and adenovirus receptors (CAR). The ubiquitous expression of CAR results
in a fairly promiscuous tropism, and yet, the absence of CAR in many cells (e.g., cancer, endothelial, epithelial and smooth muscle cells) prevents the use of the virus for treating many diseases. To overcome these drawbacks, we developed an improved vector composed of adenovirus-like particles with the fiber/knob proteins genetically removed and a cell-penetrating peptide/polymer (CPP-PEG) conjugate that functioned in place of the fiber/knob proteins. The CPP-PEG coating shields the fiber/knobless adenovirus from the immune system while functioning in place of the fiber/knob protein to facilitate efficient cellular translocation. The particles were characterized physicochemically, and the transduction efficiency was studied on cells with and without CAR. The vector retained the high transduction efficiency of the native virus but showed a reduction in the immune response typically associated with adenovirus.

Switchgrass Solution: Enhancing Ecosystem Services and Carbon Sequestration through Low-Input High-Diversity Biofuels

Morgan Noland, Gail W.T. Wilson, R. Michael Miller, Nancy C. Johnson
Oklahoma State University
Department of Natural Resource Ecology and Management
Subject Area: Biological Sciences

The major goal of this project is to develop biofuel management practices that produce high biomass with reduced nutrient inputs, ultimately sustaining wildlife habitat and increasing carbon sequestration. High-diversity provides benefits such as habitat for invertebrates and wildlife. Low-input cultivation reduces fertilizer input, while increasing arbuscular mycorrhizal (AM) fungi, potentially leading to improved soil health and carbon sequestration. Our study, conducted in established plots at Argonne National Laboratory, Illinois, compared intra-specific diversity with three different switchgrass cultivars and inter-specific diversity with combinations of switchgrass and other native prairie species. Aboveground productivity for each plant species, annual productivity of extra-radical AM hyphae, inter-radical AM colonization, soil microbial community composition, and AM fungal biomass were assessed. Our data indicate both inter-specific and intra-specific plant species biodiversity produced equal or greater aboveground biomass compared to monocultures of switchgrass, and multiple genotypes of switchgrass had greater annual production of arbuscular mycorrhizal fungi, compared to switchgrass monocultures. A positive correlation between hyphal abundance and soil aggregation and carbon sequestration was observed. Results of our study will inform plant breeders on feedstock management that improves aboveground ecosystem services, such as wildlife habitat, while increasing soil health, all without a loss in production.

Process Simulation of a Bi-phasic Reaction: Hydrogenation of p-hydroxybenzaldehyde

Christian Odafin¹, S. B. Gebreyohannes¹, T. N. Pham², J. Faria², B. J. Neely¹ and K. A. M. Gasem¹
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

Bi-phasic catalytic reactions provide an efficient method for the conversion of pyrolysis oil to usable biofuel. The simulation of the hydrogenation of p-hydroxybenzaldehyde was used as a prototype to develop a bi-phasic reactor model describing both reaction kinetics and phase separation. The effects of phase behavior modeling on bi-phasic reactor model predictions were then investigated. Specifically, case studies were conducted to examine the prediction accuracy of the Non-Random, Two-Liquid (NRTL) activity coefficient model equipped with parameters from: UNIFAC group contributions, Quantitative Structure–Property Relationship (QSPR) generalized NRTL parameters (NRTL-QSPR), and regressed NRTL model parameters (NRTL_R). Further, sensitivity analyses were conducted to evaluate the influence of the kinetic parameters on reactor model predictions.

Aspen Plus and VBA were used to model the biphasic reaction process, accounting for both the reaction and phase separation. A user-defined reaction model was designed, and Aspen Simulation Workbook was used
to link the reaction model to the phase separation model. The NRTL model parameters estimated from the NRTL-QSPR model demonstrate better phase equilibria property predictions than those generated using the UNIFAC–predicted models parameters. The sensitivity analyses indicate that the adsorption and deactivation constants have significant impact on the bi-phasic model predictions.

1 School of Chemical Engineering, Oklahoma State University Stillwater, OK 74078
2 School of Chemical, Biological and Material Engineering and Center for Interfacial Reaction Engineering (CIRE), University of Oklahoma

A Philosophical View on Employment Issues in 21st Century
Muhammad Omar and Crystal Bowles
Oklahoma State University
Department of School of Teaching and Curriculum Leadership
Subject Area: Education

This paper articulates common issues on employment and employer's perceptions toward the graduates' readiness to enter job market. A demand on several characteristics from employer has impacted higher education learning institutions to apply rigorous methods to prepare students before entering work environments. Hence, the insistence from employers has contributed to the unemployment issues that have been increasing from time to time. This paper proposes the views from employer and relate with the philosophical viewpoint. By exploring this study, it is recommended that employer and educational institutes could come up with new approaches to prepare graduates' capabilities in meeting current job market. Therefore, employer could seek the potential and skills that graduates possessed from learning instructions and match it with the current job context. In the final part, the author addresses several recommendations in dealing with the shortage of potential employees, which is beneficial for future researches.

Keywords: employability, employment, cognitive, humanistic, work experience, skills

The Role of Self-Esteem on Functions of Nonsuicidal Self-Injury
Madison O'Meara, Hilary DeShong, Stephanie N. Mullins-Sweatt
Oklahoma State University
Department of Psychology
Subject Area: Social Sciences

Nonsuicidal self-injury (NSSI) is the deliberate, direct act of harming one's own body that is not socially sanctioned and lacks suicidal intent (Klonsky, 2007). NSSI includes behaviors such as cutting, burning, carving on one's skin, and scratching. NSSI is a problem of growing concern, and is demanding attention from clinicians, researchers, and media (Whitlock, 2010). The purpose of the current study is to examine the relationship between functions of NSSI and one's self-esteem. We hypothesize that those individuals who engage in NSSI for intrapersonal reasons will have lower self-esteem than those who engage in NSSI for interpersonal reasons (Klonsky & Glenn, 2009). Participants (n= 40) with a history of NSSI completed surveys online. The Rosenberg Self-Esteem Scale, a self-report Likert scale was administered in order to gain an accurate understanding of the subjects' self-esteem levels (Davis et al., 2009) and the Inventory of Statements About Self Injury measured the reasons for participants' engagement in NSSI behaviors. Results of the current study should suggest that low self-esteem may be a greater problem for individuals who engage in NSSI behaviors for intrapersonal reasons versus individuals who do so for interpersonal reasons. Implications for research and clinical practice will be discussed.
Prediction of barley silage dry matter by near infrared reflectance spectroscopy
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

Barley silage DM prediction by near infrared reflectance spectroscopy (NIRS) and development of NIRS equations was completed using fifteen samples of barley silage and straw split into groups: water added (WTR) and fresh. Water was added to WTR samples based on publication: Silage Fermentation and Preservation (Schroeder, J.W., 2004) to broaden the DM range. Samples were weighed, scanned (InfraXact, FOSS North America) and dried (55°C) in twelve 4 hour intervals. DM was calculated and correlated to NIRS spectra at each interval. Silage samples were blocked by DM and randomized to validation (n = 128) or calibration (n = 639) sets. A commodity specific equation (SIL) was developed from the silage calibration set (SE of calibration (SEC) = 3.7663, $R^2 = 0.9791$). A broad based equation (SIL-STR) was derived (SEC = 2.9269, $R^2 = 0.9770$) using a calibration set (n = 1406) consisting of the silage calibration set (n = 639) and straw samples (n = 767). The $R^2$ and SE of prediction (SEP) for the validation of SIL and SIL-STR, using the independent validation set, were 0.9800 and 3.782, 0.9770 and 3.9580, respectively. Barley silage DM content can be accurately predicted using NIRS with broad based or commodity specific calibrations.

