



Poster

Abstracts

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Numerical Modeling of Bank Instability by Seepage Erosion

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Presentation Subject Area: Environmental Sciences

Streambanks are one of the most vulnerable geologic structures on earth. Riverbank erosion and associated sedimentation and land loss hazards are a resource management problem of global significance (Darby et al., 2000). Issues such as streambank stability and sediment load to streams have been major concerns for decades and billions of dollars have been spent on streambank protection and restoration. Predicting bank collapse due to seepage erosion undercutting has not been fully studied or modeled, even though its role in streambank erosion may be important. The limitation originates from the limited field measurements or laboratory experiments as well as the unavailability of discrete element models that can effectively simulate seepage erosion and the corresponding mass wasting. The objective of this research was to demonstrate a procedure for incorporating seepage undercutting into bank stability models and to investigate the role of seepage undercutting on bank instability. A numerical finite element model, SEEP/W, was used to model soil-water pressure variations during seepage erosion observed in laboratory experiments with two-dimensional soil lysimeters. Model parameters were calibrated using measured soil-water pressure and cumulative discharge data from the lysimeter experiments. A general limit equilibrium bank stability model called SLOPE/W was used to simulate bank stability with and without seepage erosion by comparing the computed factor of safety, F_s , at different stages of the seepage erosion process with regard to input parameter uncertainty using Monte Carlo analysis. The percentage decrease in the mean F_s ranged between 42 and 91% as the depth of undercutting increased, dependent upon the initial stability of the bank. The F_s converged to a specific value as undercutting progressed, suggesting that a stable bank (i.e., $F_s > 1$) can quickly become unstable (i.e., $F_s < 1$) when seepage undercutting is considered. For stable banks, the probability of failure reached 100% when the depth of the undercutting reached approximately 30 to 50 mm. This research verifies that the propensity of streambanks to fail during the recession limb of hydrographs may be the combined result of seepage erosion undercutting the streambanks and the reduced apparent cohesion of the bank. This research also highlights the need to incorporate the dynamic process of seepage erosion into integrated subsurface flow and streambank stability models.

Stable Carbon Isotope Fractionation in Simulated Acid Mine Drainage Contamination of Natural Waters: Observations from a laboratory experiment.

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Presentation Subject Area: Environmental Sciences

An acidification experiment designed to simulate acid mine drainage (AMD) contamination of stream water was conducted. The objective of the study was to determine how proton production during chemical evolution of AMD affected dissolved inorganic carbon (DIC) and the stable carbon ^{13}C of DIC. Water samples from an AMD spring, ground isotope ratio (water from a mine tailings pile, and stream water were acidified with sulfuric acid in the laboratory. Two sets of 20L containers of water from different sources were acidified and two sets were allowed un-acidified to evolve for several weeks in the laboratory under ambient conditions. Acidification was carried out to a $\text{pH} < 3$. One set of samples were acidified without contact with air (closed conditions) and the other set was open to the atmosphere. Physico-chemical

parameters measured included temperature, dissolved ^{13}C DIC, $\delta^{13}\text{C}$ oxygen, pH, redox potential, alkalinity, major ions, DIC, and Headspace CO_2 was collected for acidified samples in the closed system ^{13}C . In general, both acidified and un-acidified and measured for ^{13}C as CO_2 was lost samples showed decrease in DIC and enrichment of ^{13}C of the head space CO_2 also from the samples to the atmosphere. The ^{13}C enrichment as DIC was converted due to acidification. The $\delta^{13}\text{C}$ enrichment observed during DIC loss for un-acidified samples was due to equilibration with atmospheric CO_2 . On the other hand, the enrichment ^{13}C in the acidified samples was due to fractionation during $\delta^{13}\text{C}$ of dehydration of HCO_3^- to $\text{CO}_2(\text{aq})$ and conversion of $\text{CO}_2(\text{aq})$ to $\text{CO}_2(\text{g})$. The enrichment of the CO_2 in the head gas suggest a nearly constant enrichment factor during dehydration of HCO_3^- to $\text{CO}_2(\text{aq})$ and minimal enrichment during conversion of $\text{CO}_2(\text{aq})$ to $\text{CO}_2(\text{g})$. The result of this study suggests that the enrichment in AMD contaminated stream water is mainly due to fractionation associated with dehydration of HCO_3^- .

Relationships between Self-Concept, Self-Esteem and Eating Disorders in College Women

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Current research is mixed on whether specific aspects of self-concept versus global self-esteem are better predictors of eating disorders such as bulimia and anorexia (e.g., Hargreaves & Tiggemann, 2002; Ratliff & Page, 2005). College woman are one of the highest risk groups to suffer from eating disorders (Cashel, Cunningham, Landeros, Cokley, & Muhammad, 2003). The focus of this study is to look at the relationships between two aspects of self-concept, appearance-evaluation and self-evaluation, and global self-esteem with two eating disorders, bulimia and anorexia in college women.

Participants were 70 college women (mean age = 20.58). All participants were recruited from undergraduate classes and were given course credit for their participation in the study. The majority of the participants in the study were Caucasian. Each of the participants completed the *Rosenberg Self-Esteem Scale* (Rosenberg, 1965), the *Appearance Schema Inventory-Revised Self-Evaluation subscale* (Cash & Labarge, 1996), the *Multidimensional Body-Self Relations Questionnaire Appearance Evaluation subscale* (Cash, 2002), and the *The Eating Disorder Inventory (Bulimia and Drive For Thinness subscales)* (Garner, Olmsted, & Polivy, 1983).

Self-esteem, self-evaluation, and appearance-evaluation all were significantly correlated with bulimia ($p = .001$ for all scales). To determine the unique variance explained by each, a linear regression was run with self-esteem, self-evaluation, and appearance-evaluation entered simultaneously. Results showed that only self-evaluation and appearance evaluation were significant [$t(66) = 6.05, p = .001, sr = .49$ & $t(66) = -4.71, p = .001, sr = -.38$, respectively] while global self-esteem was not significant [$t(66) = .54, p = .59, sr = .04$].