3-D shaping of canine prostate by using sparsely acquired 2-D trans-rectal ultrasound images for optical tomography reconstruction
Dhanashree Palande and Daqing Piao
Oklahoma State University
Department of Electrical and Computer Engineering
Subject Area: Physical Sciences and Technology

Accurate prostate segmentation in trans rectal ultrasound (TRUS) imagery is an important step in different clinical applications, and it is particularly necessary for providing a 3-dimensional spatial prior to the image reconstruction of trans rectal optical tomography for prostate cancer detection. 2-dimensional segmentation of the axial TRUS images are performed extensively, however, 2-dimensional segmentation of the sagittal TRUS images are challenging, due to more complexities in contrast, morphological features and image artifacts, as well as significant inter-subject variations of the prostate shape and size. In this study research we develop a routine of segmenting TRUS images obtained from canine prostate, based on the combination of a Snakes algorithm and selected manual segmentation. The segmentations obtained from a sparse set of axial and sagittal images are to be combined to form the 3-dimensional contour of a prostate for implementing as the spatial prior to constrain image reconstruction of trans-rectal optical tomography, which has the potential to detect the optical signature of prostate cancer.

Effects of FSH Stimulation on β-catenin Accumulation in Bovine Granulosa Cells
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

Follicle stimulating hormone (FSH) regulation of steroidogenesis requires contribution of the transcriptional co-factor beta-catenin (CTNNB1). FSH stimulation increases granulosa cell (GC) abundance of CTNNB1 and AKT protein. The objective of the present study is to determine if FSH stimulation of CTNNB1 is mediated through its ability to regulate AKT. Bovine granulosa cells were incubated with AKT inhibitor (LY294002) for 30 minutes. Following incubation, cells were cultured in the presence or absence of FSH (100 ng/mL) for an additional 24 h. Total protein was collected for analysis by Western blot. FSH
stimulation of AKT protein was reduced (P = 0.05) in cells treated with LY294002, suggesting successful inhibition of the AKT pathway. Compared to control and FSH treated cells, inhibition of AKT signaling reduced accumulation of CTNNB1 (P = 0.13) and progesterone concentrations (P = 0.04). Subsequently, GC were cultured in presence of IGF1, an AKT simulator, and FSH. Progesterone concentrations were increased in IGF1 (P=0.007) and IGF1 plus FSH (P < 0.0001) treated GC compared to controls. Neither IGF1 alone or in combination with FSH modulated CTNNB1 accumulation (P = 0.55). Data demonstrates that AKT regulates accumulation of CTNNB1 through FSH stimulation in bovine granulosa cells.

Single source precursor approach for the synthesis of nanometric materials

Cory Perkins and Allen W. Apblett
Oklahoma State University
Department of Chemistry
Subject Area: Physical Sciences & Technology

Calcium tungstate has proven to be an attractive material for many applications including acousto-optic filters, solid state lasers, light-emitting diodes, photocatalysts, phosphors, scintillators, among others. It has also shown promise for the remediation of heavy-metals due to its high selectivity and capacity for the sorption of heavy metals. A single-source precursor method has been developed for the synthesis of nano-crystalline calcium tungstate. By taking advantage of the reactivity of alpha-hydroxy carboxylic acids, we are able to synthesize CaWO4 from the reaction of calcium salts of the alpha-hydroxy carboxylic acids and tungstic acid at reflux temperatures in water. The aqueous precursor proves extremely beneficial for the coating of high surface area supports, which yields, upon calcination, uniform nanometric particles, better suited for many applications, especially for the rapid uptake of heavy-metal ions.

Factors That Deter Young Adults from Pursuing Higher Education

Maria Perry and Dr. Lori Beasley
Scholar from the University of Central Oklahoma
Scholar Symposium Participant
Subject Area: Education

The underrepresented groups that continue to rise in immediate college enrollment are minorities; disproportionately that of Hispanic and Black high school students. The researcher conducted voice recorded interviews in a Midwestern state with eight Inner-City high school graduates, ages 18 - 25 who chose to enter the work force or the military instead of immediate college enrollment. All participants were asked 12 questions pertaining to their high school experience, the level of college preparedness they received from educators and family members, and their views on the importance they placed on pursuing higher education for them specifically. This study yields valuable information on the thought process, opinions and perspectives behind participant's decision on higher education. The qualitative study examined the relationship between minimal to no college preparedness from schools, as well as minimal to no involvement from parents and the negative lasting affects it had on this predominantly lower socio-economic status (SES) study sample. Results showed that the lack of socialization that these participants received during their high school years from family and educators had a definite and discouraging correlation between immediate enrollment and circumventing college. In conclusion, this study highly indicated a need for more college preparedness and intervention with disadvantage students at the high school level.
A thermodynamic approach to predicting RNA secondary structure from sequence

Andy Phan and Susan J. Schroeder, Ph.D.
Scholar from the University of Oklahoma
Scholar Symposium Participant
Subject Area: Physical Sciences and Technology

RNA is an essential molecule for all forms of life, playing an important role in many biochemical reactions. Being able to predict the folding pattern of RNA based on its primary structure will give insight into RNA functions that have yet to be discovered. Many current prediction models are centered on the theory of free energy minimization. This research project will investigate the accuracy of the current free energy model by compiling and analyzing data about current free energy values for RNA motifs, specifically asymmetric internal loops. The RNA motifs examined will come from an experimentally determined thermodynamic database and will be compared to RNA motifs in IRES's, which are natural, biologically occurring RNA structures used by viruses. The hypothesis will be tested using optical melting experiments to acquire new data. In this experimental procedure, a spectrophotometer measures the absorbance of RNA solutions by varying the temperature at a fixed wavelength. Utilizing melting curve data plots and a Van't Hoff plot of the melting point versus the concentrations, the thermodynamic values of $\Delta G$, $\Delta H$, and $\Delta S$ are calculated for the RNA duplex. The experimental values will then be compared to the theoretical values predicted by the current model to test its accuracy.

The Error Surface of Recurrent Neural Networks

Manh Phan and Martin Hagan
Oklahoma State University
Department of Electrical and Computer Engineering
Subject Area: Physical Sciences & Technology

This paper analyzes the error surfaces in general recurrent neural networks. We show that these error surfaces contain many spurious valleys that can cause significant difficulties in the training process. We describe two types of spurious valleys. These valleys are not affected by the desired network output (or by the problem that the network is trying to solve). They depend only on the input sequence, the initial conditions and the architecture of the network. The insights gained from this analysis suggest procedures for improving the training of recurrent neural networks.


Jagdeep Podichetty and Sundar V. Madihally
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biomedical Sciences

Use of biodegradable porous scaffolds in tissue engineering have proved to be an attractive solution for creating functionally replaceable tissue parts, developing new drugs, and producing synthetic surrogates to test diseases propagation. The scaffolds help in guiding and supporting in-growth of cells during tissue development. To grow a tissue, a porous scaffold is seeded with cells, a bioreactor is used to provide nutrients and regulate culture conditions such as pH and temperature to mimic the native environment of the cells. However, it is critical to develop fast and reliable methods to estimate and monitor tissue growth without using tedious and expensive invasive methods. The objective of this study was to develop a relationship between pressure drop and flow rate, considering scaffold mechanical properties and porous architecture, to non-invasively monitor tissue growth.

Computational fluid dynamics (CFD) were used to develop a pressure drop-flow rate relationship based on permeability and Young's modulus of the scaffold. These results were later experimentally validated. To non-invasively monitor tissue growth, the change is pressure drop across the scaffold is related to the change
in permeability. This change in permeability can be used to calculate the increase in cell and extracellular matrix (ECM) volume in the scaffold.

**Household Characteristics and Policy Effectiveness in Indonesia**

**Masniaritta Pohan and Jeffrey D. Vitale**

*Oklahoma State University*

*Department of Agricultural Economics*

*Subject Area: Social Sciences*

A primary challenge for developing emerging countries is overcoming the vicious cycle of poverty. Persistently low income constraints access to education and health. In turn it will cycle back to low income. Unless the cycle is broken by a certain economic policy, it is impossible for a rural or poor area to lift itself out of poverty. This research explains the role of household level income dynamics in altering the effectiveness of Indonesian government development policies. In microeconomics, individual's objective is to maximize utility given the available spendable income. Since true individual utility functions are hardly observable and consumers' preference is assumed to satisfy the property of local non-satiation, an increase in income will become a more central issue since it governs the bundle of goods consumers can afford. The estimation using OLS, logit, and ordered logit showed income growth is a dynamic process. Parents' income, parents' education as well as availability of schools and health facility will alter the result of the estimation which suggests the importance of policy intervention.

**The Affect of Church Size on Financial Transparency among Churches of Christ in the United States**

**Jared Poole**

*Abilene Christian University*

*Department of Accounting & Finance*

*Subject Area: Physical Sciences and Technology*

A body of literature suggests that churches looking to further their mission, retain membership, and avoid fiscal mismanagement ought to embrace transparency in their operations. Still, there remains much room for research in the field of church financial management, especially as it relates to transparency. Many factors affect the decisions that leaders make with regards to statement presentation. This study investigates how church size affects the frequency and quality of financial statement presentation in Churches of Christ. When applied to the unique circumstance of the religious organization in the United States, financial and accounting theories appear to hold that the quality and frequency with which statements are presented to members will both increase as organizational size increases. The results of this survey show room for improvement in both quality and frequency of reporting. A lack of diversity in statements presented and a substantial percentage of surveyed churches not reporting at all are both causes for concern. The results of the hypothesis testing seem to indicate that smaller churches actually report with higher quality and frequency than larger churches. This study ultimately suggests that factors such as doctrine, social context, and prior experience exert significant influence over churches' approaches to transparency.
Toll-like Receptor-4’s Role in the Dysregulation of Bone Metabolism during the Initiation and Progression of Type 2 Diabetes.


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

Recent evidence has shown that patients with type 2 diabetes (T2DM) have an increased risk of fracture 5-10 years post-diagnosis. Previous studies have suggested that inflammatory signaling may be involved in the initiation and progression of T2DM, and may contribute to the impaired bone metabolism associated with T2DM. The current study aimed to investigate the role TLR-4 plays during the initiation and progression of T2DM, and to correlate changes in glucose homeostasis with skeletal alterations over time. Four-week old male C57BL/6 and C3H/HeJ mice were randomly assigned to control or high fat (HF) diet for 2, 8, or 16 weeks. The C57BL/6 mice on the HF diet experienced a decrease in whole body BMD and bone volume/total volume in the femoral metaphysis at 8 and 16 wks. Conversely, the C3H/HeJ only experienced a decrease in whole body BMD after 16 weeks, while no changes were observed in the microarchitecture of the femur. Ex vivo cell culture and qRT-PCR results suggest an up-regulation of osteoclastogenesis with a simultaneous decrease in osteoblastogenesis, in conjunction with inflammatory signaling in the C57BL/6 mice before C3H/HeJ mice. This data suggests a pivotal role for TLR-4 signaling contributing to the skeletal phenotype observed during T2DM.

Effects of land use practices and a distinct precipitation gradient on community composition of indigenous entomopathogenic nematodes (EPN) in Oklahoma

Kyle Risser, Xandra Robideau, Carmen Greenwood

Oklahoma State University
Department of Entomology and Plant Pathology
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. Ranging from east to west, Oklahoma is home to 11 different ecoregions, 9 precipitation zones and 7 soil orders. This study aimed to characterize EPN communities throughout these diverse habitats. An additional objective of this study was to compare EPN communities in organic versus conventional beef and wheat production systems within the same ecoregion. Soil samples were subjected to bioassay using G. mellonella to ascertain infection rates by EPN. EPN were identified, initially by infected G. mellonella symptoms. Based on these symptoms, appropriate primers were chosen to amplify regions of the ITS gene. These regions were then sequenced to confirm identification. The Heterorhabditis species of EPN identified included: Steinernema feltiae, S. texanum, and S. glaseri. S. feltiae was the most commonly encountered species across the state. This study showed a higher incidence of EPN in organic fields than conventional fields; pastures than agricultural fields; and a positive correlation with the increase in soil moisture as you move eastward across Oklahoma.
Effect of Skeletal Muscle Fiber Heterogeneity on Development of Intramuscular Fat in Growing Beef Cattle

Shelby Roberts, P. A. Lancaster, U. DeSilva, G.W. Horn, and C.R. Krehbiel
Oklahoma State University
Department of Animal Science
Subject Area: Whiteman Award Presentation

This study's objective was to determine differences in intercellular signaling of skeletal muscle fibers that could be responsible for the initiation of intramuscular adipose tissue development. Longissimus dorsi (LD) muscle samples were collected from steers (n = 12; 385 days of age; 378 kg) grazing wheat pasture. Muscle samples were dissected under magnification and sorted into 3 categories based on visual stage of development: immature, intermediate and mature intramuscular fat (IM). Muscle fibers lying adjacent to each IM category and those not associated with IM were collected. Gene expression data, collected using quantitative RTPCR, were analyzed using a general linear model including tissue as the fixed effect. Fatty acid binding protein 4 and PPARγ expression were greater (P<0.05) in more mature IM while PREF-1 expression was less (P<0.01) indicating successful separation of maturity categories. Angiogenic growth factors in immature IM tissue had a strong positive correlation (r>0.88) with angiogenic growth factors in LD associated with immature IM; however, no correlation was observed in other IM categories. Also, IGF1 in LD was positively correlated (r=0.56) with IGF1 receptor in immature IM but not other categories. These data indicate a coordinated effort between LD and IM in early stages of IM development.