Self-esteem, self-evaluation, and appearance-evaluation were also all significantly correlated with drive for thinness ($p = .001$ for all scales). To determine the unique variance explained by each, a linear regression was again run with self-esteem, self-evaluation, and appearance-evaluation entered simultaneously. Results again showed that only self-evaluation and appearance evaluation were significant [$t(66) = 4.50, p = .001, sr = .40$ & $t(66) = -4.23, p = .001, sr = .38$, respectively] while global self-esteem was not significant [$t(66) = -.001, p = .99, sr = .00$].

It is interesting to note that although global self-esteem was related to eating disorders when looked at by itself, when entered into a regression with other more specific aspects of self-concept, it was no longer significant. This suggests that specific aspects of self-concept may account for much of the variance in eating disorders that had previously been explained by global self-esteem.

When treating eating disorders, addressing issues such as the internalization of appearance-evaluation and self-evaluation may need to be targeted rather than global feelings of self. Giving a therapist a target that is narrow like a woman's self-evaluation and appearance-evaluation may lend more efficient treatment instead of addressing global issues that may not be directly related to eating disorders.

An Alternative to the Normalized Gain for Physics Education Research

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Presentation Subject Area: Education

Normalized gain has often been used in Physics Education Research to test for differences in repeated measures (e.g., pre- and post-tests) despite the fact that there are established statistical procedures for these analyses. Normalized gain is defined as:

$$\langle g \rangle = (\langle S_f \rangle - \langle S_i \rangle) / (1 - \langle S_i \rangle)$$

where $\langle S_i \rangle$ is the initial class average and $\langle S_f \rangle$ is the final class average. High gains correspond to $\langle g \rangle \geq 0.7$, medium gains to $0.3 \leq \langle g \rangle < 0.7$, and low gains to $\langle g \rangle < 0.3$. Potential problems with the use of normalized gain include: (1) there is little theoretical basis regarding the establishment of the strength of effect scales, (2) errors are not considered or analyzed, (3) there is no explanation of the underlying theoretical basis or inherent assumptions for normalized gain analyses, and 4) the possible extensibility of normalized gain to a general population is unclear.

Due to these problems, Physics Education Researchers should examine established statistical methods designed specifically for repeated measurements.

A 'within-subjects' ANOVA may be used to determine whether differences exist between pre- and post-test measures. This ANOVA technique is appropriate for repeated measures, tests for statistically significant differences between groups, may be used to estimate an intervention's strength of effect (ω^2), and provides an estimate of the extensibility of analysis conclusions to the general population.

Detailed comparisons between normalized gain and ANOVA analyses were conducted and used to contrast the techniques and their results. Science Teaching Efficacy Beliefs Instrument (STEBI) data was obtained from one semester of an inquiry-based physics course (N = 40). The STEBI instrument was administered both prior to and after one semester's physics instruction. This STEBI data was analyzed using normalized gain and a within-subjects ANOVA. These results were then compared to one another.

Normalized gain analysis indicated a low increase ($\langle g \rangle = 0.16$) in STEBI scores after one semester of instruction. The within subject ANOVA results ($p < 0.001$) indicated that there were statistically significant differences between the pre- and post-test STEBI data, with an estimated significance error rate of less than 1 in 1000. The strength of the effect ($\omega^2 = 0.32$) indicated that one semester's inquiry-based physics

instruction had a large effect on the significantly improved STEBI scores – 32% of the increase in STEBI scores was due to the intervention (instruction).

The normalized gain and within-subjects ANOVA results were quite different. The potential problems listed above were likely responsible for these differences. Within-subjects ANOVA analyses avoid the potential difficulties associated with normalized gain analyses. ANOVA results estimate the probability that the results were in error, the strength of the effect that was tested, and allow statements regarding the extensibility to other (non-tested) populations having the same characteristics.

An Evaluation of Inquiry-Based Science Course Components on Midterm Exam Performance.

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Presentation Subject Area: Education

Method

This study examined student performance on an inquiry-based physics course midterm exam. The participants (N=31) consisted of Elementary Education majors enrolled in an inquiry-based physics course. Hierarchical regression was used to determine which course components contributed a significant portion to the squared correlation coefficient when the midterm exam score served as the criterion variable. The midterm exam questions are evaluated based on a student's ability to explain their answer. The order of predictors entered into the regression based on perceived instructor importance was: (1) homework average, (2) quiz average, and (3) data (sun-plots and moon observations). All student course component averages were evaluated immediately prior to the midterm exam. Homework consisted of essay questions which are evaluated based on a student's ability to explain their answer. Quizzes were taken online using WebCT and covered both the current lab and reviewed past concepts. Quiz questions were multiple-choice and short written answer. Students were allowed to take the quiz as many times as desired, with questions selected at random. Students were required to take data throughout the semester. As long as the students took the data appropriately they received a high score.

Results

Table one displays the correlations between the variables. After homework average is entered into the regression, $R^2_{E,H} = 0.496$, $[F(1,29) = 27.05; p < 0.01]$. This means the addition of homework into the equation resulted in a statistically significant increase in the squared multiple correlation coefficient. We see that 49.6% of the variation in exam scores was shared with the homework average. However, the addition of quiz average ($R^2_{E(Q,H)} = 0.006$, $[F(2,28) = 3.27; p = \text{non-significant}]$) and data ($R^2_{E(D,QH)} = 0.003$, $[F(3,27) = 1.64; p = \text{non-significant}]$) did not significantly improve the squared multiple correlation coefficient. The unique variation due the quiz average added to the second regression was 0.6%, and the unique variation that data added in the final regression was 0.3%.