Synthesis and Characterization of Zinc Salts of 2-Oximinocarboxylates for Arsenic Remediation

Evangeline Rukundo and ALLEN APBLETT, PhD
Oklahoma State University
Department of Chemistry
Subject Area: Physical Sciences & Technology

Arsenic's toxicity to men and other living organisms is responsible for environmental problems and difficulties in obtaining potable water in many parts of the world. Zinc oxide materials offer a combination of catalytic oxidation and adsorption properties that can be utilized to efficiently remove arsenic (III) and arsenic (V) from drinking or waste water. In this project, the synthesis of nanocrystalline zinc oxides by low-temperature solid-state decomposition of 2-oximinocarboxylates is being pursued. The influence of variation of the alkyl groups on the decomposition temperatures, and the particle size, surface area, and surface chemistry of the zinc oxide produced by thermal decomposition are being determined. The precursor compounds and the zinc oxide production will be characterized by infrared, Raman, 1H and 13C NMR spectroscopy, thermal gravimetric analysis, X-ray powder diffraction, and X-ray crystallography. The arsenic adsorption and catalytic properties of the nanocrystalline zinc oxides will be reported.

The Relationship Between Attitudes Student-Athletes Have Toward Their Academic Achievement and the Importance They Place on Academic Services

Thiele Ryan
Oklahoma State University
Department of Health and Human Performance
Subject Area: Education

Three hundred fifty student-athletes at The University of Tulsa from 14 different men's and women's intercollegiate sports completed a survey regarding their attitude toward their academic achievement and the importance they place on academic services. Academic services were defined by the services offered to them at The University of Tulsa (Advisor, tutoring, study hall, group study or no services used at all). The students were surveyed using a Likert Scale to select the services they utilized and the affect they self reported the services had on their academic achievement (High GPA 3.0+ or Increased GPA from on Term
to the next). The results show statistical significance (0.01 level) between survey Questions 1, 2, 5, 6, 7, 8, 9, 10 and academic advisor, tutoring/mentoring services, and study hall. Also, the results show statistical significance (0.01 level) between self-reported GPA and survey Questions 2, 3, and 4. The data suggests a strong correlation between a positive attitude student-athletes have toward their academic achievement and the importance they place on academic services.

**Optimized Low-Power Elementary Function Approximation for Chebyshev Series Approximations**

**Masoud Sadeghian and James E. Stine**  
Oklahoma State University  
Department of Electrical and Computer Engineering  
Subject Area: Physical Sciences & Technology

This paper presents a method for computing elementary function using optimized number of most significant bits of coefficients along with truncated multipliers for designing interpolators. The proposed method optimizes the initial coefficient values, which leads to minimize the maximum absolute error of the interpolator output by using a Chebyshev series approximation. The resulting designs can be utilized for any approximation for functions up with smaller requirements for table lookup sizes. Designs for several interpolators that implement reciprocals are presented and analyzed. This paper demonstrates that optimal coefficient values with high precision and smaller lookup table sizes can be optimally compared to standard coefficients for interpolators. The paper presents also VLSI implementation results, targeting a 65nm CMOS technology from IBM.

**Effects of torrefaction and densification on quality of syngas generated from fluidized-bed gasification of switchgrass**

**Madhura Sarkar, Ajay Kumar, Jaya Shankar Tumuluru, Krushna N. Patil, Danielle Bellmer, Raymond L. Huhnke**  
Oklahoma State University  
Department of Biosystems and Agricultural Engineering  
Subject Area: Biological Sciences

Torrefaction and densification preprocessing technologies can improve properties of biomass feedstocks prior to conversion into fuels, chemicals and power. Torrefaction is a slow pyrolysis process that is carried out at 200-300°C to increase biomass energy density, while densification increases mass density of the biomass. Increasing energy and mass densities, separately or together, can improve flow properties and quality of syngas during gasification processes. However, there is limited literature available on gasification of pretreated switchgrass. The goal of this project was to investigate the effects of switchgrass torrefaction and densification on operation and syngas quality during fluidized-bed gasification. Torrefaction of switchgrass was carried out at temperatures of 230°C and 270°C at a residence time of 30 min while densification was carried out with and without binder. Gasification of the torrefied and densified switchgrass is being performed at equivalence ratios of 0.32 and 0.45. The yield and composition of syngas are measured. It is expected that due to a decrease in the oxygen/carbon and hydrogen/carbon ratios in the torrefied biomass, quality of syngas, especially CO and H2 contents, will increase.
Opinion Mining and Geo-Positioning of Professional Drivers' Textual Feedbacks

Mantosh Kumar Sarkar and Goutam Chakraborty
Oklahoma State University
Department of Marketing
Subject Area: Physical Sciences & Technology

Many companies collect feedback from their customers via mobile apps, often they restrict their analysis to numeric data and ignore analyzing customer feedbacks and sentiments from textual data because of perceived difficulties associated with analyzing text data. In this paper, we analyze customer feedbacks by professional drivers sent via a mobile app that the drivers use to locate a store, check their reward points etc. The drivers are customers of a retail & energy company which offers a variety of services such as gas stations and convenience stores and also offer amenities such as food from national restaurant chains, trucking supplies, showers and RV dump stations. The company experts currently manually classify these textual feedbacks into positive and negative groups. We demonstrate how SAS® Text Miner can be used to automatically generate and summarize topics from positive and negative feedbacks. In addition, we demonstrate how SAS® Sentiment Analysis studio can be used to build rules to predict customers' sentiments automatically so that expert's time can be used for more strategic purposes. Finally, we also show how feedbacks with positive and negative sentiments can be geo-positioned on the US map via JMP® scripts for providing a better visualization of sentiment distribution.

Shakuntala in Bollywood: A Comparison and Contrast in Tales

Jashodhara Sen
Oklahoma State University
Department of Theatre
Subject Area: Humanities

The great poet Kalidasa wrote the classic Sanskrit play Sakuntala about the love relationship between king Dusyanta and the daughter of a sage Kanva, Sakuntala. Originally the plot is found in Mahabharata and later dramatized by Kalidasa. His story involves attraction, the union of lovers, departure, and reunion. The story is a work of genius and followed every aspect of playwriting suggested by Bharata in the Natyashashtra. Kalidasa’s Sakuntala is an actual account of the society and how hermit-women live their life away from the world yet have their own social order. The relationship depicted in the play between Dusyanta and Sakuntala is a pure documentation of love relationship and followed by a marital relationship. Eventually, Sakuntala becomes pregnant and that is when she demands for her own rights. In 1985 in India, Bollywood (the largest film industry in the world) produced a movie called ‘Ram Teri Ganga Mali’ (Ram, Your Ganges Is Polluted) which is supposedly inspired by the play Sakuntala. The film has some resemblance with the original play; nevertheless, the director has taken extreme cinematic liberty to narrate a story. The socio-economic condition and the political situation of India during that time are more or less responsible for the twists and turns in the narrative of the story. Additionally, popular demand in the mass audience is another important factor to make a commercially successful film loosely based on the classic. This paper will compare and contrast Sakuntala, a popular classical literature with a more contemporary account of the same concept in a film version named Ram Teri Ganga Maili with a completely diverse approach, concentrating on the erotica, position of women, family dynamics and values in the classical literature, and larger than life allegory in the film.

Influence of processing techniques on Relaxation Properties of biodegradable polymers

Vijayalakshmi Sethuraman, Dr.Russell Rhinehart, Dr. Sundar Madihally
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biomedical Sciences

Promising novel solutions to restore, maintain, or enhance tissue function or a whole organ is regenerating tissues using biodegradable structures onto which cells attach, populate, and synthesize new tissue.
Synthesizing matrixes of both synthetic and natural polymers should possess physical, chemical and mechanical factors suitable for tissue regeneration. Biological tissues exhibit viscous (like fluids) and elastic (like solids) behavior, hence, prepared materials should have similar characteristics.

Previously we have reported on the stress relaxation characteristics of poly-lactic-co-glycolic acid (PLGA) films, Polycaprolactone (PCL) films and chitosan, chitosan-gelatin porous structures formed by freeze-drying. The objective of the study is to evaluate the effect on viscoelastic properties due to processing technique in synthetic polymers. For this purpose, PCL (Poly caprolactone) scaffolds were prepared by salt leaching technique and electro spinning technique. The ramp-and-hold type of stress relaxation test was performed for five successive stages for scaffolds prepared from both techniques. The relaxation characteristics were modeled using pseudo component were two models was developed (i) containing a hyper-elastic spring (ii) retaining pseudo-components (iii) reforming pseudo-components in Visual Basic Applications accessed through MS Excel.


---

**Reaction kinetics-based gasification model using a continuous stirred-tank reactor (CSTR)**

*Ashokkumar Sharma, Ajay Kumar, Sundar Madihally, Rob Whiteley, Raymond L. Huhnke*  
*Oklahoma State University*  
*Department of Biosystems and Agricultural Engineering*  
*Subject Area: Biological Sciences*

Gasification process converts a solid biomass into gaseous fuel called syngas, a well-known intermediate for making biofuels, biochemical and biopower. The gasification process involves several homogeneous and heterogeneous reactions, which play a significant role on composition and yield of the syngas. Literature shows several modeling studies on biomass gasification using the Gibbs equilibrium modeling approach. However, the assumption made in Gibbs equilibrium model that the gasification reactions reach equilibrium condition does not happen in reality due to short residence time. The objective of present study is to develop a reaction kinetics-based gasification model using a continuous stirred-tank reactor (CSTR) to predict syngas yield and composition and to validate model prediction with the experimental results. Kinetics data of gasification reactions were obtained from literature. Gasification conditions, i.e. temperature (800 to 900°C), air flowrate (4.5 to 10 kg/h), biomass feedrate (2.9 to 4.2 kg/h) and proximate and ultimate analyses data of switchgrass, were obtained on our lab-scale fluidized-bed gasifier. The mass balance and fundamental design equation of CSTR were used to determine the extents of various gasification reactions, which will be further used to calculate and predict syngas composition. The model prediction will be validated with the experimental results of fluidized-bed gasifier.

---

**The Drivers of change in the Korup National Park in Cameroon**

*Siewe Siewe*  
*Oklahoma State University*  
*Department of Geography*  
*Subject Area: Social Sciences*

Since its creation in 1937, the status of the Korup National Park has evolved from a community forest reserve, to a national park in 1986. With this change also came a change in the management plans of the
As a reserve, the rights of the villagers to own land was recognized, and village enclaves were created within which local activities could be carried out. These rights were lost in 1986 as the park was changed from a reserve into a national park, in favor of the complete resettlement of the local inhabitants. Today, the failure of the resettlement policy and the evolution of the international doctrine on protected areas have led to a more liberal form of managing in the park, promoting changes in the land-use and land-cover of the area. This study explores the changes in land-use and land-cover change (LULCC) in the Korup National park, between 1990 and 2011, using Landsat images and household surveys. Remote sensing analysis show that deforestation and degradation in the park increased over the years and with the use of GIS and multiple regressions models, these changes can be attributed to the changes in the management policies of the park, and also to the changes in the village/household structures. Other factors like the presence of a market and proximity to urban areas are significant, though not as important as the aforementioned points.

A Silica Hollow Bottle Resonator Sensor for Methane Detection

Razvan Stoian and A.T. Rosenberger
Oklahoma State University
Department of Physics
Subject Area: Physical Sciences & Technology

Gas detection and methane detection in particular are of great importance in the field of optical-based sensing of chemical elements. This presentation will address the using of a silica hollow bottle resonator used as a sensor for traces of methane. The making of the resonator with the help of off-the-shelf items (e.g. capillaries, hydrofluoric acid, and electronics) is presented first. Commercially available capillaries of 50 µm wall thickness are etched through a simple and original procedure that circulates the etching agent (hydrofluoric acid) through the capillary at regular time intervals, thus rendering the internal surface of the capillary smooth and uniformly etched over its entire length. The hollow bottle resonator is obtained by heating a small region of the capillary and pressurizing its interior using a syringe. Data regarding methane sensing via absorption spectroscopy in the 1550 nm region will also be featured. Both ends of the resonator are coupled to a vacuum chamber filled with methane at a certain pressure. The concentration of methane in the capillary section will have a strong effect on the intensity of the optical signal collected from the surface of the silica hollow bottle resonator.

The Effect of HPV Awareness on the Sexual Practices of African American Women

Kayla Storrs and Maria Lupe Davidson, Ph.D.
Scholar from the University of Oklahoma
Scholar Symposium Participant
Subject Area: Diversity Issues

With 6.2 million new diagnoses of Human Papillomavirus, HPV has become the most common STD in the United States. Such high numbers of diagnoses raise questions regarding the cause of transmission rates of HPV. One such question is how HPV awareness may have an impact on the transmission rates of HPV. This study explores how lack of HPV awareness among females in the African American community may have a negative effect on their sexual practices, putting them at higher risk for HPV. Survey data was collected regarding the level of HPV awareness for study participants, along with information about their sexual practices. Results indicate that the majority of the participants were unaware of the health risks of HPV, and of those, most were engaging in risky sexual behaviors. These findings suggest that more sexual education is needed within the African American community.
Roadside Transnationalism: Geographies of Identities, Place, and Diaspora in an Ethnic Entrepreneurial Space

Aswin Subanthore
Oklahoma State University
Department of Geography
Subject Area: Social Sciences

Conceptualizing notions surrounding place lies at the core of interpreting our changing global context. Within these interpretations, scholars have introduced theoretical lenses such as spaces of flows (Castells, 2004), diaspora (Brah, 1996; Nagel, 2001), transnationalism (Mitchell, 1997), among others in helping us envision various forces that shape globalization. In particular, and as an emerging research agenda within geography, transnationalism has emerged as a key theoretical lens tackling questions surrounding notions of space, place, and identities to help unravel various interconnectedness that each of these attributes offer to address the complexities associated with globalization. As a case study in ethnic transnationalism, I present my research conducted at a roadside ethnic restaurant located in Edmond, Oklahoma where everyday meanings of identities, nationalism, and ethnicities are constructed. Using participant observations and ethnographic fieldnotes, I attempt in situating this otherwise lesser-known restaurant as a place where various transnational geographies are negotiated. In doing so, I answer larger questions pertaining to the inner-workings of how immigrant identities are constructed as well as how even “ordinary” places can be interpreted as places of globalization.