Table One- Correlations among Variables

	Exam	Homework	Quiz	Data
Exam	0.787 (0.106)	0.704	0.535	0.404
Homework		0.663 (0.136)	0.680	0.478
Quiz			0.836 (0.117)	0.489
Data				0.741 (0.137)

Note: Means (standard deviations) are placed on the diagonal.

Conclusions

The theoretical order of predictors was consistent with the observed squared correlation coefficients, but when all three variables were entered into the equation only the homework average contributed significantly to the squared correlation coefficient. This shows that there is measurement overlap between the three predictor variables. Homework average, quiz average, and data average largely measure the same thing. Students who score well on homework also score well on quizzes and data.

Based on the results of this study, the best way to prepare the students for the exam is to have students do activities that are evaluated in a similar manner to the exam. Based on the results of this study, future inquiry-based physics professors should focus the student's effort on performing well on the homework. If the students are successful on the homework, they will probably also perform well on the exam.

Deciphering extensional dynamics within the Menderes Massif, Western Turkey

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Presentation Subject Area: Physical Sciences & Technology

The Menderes metamorphic core complex in southwestern Turkey exposes amphibolite-facies, high temperature and pressure, rocks with ages of prograde metamorphism ranging from the Cambro-Ordovician to the Eocene-Oligocene. Sometime in the mid- to late Cenozoic, blueschist- and amphibolite-facies compression shifted to large-scale extension and core complex development in this, (arguably) the largest core-complex of the Alpine-Himalayan orogen. The timing of the shift from compression to extension provides an insight to which of the three mechanisms produced this widespread extension in orogens: orogenic collapse (extension initiates in the Oligocene), back-arc spreading (Miocene), and tectonic escape (Pliocene to present). Previously published results imply that initiation could have occurred anytime between the late Eocene and late Miocene. At the time of extension, two plutons (Salihli and Turgutlu), located in the northern (Alasehir) detachment occur, leaving us to believe that their age must postdate initial extension and thus potentially distinguish tectonic mechanisms. Samples from these two plutons, the Salihli and Turgutlu, were collected and thirty-four Th-Pb ion microprobe monazite (REThPO₄) ages are identical between the two granites, and date their intrusion at 15.0[±]2.0 Ma (¹σ, MSWD=2). Biotite ⁴⁰Ar/³⁹Ar ages reported elsewhere are 13.1[±]0.2 Ma (Turgutlu) and 12.2[±]0.4 Ma (Salihli). These data are most consistent with orogenic collapse dynamics, initiating prior to 15 Ma, with possible rapid mid-Miocene slip. Trends on Harker diagrams and rare earth element (REE) patterns imply that the two granites initiated from the same source, and show interesting similarities to orthogneisses exposed 10-20 km southeast in the central area of the massif (Odemis-Kiraz). This work has implications for Aegean tectonics, the transition from

compression to extension in orogens overall, and for development of monazite as a geochemical and chronologic monitor of extension.

Extraction and identification of hypoglycemic polypeptides from the *Gymnema Sylvestre* plant, and bioactivity of hypoglycemic polypeptides

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Hypoglycemic polypeptides were extracted from *Gymnema Sylvestre* stems by blending and stirring. The mixture was then homogenized. Precipitate was collected. Identification of the protein was done by Thin-Layer Chromatography.

Effects of Cranberry Juice on Cell Viability and Nitric Oxide in Lipopolysaccharide-Stimulated RAW264.7 Murine Macrophage Cells

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Cranberry juice, made from American cranberries (*Vaccinium macrocarpon* Ait.), is a concentrated source of anti-inflammatory flavonoids such as anthocyanidins and proanthocyanidins. Regular dietary consumption of foods rich in such anti-inflammatory polyphenolic compounds protect against low-density lipoprotein (LDL) oxidation and elevated inflammatory marker expression, main contributors in the development of cardiovascular disease. Lipopolysaccharides (LPS) is an endotoxin used to stimulate an *in vitro* inflammatory response that mimics *in vivo* LDL oxidation in order to test the effects of various anti-inflammatory compounds. The objective of this study is to determine if varying concentrations of cranberry juice (0.02%, 0.039%, 0.078%, 0.156%, 0.31%, 0.625%, 1.25%, 2.5%, 5%, or 10%) reduce LPS-induced nitric oxide expression in murine macrophage cells (RAW264.7). Macrophage cells were cultured in Dubelcco Modified Eagle Media (DMEM) supplemented with 10% fetal bovine serum (FBS) and 1% penicillin and incubated at 37 °C in a humidified incubator with 5% CO₂ until 90% confluent. The cultured cells were treated for 24 hours with the different concentrations of cranberry juice diluted in DMEM. After the cranberry treatment, the cells were subjected to a 24-hour LPS challenge (500ng/uL). Cell viability and nitric oxide concentrations were assessed by the Resazurin and Griess Assays, respectively. Cranberry juice treatment did not reduce cell viability in comparison to LPS-stimulated control. As expected, LPS-stimulation resulted in a significant increase in nitric oxide production in comparison to the negative control (0% cranberry juice, minus LPS). The 10% cranberry juice treatment significantly reduced nitric oxide brought about by the LPS-treatment ($p < 0.0010$). Our results suggest that the supplementation of cranberry juice may help reduce inflammation, which is a contributing factor to the development of cardiovascular disease.

This study funded by Seretean Nutritional Sciences Undergraduate Research Scholarship and CHES at OSU.