Spray Droplet Characterization for Post Combustion Carbon Capture

Yash Tamhankar, J.R. Whiteley, and C.P. Aichele*
Oklahoma State University
Department of Chemical Engineering
Subject Area: Physical Sciences & Technology

The absorption-stripping process with aqueous amine solvents is the most developed and established technology for Post Combustion Carbon Capture (PCCC). Spray columns are potential candidates for the absorption portion of this process. The low pressure drop associated with spray columns can potentially reduce capital and operating costs for PCCC plants. The absence of internals in spray columns make them less susceptible to corrosion caused by aqueous amine solvents. The efficiency of mass transfer depends on the surface area of the droplets, interaction between the droplets, oscillation, coalescence and break-up. Knowledge of droplet distributions is critical for estimating the efficiency of spray columns and understanding the fundamental behavior of sprays. This paper showcases the efforts underway at Oklahoma State University in measuring droplet and velocity distributions for various aqueous amine solvents inside a glass column using a Phase Doppler Interferometer (PDI). The experimental set-up, operating procedures and measuring techniques will be discussed. Results from the experiments will elucidate the effect of gas rate, liquid rate and nozzle type on the droplet distribution and spray tower performance. Insights regarding the contribution of droplet surface area and droplet interactions to mass transfer efficiency will be shared.

*Corresponding author: clint.aichele@okstate.edu

Chemical and Physical Changes of Bone by Solid-State NMR

Amanda Taylor and Amanda Taylor
Oklahoma State University
Department of Physics
Subject Area: Biological Sciences

The structure and composition in bone determine its strength and resilience to loading. Changes in these factors are being studied in ovariectomized mice, which model induced bone loss. We have used solid-state NMR (SSNMR) to assess the collagen, water, and mineral contents of intact mouse bones. Pore sizes and spatial information about the mineral-collagen interface have also been elucidated from measurements. The
ultimate goal of this research is to find what mechanisms are the most prevalent causes of increased fracture risk in bones.

**Impact of IT Security Breaches on Firm's Stock Prices: An Example From Sony**

Kim Thai and Dr. Kuang-Chung (Glenn) Hsu  
Scholar from the University of Central Oklahoma  
Scholar Symposium Participant  
Subject Area: Physical Sciences and Technology

Recently, information technology has described a new type of security breachers: Hacktivists. ex. Sony Corporation suffered a series of information breaches from Anonymous during April to July 2011. Anonymous breached Sony's IT security, retrieved personal information, and "dumped" the information in a series of attacks on various websites. The purpose of this research is to assess how Anonymous's security breaches and attacks affected Sony's public image, or market value. A time-series regression of Sony's stock between April to July 2011 was used to analyze the impact of the breaches on stocks. The results of our study showed significance in stock impact 14 days before the actual date of the attack. Anonymous's early announcement on a breach may be the explanation for such findings.

**Space to Entertain: An Analysis of Floor Plans and Magazine Articles from 1950-2000**

Rebekah Thompsen  
Oklahoma State University  
Department of Design, Housing, and Merchandising  
Subject Area: Social Sciences

The purpose of this study is to examine the changes in and relationship between spatial utilization and entertaining/socializing in the average American home. The socio-cultural background of the home itself is outlined followed by an examination of social capital in the U.S. including entertaining trends. Lastly the spatial elements of the home are discussed in relation to categorization and territories as illustrated in the floor plan. Using content analysis, home floor plans published in plan books and articles about home entertaining published in popular magazines from the 1950s to the beginning of the 21st century are explored. Qualitative information about entertaining practices gleaned from periodicals will be used to form an overall impression of the social landscape in the U.S. during the latter half of the 20th century. After quantifying the categorization and usage of space in the home, the data will be compared to contemporary cultural trends in an attempt to evaluate home floor plans as valid indicators of social change.

**Rebuilding an American Indian Nation Twice, 1839-44 and 1866**

Tabatha Toney  
Oklahoma State University  
Department of History  
Subject Area: Social Sciences

After the crisis of removal, the Cherokee Nation suffered setbacks regarding sovereignty upon arrival in Indian Territory with violent internal factionalism that destroyed their nation from 1839-44 and again in 1866. While the Cherokees struggled to rebuild their nation twice, the United States government capitalized on the tribe's internal divisions to pass legislation further hindering the sovereignty of the tribe.

Many American Indian protests of history and today result from grievances within a tribe's own government or a lack of tribal self-determination. The proposal seeks to portray the question of sovereignty and cost of factionalism beginning in 1839 with the violent aftermath of removal. The Cherokees began rebuilding their nation into what is considered the golden age of their republic. The Civil War divided the tribe again as
factions reemerged. After the war, the United States government utilized these divisions to force a treaty on the Cherokees harsher than any punishment imposed on former Confederate states.

Today the Cherokee tribe still suffers from internal divisions regarding such issues as freedmen rights and citizenship. This paper will provide further historical context as to the importance of sovereignty and the consequences of political factionalism.

**Fact or Fiction: Ethics versus Moral Lessons in Young Adult Literature**

Amber Trent  
**Scholar from the University of Texas at Arlington**  
**Scholar Symposium Participant**  
**Subject Area: Humanities**

Young adult literature often imparts a moral lesson in any of its stories. Sometimes, these stories come under the claim of being real, such as with Go Ask Alice and James Frey's adult novel A Million Little Pieces. By claiming a story to be true, it is thought that young adult readers will be more receptive to its moral lesson. This is not the case as the young adult readers' trust is betrayed. When that emotional response is betrayed, the young adult readers disregard the moral lesson. Sometimes, fiction is able to bridge the emotional gap to the reader-response better than non-fiction. Crank By Ellen Hopkins is an example of how fiction is able to bridge the emotional gap with young adult readers. In this paper I will examine issues surrounding Go Ask Alice and Crank, such as questions about authorship, the reader-response to each, how time affects the readers' view of a story, and why the first person diary format produces a deep emotional response from the reader. Each aspect play into how the young adult readers respond to the moral lessons within these different books.

**The Moderating Effect of Humor Style on the Relationship between Interpersonal Predictors of Suicide and Suicidal Ideation**

Raymond Tucker, Raymond P. Tucker, M.S., LaRicka R. Wingate, Victoria M. O'Keefe, Meredith L. Slish, Matt R. Judah & Sarah Rhoades-Kerswill  
**Oklahoma State University**  
**Department of Psychology**  
**Subject Area: Social Sciences**

A wealth of research has supported the notion that humor styles play a pivotal role in psychological adjustment (Kuiper & Martin, 1993; Overholser, 1992). Although humor has been investigated in relation to psychopathology such as depression and anxiety, no research has determined a relationship between humor styles and suicide risk. The current study tested whether four specific humor styles alter the relationship between suicidal ideation and both thwarted belongingness and perceived burdensomeness (i.e., robust predictors of suicide outlined in the Joiner's (2005) Interpersonal Theory of Suicide). Three hundred and seventy-five undergraduate students participated in this study by completing self-report measures of humor styles, suicidal ideation, depression, thwarted belongingness, and perceived burdensomeness. Results indicated that affiliative humor (humor aimed at strengthening social bonds and easing interpersonal tensions) weakened the relationship between thwarted belongingness and suicidal ideation as well as perceived burdensomeness and suicidal ideation even when depressive symptoms were controlled. Conversely, self-defeating humor (the excessive use of self-disparaging humor to amuse others) strengthened these relationships. Results of the current study indicate that tracking humor styles may be an important clinical tool in understanding and treating suicidal thinking.
Characterization of complex dispersions

Deepika Venkataramani, Peter Clark, Jim Smay, and Clint P. Aichele
Oklahoma State University
School of Chemical Engineering
Subject Area: Physical Sciences & Technology

Complex dispersions including emulsions and hydrates can be encountered during drilling, production, transporting, and processing of crude oils. These dispersions typically lead to higher operating costs as they currently require costly treatment strategies. The objectives of this work are emulsion characterization, measurement of particle size distribution, and quantification of surfactant behavior using acoustics. The project will also evaluate the flow characteristics of dispersions using advanced rheological techniques. Rheology utilizes the viscosity and elastic properties to measure complex rheological behavior of dispersed systems. The acoustic technique utilizes sound waves and the attenuation coefficient to characterize particle size, zeta potential, and conductivity. The particle size measurements coupled with rheology will lead to fundamental characterization of these complex systems that will lead to enhanced flow assurance management strategies.

Role of Cationic Liposomes in Adenovirus Gene delivery to CAR- Negative Cells

Sravanthi Vupputuri, Lobat Tayebi, and Joshua D. Ramsey
Oklahoma State University
Department of Chemical Engineering
Subject Area: Biological Sciences

Adenovirus (Ad) is often preferred over other gene delivery vectors due to its transduction efficiency in different human tissues and its ability to accommodate large transgenes. Ad-based gene delivery vectors, however, have two serious drawbacks: (i) the inability to efficiently infect cells lacking the coxsackie adenovirus receptor (i.e., CAR-negative cells) and (ii) immunogenicity, where the Ad capsid protein may mediate an inflammatory response and could also initiate clearance of the virus in patients with preexisting immunity. In this study, a vector composed of Ad and PEGylated cationic liposomes was synthesized to address the above drawbacks. Conjugation of Ad with PEGylated cationic liposomes enabled the virus to infect CAR negative cells, providing an almost 210 fold improvement in gene expression compared to the native virus. The vector’s infectivity was optimized, its cytotoxicity was measured, and its physicochemical characteristics (i.e., hydrodynamic diameter, and zeta-potential) were determined. PEGylated liposome encapsulated Ad vectors were resistant to the neutralizing effects of mice anti-adenoviral antibodies. Hence, PEGylated liposomes may be useful for applications using adenovectors in which the target cells lack CAR or in which the recipient already has or develops a neutralizing antibody response.

Seasonal Variability in Net Ecosystem Carbon Dioxide Exchanges in Young Switchgrass Stand

Pradeep Wagle and Vijaya Gopal Kakani
Oklahoma State University
Department of Plant and Soil Science
Subject Area: Biological Sciences

Seasonal changes in net ecosystem CO₂ exchanges (NEE) in response to controlling factors during the second (2011) and third (2012) years of stand establishment in the southern Great Plains of the United States (Chickasha, OK) were examined using eddy covariance system. Larger vapor pressure deficit (VPD > 3 kPa) limited photosynthesis in switchgrass and caused asymmetrical diurnal cycles of NEE. As a result, hyperbolic light-response curve (NEE partitioning algorithm) consistently failed to provide better fits at VPD > 3 kPa. Modified rectangular hyperbolic light-response curve which included VPD’s effect on photosynthesis improved the model performance significantly. The maximum monthly average NEE and dark respiration reached magnitudes of -33.02 (± 1.96) and 11.55 (± 0.74) µmol CO₂ m⁻² s⁻¹, respectively.
during peak growth. Although large differences were observed between two seasons in terms of cumulative seasonal GEP and ER, total seasonal ER accounted for about 75% of GEP regardless of the length of the growing season and differences in aboveground biomass production, suggesting that net ecosystem carbon uptake increases with increasing GEP. The ecosystem was a net sink of CO$_2$ during 5 to 6 months and total seasonal uptakes were -1128 and -1796 g CO2 m$^{-2}$ in 2011 and 2012, respectively.

**Physiomechanical Properties of Chitosan-based Injectable Hydrogels for Cartilage Regeneration**  
**Kenneth Walker and Sundararajan Madihally**  
Oklahoma State University  
Department of Chemical Engineering  
Subject Area: Biomedical Sciences

Cartilage could be ravaged by various diseases and regular physical activities; osteoarthritis is the most common joint disorder requiring significant medical aid. Tissue regeneration techniques offer alternative strategies, but require seeding immuno-compatible cells to colonize biodegradable scaffolds to circumvent immune rejection. Hydrogels are desired for cartilage scaffolding because of the possibility of providing both liquid and solid phases similar to in vivo conditions. Further, injectable hydrogels offer a minimally invasive alternative to arthroscopic surgeries and ease of incorporation of cells and biologically active agents. Whereas, adult human mesenchymal stem cells (hMSC) are differentiated in pellet cultures which is difficult for use in the injectable form. The objectives of this study were to investigate the possibility of forming chitosan based hydrogels in combination with gelatin and hyaluronic acid and the effects on mechanical and physical properties with different concentrations. Additionally, the differentiation of hMSCs and an autologous human foreskin fibroblast (hFF-1) cell source suspended in thermosensitive chitosan-based hydrogel were explored for cartilage regeneration.

**The Oklahoma State University Student Union Facade: A History of Architectural Influence**  
**Amy Wallace**  
Oklahoma State University  
Department of Design, Housing, and Merchandising  
Subject Area: Humanities

Oklahoma State University displays one of the highest standards of Georgian architecture. The purpose of this research is to discover where Georgian architecture originated and how it evolved over the years. This research is a detailed description of all features on the facade of the Oklahoma State University Student Union. I will compare the various details shown on the facade of the Student Union to architectural features of other historical structures.
In Silico Prediction of Cancer Mechanism of Action

Eric Whitebay, J. D. Ramsey, B. J. Neely and K. A. M. Gasem
Oklahoma State University
Department of chemical engineering
Subject Area: Biomedical Sciences

Traditional chemotherapy remains a key treatment method in battling cancer, offering distinct advantages over other treatment options. To develop new chemotherapeutic drugs, greater knowledge concerning the mechanisms of action (MoA) of current cancer drugs is required. By understanding how current drugs inhibit cancer growth through their underlying MoA and what molecular features affect the MoA of a drug, development of new and better chemotherapeutic agents is facilitated.

Quantitative structure-activity relationship (QSAR) prediction of MoA allows greater insight into the relationship between drug activity and molecular structure. Classifying new potential drugs by MoA can reduce experimental testing by restricting testing candidates to only those potential drug candidates predicted to have a specified level of effectiveness. Previous research has employed QSAR predictions in an effort to predict the MoA of new, untested chemicals; however, these predictions required experimental input. Our efforts have centered on advancing beyond the current state of the art by providing QSAR predictions that are truly a priori in nature. Using a NCI database of 122 molecules, our model has an overall predictive accuracy of 84%, with 10% of the molecules not classified into any MoA class and 6% of the molecules classified into an incorrect class.