Select Components of Dried Plum and their Effects on Bone Loss Induced by Hindlimb Unloading in the Female Rat

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Scope and Method of Study: Dried plums have been used medicinally for many years but only recently have been shown to reverse bone loss associated with hormonal deficiency and skeletal unloading. The aim of this study was to investigate whether the boron or polyphenols are responsible for mediating the effects of dried plum on bone. Fifty-four, 6 mo-old, female Sprague Dawley rats were divided into 6 groups and hindlimb unloaded (HU=5 groups) or kept as ambulatory (AMB=1 group). Following 4 wks of unloading, bone loss was confirmed in HU rats which returned to normal ambulation and the following treatments were initiated: control diet (HU-Con and AMB-Con), or control diet supplemented with dried plum (15% w/w; HU-DP), a comparable dose of boron (6.51 mg/kg diet; HU-Boron) or extracted polyphenols (125.1 g/kg diet; HU-PP). One group of HU rats received the anabolic agent, parathyroid hormone (PTH (80 ug/kg body wt; 3 x wk; HU-PTH) and served as a positive control. After the 12 wk treatment period, urine, serum and bone samples were collected and stored for analyses.

Findings and Calculations: Assessment of bone mineral density (BMD) using dual energy x-ray absorptiometry indicated the HU-PP group had similar 4th lumbar (L4) vertebral BMD as the HU-DP and HU-PTH groups. Likewise, PP had a similar influence on tibial BMD as DP, but did not reach the level of the PTH-treated group. Recovery of L4 trabecular bone volume (BV/TV) and thickness (TbTh) was comparable in the HU-PP and HU-DP groups. By comparison, boron was similar to DP in terms of connectivity density; it was unable to restore other microarchitectural parameters to the level of HU-DP group. No differences in trabecular number (TbN) and spacing (TbSp), or cortical parameters were observed with any of the treatment. The PP diet increased Von Mises stresses to that of DP, but like boron, was unable to enhance overall bone strength to the level of DP. No alterations were observed in biochemical markers of bone metabolism at the end of the 12 week treatment period; however the HU-DP and HU-PP groups experienced a significant increase in urinary calcium excretion. We conclude that treatment with polyphenol extract has comparable effects to that of dried plum on bone density and several indices of trabecular bone microarchitecture following unloading, but further investigation into its mechanism of action are needed.

Body Composition changes in collegiate wrestlers over the course of a season

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PURPOSE: The purpose of this study was to examine the changes in body composition in collegiate wrestlers over the course of a season. METHODS: Ten Division I collegiate wrestlers (Mean Age= 19.5 +/- 1.17 yrs, Mean Ht.= 60.5 +/- 4.26 in, Mean Wt.= 182.4 +/- 23.27lbs), volunteered for participation in this study. Body composition was recorded pre-season, mid-season, pre-nationals and post-nations. The body composition was measured using a skin-fold caliper. A one-way repeated measures ANOVA and Tukey's Post Hoc were used to determine significance. RESULTS: There was statistical significance in the change in body composition from pre-season to post-national (P=0.41). There was no statistical significance in pre-

nationals to post-nationals body composition. **CONCLUSION:** There is a significant change in body composition for collegiate wrestlers over the course of a season. However, due to the limited number of participants in the study, starters as well as bench players had to be used. Pre-nationals and post-nationals testing may have been skewed because of these different levels of participation.

Relationship of Detection Station Size and Food Volume to Initial Visitation by Termites (Isoptera: Rhinotermitidae)

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Termites are damaging structural pests in the United States and play an important role in many ecosystems. Recent increases in the use of more directed termite control techniques have helped to renew an interest in basic termite ecology. A study was conducted on an Oklahoma native tallgrass prairie to investigate termite foraging behavior relative to monitoring station diameter and food source volumes. This study was installed in a split-block design and evaluated weekly. In this ongoing study, initial data indicate an increased number of larger diameter stations become active with termites compared with smaller diameter stations.

Characterization of Heterotrimeric G protein Signaling in *Dictyostelium discoideum*

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Heterotrimeric G protein-mediated signal transduction pathways regulate cellular processes in response to external signals. These pathways are basically comprised of a receptor, G protein and downstream effector. G protein-coupled receptors spanning the cell membrane receive extracellular stimuli and trigger the intracellular activation of heterotrimeric G proteins located along the cytosolic edge of the cell membrane. These activated G proteins then act upon downstream effectors to induce cellular responses. In higher eukaryotes, these pathways function in vision and the responses to many hormones and chemoattractants. Because signaling pathways can be difficult to study in complex organisms, simple eukaryotic models like *Dictyostelium discoideum* can be useful. This soil amoeba uses G protein-mediated signaling to detect and chemotax toward bacteria (food), but once depleted of nutrients *Dictyostelium* undergo multicellular development that includes cell differentiation and formation of a fruiting body.

G protein-coupled receptors (GPCRs) represent the largest family of eukaryotic cell surface receptors. Nine of these heptahelical proteins have been characterized in *Dictyostelium* and compilation of *Dictyostelium* genomic and cDNA data indicates the existence of forty-six additional GPCRs. Seventeen of these resemble human glutamate neurotransmitter receptors. Genes encoding two of these putative glutamate receptor-like (Grl) receptors have been disrupted through homologous recombination and verified using Southern blots. The initial phenotypic analysis of these mutants indicates that neither receptor is essential for the development of mature fruiting bodies, but continuing studies will examine if these receptors have a role in the temporal and/or spatial regulation of developing cells.

Downstream effectors of *Dictyostelium* G protein-mediated signal transduction pathways can influence gene regulation in response to extracellular stimuli. The *Dictyostelium* G α 5 heterotrimeric G protein is required for proper stalk development and inhibition of folate chemotaxis. Recently, a mitogen-activated protein kinase (MAPK) docking site has been identified on the G α 5 subunit and this site may be important for interactions with the MAPK Erk2 involved with folate and cAMP responses such as chemotaxis and gene expression. To study this potential interaction, the putative docking site on the G α 5 protein has been altered using site-directed mutagenesis. Developmental and chemotaxis assays are being performed to investigate the importance of this site. Because MAPK activity is often required in the nucleus, the impact of G α 5 function on Erk2 localization is being examined using a *green fluorescent protein:Erk2* (*GFP:Erk2*) reporter gene. For these assays, fluorescence microscopy is being used to detect the GFP:Erk2 fusion protein expressed in a variety of *Dictyostelium* strains that differ in G α 5 function.

Does A Nutrition Class Make a Difference?

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Presentation Subject Area: Biological Science

This study examined how a nutrition intervention class influenced students. Approximately 30 high school students were chosen to participate in the intervention. A pre-test was given to all the students, which evaluated their diet history, physical activity and knowledge of basic nutrition principles. Over a span of six weeks the students were taught about the basics of good nutrition, reading labels, portion sizes, selecting snacks and the MyPyramid.gov website. Healthy snacks were also provided for the students during each visit. This gave the students an opportunity to taste a variety of nutritious snacks and provide ideas of snacks they could make themselves. Nutrition games were also used throughout the six weeks in order to give the students hands on experiences as well as emphasize the lesson taught at that time. At the conclusion of the six weeks, a post-test was given to the students as a way to measure if their eating and/or physical activity habits, as well as nutrition knowledge had changed. As a result of the six-week class, 74% of the students knew the number of calories the average person should consume; this was an increase of 63% from the beginning of the class. Seventy-four percent of the students said they would like to know more about nutrition and more than 25% of the class answered all the questions correctly on the nutrition label post-test. Through this research it is apparent the majority of high school students lack knowledge about nutrition and physical activity.

Nutrition education in the school is important in order to decrease the prevalence of childhood diseases, help children make healthier lifestyle choices, and increase their daily physical activity levels. Schools can play a pivotal role in promoting healthy lifestyles and physical activity in the lives of children.

Nanoindentation of Single Crystal Gold Nanowires

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Measurement of the mechanical properties of nanowires by indentation becomes difficult because of the influence of the curvature and substrate. The most widely used method to measure these properties is the Oliver-Pharr method (OP). However, Nix's group (2006) showed that OP method overestimates the contact area and contact depth in soft materials, thus underestimating the hardness and young modulus which makes use of these variables. Joslin-Oliver (JO) method can give better approximation for the hardness of soft materials because this method uses the term P/S^2 which does not depend on the indentation depth and contact area. JO method works well for the thin film systems having similar moduli such as gold film on a glass substrate. Single crystal gold nanowires of about 230 nm height, 1300 nm width and 200 μ m length were fabricated between two gold electrodes on a glass substrate using ENFilADIng (Electrochemical Nano-Filament Assembly with Directed Interfacing). The load-displacement behavior is measured using a nanoindenter which are analyzed using the JO and the OP method to obtain the hardness and modulus. The results from the two methods are compared with each other.

Hurricane Katrina: Older Adults and Substance Abuse

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Presentation Subject Area: Social Sciences

Abstract not received

Evaluation of genomic variation in *Spiroplasma kunkelii*

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Presentation Subject Area: Biological Sciences

Corn stunt causes significant losses in maize in many countries of the Americas. Resistant genotypes have been identified, but the re-emergence of corn stunt in some resistant cultivars suggests that such resistance may lose effectiveness over time. One possible explanation for this phenomenon is the emergence or influx of new mollicute pathotypes. With the ultimate goals of determining the extent of genetic variation of the causal agent, *Spiroplasma kunkelii*, and estimating its potential to generate new pathotypes, we evaluated the suitability of REP-PCR and sequence analysis of selected genes to discriminate among four isolates of *S. kunkelii* from Argentina, Costa Rica, Florida and Mexico. No DNA polymorphisms were revealed using REP-PCR with the commonly used BOX, ERIC or REP primers. Because spiroplasma genomes contain multiple insertions of viral origin, we designed primers specific for two spiroplasma viruses, C74 and R8A2. Again, no polymorphism was detected. Sequence comparison of genes encoding for the membrane proteins spiralin and P58, and of selected viral insertions, showed 100% homology among the isolates tested. This

preliminary information indicates that the isolates of *S. kunkelii* included in this study share a strong similarity at the DNA sequence level. Ongoing experiments involving additional isolates and other approaches will clarify the similarities and/or the variation of DNA composition within and among natural populations of *S. kunkelii*.

Representations of Black Masculinity in Lynching Photography

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Presentation Subject Area: Humanities

Representations of black masculinity have developed and shifted with time. In many regards, they have become metapictures: representations of representations. Meaning, these images have come to represent the status of the entire black community. From the growing culture of amateur photography in the early 20th century, the legacy of lynching became public. For the black community, these photos represented a portion of history which many hoped would be forgotten. This study seeks to answer two questions regarding lynching photos: How do these images complicate race and gender relations in America? How have these images helped shape representations of black masculinity? Analyzing the lynching photos in *Without Sanctuary* by Hilton Als, the following research will attempt to answer these questions while exploring the depth to which they still linger in the American imagination.

Cloning and Co-Expression of Human and Bovine CD 11 and CD18

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Presentation Subject Area: Biological Sciences

The leading cause of economic loss in the United States' cattle industry is Bovine Respiratory Disease (BRD). During BRD, *Mannheimia* (*Pasteurella*) *haemolytica* increases leading to Bovine pneumonic manheimiosis (BPM). This BPM is caused by a leukotoxin produced by *Mannheimia haemolytica* which is known only to intoxicate ruminant leukocytes and platelets. This leukotoxin (Lkt) produced by *Mannheimia haemolytica* is a member of the Repeats in Toxin (RTX) family of pore-forming cytotoxins and is known to act on α and β integrins (Bovine CD 11 and 18). Although previous studies have shown that α integrins are the receptor for the leukotoxin produced by *Mannheimia haemolytica*, recent studies have reported that CD 18 is necessary and sufficient to mediate Lkt induce cytolysis of cells and also that CD11 and CD18 both may be needed for cytolysis. These recent observations have raised the question whether the CD 18 of other β integrins such as Mac-1 can act as a receptor for *Mannheimia haemolytica* leukotoxin. Therefore, as a first step towards identifying the binding regions of *Mannheimia haemolytica* leukotoxin towards bovine CD11 and CD18, we have co expressed the Bovine and Human CD 11 and 18 in four different combinations in a mammalian expression vector to identify the functional role of these genes during *Mannheimia haemolytica* infections.