From Dropped Out to Checked In: A Snapshot of Alternative Education

Monica Williams and Jeri Carroll, Ph.D.
Scholar from Wichita State University
Scholar Symposium Participant
Subject Area: Education

Many high schools today employ a conventional model of schooling for students in grades 9-12. This model includes traditional, lecture-style classes that follow a typical schedule of two semesters (four, nine-week terms), midterms, and finals. Although many students are able to conform to this model, for those who do not, research shows that alternative education can meet their needs. The purpose of this study was to determine the structure and effects of an alternative high school in a small, but growing, midwestern school district. After a review of the literature, researchers completed a case study of this high school in order to review its history, necessity, student population, structure, and effects. This research encompassed both qualitative data (student surveys and principal/superintendent interviews) and quantitative data as it sought to determine why these students were in alternative schools as well as their outcomes. The results of this research may help pinpoint the continued need for these types of environments in districts and how they can be used effectively to serve nontraditional students as they find success.

Keywords: dropouts, alternative education, nontraditional students, school structure

A wireless multi-sensor wearable system for obstructive sleep apnea (OSA) monitoring

Woranat Wongdhamma and Trung Le
Oklahoma State University
Department of Industrial Engineering and Management
Subject Area: Biomedical Sciences

Eighteen million Americans have suffered from a moderate sleep apnea. More than half of them remain undiagnosed due to a high cost and time consuming of a diagnosis process which is mostly done in a sleep laboratory with a supervision of a certified technician. The need for developing an alternative for a low cost and mobile equipment to help justify whether the person carries an obstructive sleep apnea (OSA) disorder.
and at what level of severity, is important. This type of equipment will possibly be used for an in-house and reliable self-OSA diagnosis which will dramatically reduce the cost and time. In this paper, the design of a wireless wearable vital signs monitoring system is presented. This system could measure, display, and store 3-lead vectorcardiogram (VCG), 12-lead electrocardiogram (ECG), heart sound, heart rate (HR), energy and frequency spectrum of VCG, 3-dimension VCG, arterial oxygen saturation percentage (SPO2), and respiratory rate, simultaneously, synchronously, and wirelessly. Comparing the collected data from the developed system to the ones from commercial devices, the result shows that there is no statistically significant difference between them.

The N-terminus of fat body triglyceride-lipase (TGL) is involved in protein-protein interaction: implications in the mechanism of lipid mobilization

Zengying Wu, Soulages, J.L., Hager Z., Joshi B. D., Daniel S. and Arrese E.L.
Oklahoma State University
Department of Biochemistry and Molecular Biology
Subject Area: Biological Sciences

Fatty acids stored as triglycerides (TG) in the insect fat body serve, among other processes, as precursors for energy production and the synthesis of cellular components. Mobilization of fatty acids from TG stores depends on the action of lipases. Triglyceride-lipase (TGL) is a major fat body lipase in Manduca sexta. TGL is a large cytosolic protein (MW= 73.8kDa) that has three highly conserved regions. The N-terminus region contains a WWE domain (amino acids 46-128). This domain is predicted to mediate specific protein-protein interactions. The role of this domain in the function of TGL is unknown. To identify possible functional modulators of TGL activity, we screened the fat body homogenates to identify WWE-interacting proteins. For this purpose we used a biochemical assay based on the isolation and identification of proteins that specifically bind the N-terminus region of TGL (WWE) fused to a tag containing thioredoxin and a poly-His chain immobilized to Ni-Sepharose beads. Beads containing only the thioredoxin-poly-His tag were used as control. Proteins bound to beads were separated by SDS-PAGE and identified by mass spectrometry. Twelve WWE-interacting proteins were identified. These are proteins in which the amount of protein bound to Trx-WWE resin was at least 1.5-fold higher than the protein bound in the control resin. Antibody was available for five of the identified proteins for which the results were confirmed by immunoblot. The apolipoproteins of lipophorin (Lp)- the main circulatory lipid carrier of insects- were found to interact with WWE. The interaction was confirmed by co-immunoprecipitation using anti-HDLp antibody. Lipoyamide dehydrogenase (LipDH) was also found to interact with the WWE domain. Additional evidence supporting a role of LipDH in TGL activity will be presented. The potential role of these proteins in lipid mobilization will be discussed.
Influence of operation conditions on fast pyrolysis of eastern red cedar

Zixu Yang, Ajay Kumar, Michael Buser, Raymond L. Huhnke
Oklahoma State University
Department of Biosystems and Agricultural Engineering
Subject Area: Physical Sciences & Technology

Eastern red cedar is threatening the survival of crops and native plant species in grassland due to its environmental flexibility and rapid expansion. Converting the solid biomass polymers into a liquid fuel intermediate (bio-oil) through fast pyrolysis is one of the promising approaches to address the environmental issue of eastern red cedar while simultaneously producing sustainable fuels. In this study, the effects of operation conditions (pyrolysis temperature, feed rate, gas flow rate, and particle size) on the products and bio-oil quality were investigated in a lab-scale fluidized-bed pyrolyzer. The physicochemical properties of bio-oil measured included proximate and ultimate analyses, water content, pH value, density, and viscosity. The chemical compositions of bio-oil were characterized by gas chromatography/mass spectrometry (GC/MS) and Fourier transformation infrared spectrometer (FTIR). A comparison of the properties of bio-oil obtained from eastern red cedar and other common types of biomass will be discussed.

Keywords: eastern red cedar; pyrolysis; fluid bed; bio-oil

Restricted Scheffe method using minimal cone approach in multiple comparisons

Yimin Zhang and Mindy McCann
Oklahoma State University
Department of Statistics
Subject Area: Physical Sciences & Technology

Casella and Strawderman (1980) constructed a Scheffe-type confidence band for multiple regression over a restricted range of the predictor variables, which is also referred to as the restricted Scheffe method. We propose applying the restricted Scheffe method to a discrete set of multiple comparisons. This will provide a less conservative solution than Scheffe's method and possibly other alternative methods. A rectangle embedding approach was also introduced by Casella and Strawderman (1980) to find appropriate restricted ranges that practical problem settings can fit into. However, this approach that is intended for continuous regression, suffers from the over-expansion drawback with multiple discrete comparisons. A new minimal cone approach is developed to obtain the optimal restricted range from the coefficients of multiple comparisons. We investigate the restricted Scheffe method utilizing the minimal cone approach in comparison with many single-step competitors in a variety of multiple comparisons problems.

Optimization of a Spin-flip Zeeman Slower for Generating Ultracold Atomic Gases

Lichao Zhao, Jie Jiang, Micah Webb, Yingmei Liu
Oklahoma State University
Department of Physics
Subject Area: Physical Sciences & Technology

Laser cooling and trapping alkali atoms with a magneto-optical trap (MOT) is a standard and important technology for generating ultracold quantum gases, for example a Bose-Einstein condensate. We present the design and construction of a spin-flip Zeeman slower to improve MOT's capture efficiency by significantly slowing down hot sodium atoms before the atoms overlap with the MOT. Our experimental data have also demonstrated an efficient method to optimize the spin-flip slower by using our simulation program and monitoring the number of atoms trapped in the MOT. In addition, we experimentally determine and theoretically explain how the MOT capture efficiency strongly depends on a few intrinsic parameters of our sodium system. These conclusions and our simulation program are very useful in designing an optimized Zeeman slower for other alkali atoms, especially those with high initial velocities.