Land and Water Conservation Fund (LWCF)- Though Different Lens

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The Land and Water Conservation Fund (LWCF) provide federal matching funding to assist in preserving, developing, and assuring accessibility to outdoor recreation resources. From 1966 to 2005, nearly 1300 sites have been assisted by LWCF in Oklahoma. The funding has established outdoor recreation legacies for the public. However, although LWCF is statutory, LWCF needs to compete with other national programs for budgets. The funding has been unstable and shrunk as promised. To fulfill continuously growing demands of outdoor recreational resources the state need more strategically set formula for choosing LWCF sites. In addition to the scopes of projects, geographic distribution has been an important factor to appraise priorities for the funding.

The intent of this study is to assess whether the distribution of LWCF projects equitable by the amount of projects and the funding per capital in congress districts. The use of congress districts would indicate population factor and political power with geographic features.

Data collection includes all available data recorded and investigated from 1966 to 2005 Oklahoma Tourism and Recreation Department (OTRD) records which report project numbers, status, names, sponsors, locations, approved dates, scopes, and other 12 features of LWCF projects. The features are chosen to conduct statistical analysis and referential information for discussion. Congress districts boundaries are retrieved from Bureau of Census. This time frame encompasses all data from LWCF was enacted to current documentations. Projects located in Oklahoma City and Tulsa are identified to street level and projects other than in Oklahoma City and Tulsa are identifies to city level. SPSS 12.0 and ArcGIS 9.1 are used to conduct analyses. Both districts are compared to the amount of projects and founding. With additional features of this study Analysis of Variance (ANOVA) are conducted to valid the findings.

The results show that although LWCF projects are equally distributed across congress districts, the districts which cover smaller but relatively high populated districts have more funding than those districts with greater areas to cover but smaller population. To measure funding for districts without area factor the most unpopulated districts have more funding than those populated districts. The similar results indicate the two unpopulated districts have more funding per capital. Interestingly, Oklahoma City and Tulsa area sharing the similar stands show different in the amount of funding and funding per capital. The distribution pattern shows that LWCF generally minds more and provides recreation resources for rural areas where are concerned as lack of resources comparing to urban districts.

The Economic Impacts of National Park to the Local Region - Chickasaw National Recreational Area

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Presentation Subject Area: Social Sciences

Public land use is a major concern in the local or regional economic effect. The uses of private lands might bring in the economic sectors to the region, but the public land uses may create local economic activities via tourism which the private land uses may not achieve (Weiler and Seidl, 2004).

According to National Park Service, the 270 million visitors annually to the national parks make a significant contribution to the economy of the nation. The principal economic beneficiaries of this enormous visitation are in the food, lodging, and travel businesses. Other local and national firms benefit by providing services or supplies required for operating, maintaining and sustaining individual parks and the entire National Park Service. The National Park Service spends approximately \$300-\$400 million annually for goods and services acquired under contract.

The Chickasaw National Recreational Area is located in Sulphur, Oklahoma. The main activities in the park are camping, hiking, picnicking, fishing, hunting, swimming, and water skiing.

The economic effect estimation of the Chickasaw National Recreational Area is based on visitation estimation econometric model and the MGM2 model.

This econometric model used to estimate the number of visitation is based on the Weiler and Seidl's research in 2004. The variables in the estimation econometric model are annual Oklahoma state population (SP) and National Park Service net visitors (NPSNV). The data of variable SP are based on the estimation on July 1 each year from U.S. Census Bureau.

MGM2 estimates the impacts that park visitors have on the local economy in terms of their contribution to sales, income and jobs in the local area. The Money Generation Model produces quantifiable measures of park economic benefits that can be used for planning, concessions management, budget justifications, policy analysis and marketing. The paper indicates the economic impacts of national parks to the region and these economic impacts can be shown in details, such as different sectors. Through the MGM2 program, we can show how the economy of region would be affected by the public land use. This may help the policy maker to evaluate the results.

In this research, the results from MGM2 shows that visitors to Chickasaw National Recreational Area spent \$ 34.57 million dollars in 2003 which supported a total of \$ 35.12 million in sales, \$ 12.26 million in personal income, 911 jobs, and \$ 19.43 million in value added. These figures could clearly point out the economic benefits from Chickasaw National Recreational Area. This maybe a economic source to improve the local economy other than production firms.

The way of the combination of econometric and economic analysis can be used in a broader range. The public land use is always a concern to the public, such as national parks, and highway constructions. The economic impacts of these public land uses to the local area could be figure out by such method. This is maybe a good way to try to carry out a public policy.

The Application of Social Networking Concepts and Internet Social Networking Technology at the Local Level

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Presentation Subject Area: Social Sciences

Can an Internet social networking website employed to serve at the local level increase awareness and active community participation? In addition, can this social networking website help to establish connections between local groups?

Some researchers argue that the Internet isolates individuals from their local community. However, other research has shown that the Internet and social networking sites (e.g. myspace.com and Yahoo! 360) have the potential for creating online communities composed of members both local and distant. Furthermore, these same studies show that many online relationships move offline and vice versa. What remains to be explored is how local community organizations could utilize these social networking tools in order to further their own goals. In fact, we know very little about what kind of features local community organizations would use to accomplish their goals.

The goals of this project are twofold. First, the project seeks to explore through the use of qualitative interviews with local community members and groups what features of a social networking website would provide additional tools and be useful to active local organizations. The interview questions will help to identify interests, concerns, and needs of the local community. Second, using the data from these interviews, a social networking website will be constructed that seeks to serve the local community.

Novel Environmentally Friendly Metallo-Organic Corrosion Inhibitors

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Presentation Subject Area: Physical Sciences & Technology

Chromate conversion coatings provide excellent corrosion protection but environmental factors are driving the search for a replacement. Therefore, we have developed and tested metallo-organic replacements for chromate that combine into a single compound several chemical constituents that are already known for their corrosion inhibitive properties in anticipation of synergistic behavior. The general formula of these inhibitors is $(M)_x(\alpha\text{-hydroxyacid})_y(M_aO_b)_z$ where all three constituents are replaceable. Most commonly used constituents in our investigation were Ca^{+2} and Zn^{2+} as the metal cation, gluconic acid and benzoic acid as hydroxyacid, and molybdate, vanadate and borate as the complexed metal oxide. These were determined to be very effective corrosion inhibitors for aluminum alloys in weight-loss immersion tests. On the other hand, the simple metal α -hydroxyacid salts without the metal oxide complexes performed better for steel. Chromium (III) carboxylates which do not have the toxicity issues of chromates were also found to be beneficial corrosion inhibitors for aluminum alloys. Similarly, colloidal suspensions of chromium boron oxide and chromium hydroxide were also found to be effective replacement for chromates both in solution and in sol-gel coatings. In this research, numerous corrosion inhibitors for recirculating water systems and corrosion inhibiting coatings were developed. As well, several compounds were found to react with metal surfaces to generate conversion coatings that retard corrosion.

3D Mechanical Solid Modeling Using SolidWorks 2004

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Presentation Subject Area: Physical Sciences & Technology

The purpose of this research is to gain a basic mastery of SolidWorks 2004 and CosmosExpress. SolidWorks is a widely used computer aided design software used by engineers and other professionals

interested in creating both simple and complex 3D models. CosmosExpress, a finite element system included in the SolidWorks software, performs stress analysis and heat transfer tests on SolidWorks models.

Dynamic Fracture Simulation using Generalized Interpolation Material Point (GIMP) Method and Cohesive Zone Model

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The dynamic crack growth is simulated by implementing a cohesive zone model (CZM) in the generalized interpolation material point (GIMP) method. Multiple velocity fields are used in GIMP to enable it to handle discrete discontinuity on each side of the interface. Multilevel refinement is adopted in the region around the crack-tip to resolve higher strain gradients. Numerical simulations of the crack growth in a homogeneous elastic solid under mode-II plane strain conditions are conducted with the crack propagating along a weak interface. A parametric study is conducted with respect to varying impact speeds ranging from 5 m/s to 60 m/s and cohesive strengths from 4 MPa to 35 MPa. Numerical results are compared qualitatively with the available experimental results. The simulations are able to handle crack growth with crack-tip velocities in both sub-Rayleigh and intersonic regimes.

Use of a Novel Biomaterial to Repair Mandibular Defects

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Mandibular defects, which are often characterized by fractures or a loss of bone, are usually caused by trauma or cancer removal. Up to this point, autogenous bone has typically been used to repair these defects. Autogenous bone grafts are created by taking bone from a person's own body, usually from the hip, and inserting it in the reconstruction site, where it will then (hopefully) regenerate and repair the defect. This process requires that the patient be subjected to another surgical location and more complicated procedures, in addition to increasing the risk of infection.

A leading developer of advanced medical products has recently created a novel artificial osteoinductive biomaterial consisting primarily of titanium to be used as an implant to help repair mandibular defects. Titanium has long been regarded as one of the best materials to use as an implant in the human body due to its unrivaled properties of strength, biocompatibility, and longevity. However, this new implant is unique because it is porous titanium. In theory, it will allow bone to regenerate throughout the pores in the implant, further strengthening the defective area and stabilizing the implant. This would be extremely beneficial to patients because the mandible is a high-stress area that requires structural soundness.

In spring of 2007, several veterinarians from the Oklahoma State University College of Veterinary Medicine will be collaborating with a number of oral-maxillofacial surgeons and residents from the University of

Oklahoma to test this biomaterial for efficacy and safety. Using dogs as a study model, the researchers will compare the performance of the new implant to that of autogenous bone grafts.

Ten medium sized, mixed breed dogs will be randomly assigned to five groups. One of the dogs in each group will be given a traditional autogenous bone graft and serve as a control. The other dog will receive a porous titanium implant that has been custom molded to fit the mandibular defect. Implant performance will be compared to the autogenous bone graft performance at 3, 6, 12, and 18 months post-operation. Bone growth throughout the implants will especially be examined. This study will allow researchers to study both the short- and long-term effects of the implants compared to autogenous bone grafts.

If this implant is effective, its use in future surgical procedures could prevent thousands of people from experiencing additional pain and complications due to surgery, improving their quality of life. Examples of other possible benefits include reduced rate of infection, reduced pain due to having only one surgical site, and increased strength/longevity of implants.

Impact of Parental Education and Past Achievement on College Persistence

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Presentation Subject Area: Education

Current literature is divided over whether higher education institutions can directly affect higher student persistence or whether demographic and social factors play a larger role. This study explores the relationship between student persistence in postsecondary education and parental education level combined with prior achievement. Multiple regression analysis seems to suggest the father's education level plays a significant role in how important a student feels it is to persist when pursuing their postsecondary education.

Structural Studies of Bam35 P3 with Current Emphasis on Optimization of Protein Expression

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Bam 35 is a dsDNA icosahedral bacteriophage that infects Gram-positive bacteria and is classified under the Tectiviridae family of viruses. The specific protein of the virus that we are looking at is the major-coat protein, P3. We assume the structure of Bam35 P3 to be very similar to that of PRD1 P3, the major-coat protein of the PRD1 virus, whose structure is known. Our reason to believe this comes from Bam35 and PRD1 having very comparable virion and genome order. PRD1 has already shown a correspondence to viruses in the Adenoviridae, Phycodnaviridae, and Iridoviridae families. The significance in studying the structure of Bam35 P3 is the further confirmation of a viral lineage among viruses.

The determination of protein structure is done through X-ray diffraction of the crystallized protein. In order to crystallize the protein, a concentrated and pure sample of the protein is necessary. To get to this point, the

protein is over-expressed in a strain of *Escherichia coli* containing the genetic information to produce the protein and is then purified using ion-exchange chromatography and FPLC. We reached this point with rather poor expression of the protein multiple times and no crystals were formed. Our efforts then turned to optimizing the expression of the protein.

We determined that the problem is occurring during the growing up process of our bacteria and have decided to find a broth that shows the most favorable expression. Since then we have tested our original broth with various amounts of glucose, broths from different vendors, broths that have been autoclaved and filtered, and are continuing further trials at the moment. For Bam35 P3 expression, the best conditions are prepared media from Ward's or Sigma without glucose. We have obtained the individual components of the Sigma formulation and have been able to obtain good expression in our media preparations that have been autoclaved. We will continue to optimize the expression of Bam35 P3 and work on purification and subsequent crystallization.

Glutamate Receptor-like Receptors of *Dictyostelium discoideum*

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Presentation Subject Area: Biological Sciences

G protein-coupled receptors (GPCRs) represent the largest family of eukaryotic cell surface receptors. Investigation of these receptors, employing both genetic and biochemical approaches, in simple eukaryotes such as the social soil amoeba *Dictyostelium discoideum* can provide important insight into receptor function. *Dictyostelium discoideum* uses G protein-mediated signaling for various aspects of vegetative growth and development. Nine GPCRs, including four (cAR1-cAR4) that respond to exogenous cyclic AMP and three (Cr1A-Cr1C) cAMP receptor-like proteins, have been previously characterized in the soil amoeba.

Compilation of *Dictyostelium* genomic and cDNA data indicates the presence of seventeen human glutamate receptor homologs. Genes encoding two of these putative glutamate receptor-like (Grl) receptors, GrlE and GrlH, have been disrupted through homologous recombination and verified using Southern blots. Phenotypic analysis of these receptor mutants, including complementation and over-expression assays, will lead to elucidation of these receptor's roles and provide additional insights regarding *Dictyostelium* development and vegetative growth while extending the known functionality of similar proteins in higher eukaryotic systems.

Reclaiming Paradise: The Quest for Eden in Environmental Literature

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Presentation Subject Area: Humanities

The Garden of Eden myth is symbolic of how humans perceive the innocence and purity found in unspoiled nature. My study looked at three environmental literature selections: *Pilgrim at Tinker Creek*, *The Monkey Wrench Gang*, and *A River Runs Through It*. In each of these selections, the main characters seek out spiritual truth in nature by finding their own Eden within their local environments through acts of baptism,

sacrifice, and communion. Annie Dillard, the agnostic, finds salvation in the realization of God at Tinker Creek. George Hayduke, the martyr, seeks salvation through the triumphs of his personal crusade against the industrialization of the Southwest. Paul and his brother seek salvation through mastering the art of fly fishing in the rivers of Montana. Each character finds spiritual salvation through their intimate relationship with their local environment.

Developing a Scale to Identify and Measure Educators' Intuitive Characteristics

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Presentation Subject Area: Education

The purpose of this study was to develop and validate a scale to identify and measure educators' intuitive characteristics. The scale items were extracted from current literature in the areas of education, nursing and management. Subject matter experts from education were asked to review the items for accuracy and focus. After review and editing a final version of the instrument was created. The instrument sought to identify 7 core characteristics of intuitive professionals. A total of 28 items were created. Ultimately analyses discovered a 5 factor solution defining the intuitive attributes of teachers.

Investigating Teachers' Perceptions of Their Own Intuition and Decision Making Abilities

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Presentation Subject Area: Education

This was the first phase of a larger, on-going project to understand K-12 teachers' decision-making abilities. Specifically, the information presented here represents a qualitative study designed to ascertain teachers' own perceptions of their decision making processes. In particular, each subject was asked what role, if any, does intuition play in making these decisions and, if so, how does it manifest itself in their practice? Two subjects were interviewed and observed in the classroom. After a review of the data there emerged 3 consistent themes: the importance of caring, the desire and need to be reflective and lastly, acknowledgment of the use of intuition.

Seasonal Changes of Quadriceps Femoris Percent Decline in Collegiate Wrestlers

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Presentation Subject Area: Education

PURPOSE: The purpose of the present study was to examine the changes in percent decline of the quadriceps femoris muscle in college wrestlers. **METHODS:** Ten Division I collegiate wrestlers volunteered for participation in this study. Age, height, body weight, initial peak torque (IPT), and final peak torque (FPT) was recorded pre-season, mid-season, pre-nationals, and post-nationals. The IPT and FPT of the quadriceps femoris was recorded isokinetically using a Biodex III isokinetic strength tester. Subjects were in the seated position on the Biodex and proceeded to performed 50 maximal leg extensions at 180 degrees per second with their dominant limb. The IPT and the FPT were recorded and used to calculate percent decline. **RESULTS:** The results of the present study indicated that there was not a significant ($p>0.05$) change in percent decline during the seasonal test times. **CONCLUSION:** Repeating maximal contractions causes a decline in torque production and can give us an idea of the fatigability of muscle. Competing throughout a wrestling season is a long difficult process. It is possible that at various points during the season a wrestler may be more susceptible to fatigue; however, in the present study the wrestlers were able to maintain percent decline values.

An analysis of the impact of sustainable interior design on wellness in assisted living for the elderly in the United States

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Presentation Subject Area: Environmental Sciences

A major shift in elder housing is about to come to fruition in the United States. The 'Baby Boomer' generation, the largest block of the population, will soon reach retirement age and will not be reluctant to use their considerable social and financial influence to impact the way our society cares for and housing its most aged citizens. Assisted living is currently the most popular form of elder housing in the U.S. Many senior citizens are choosing to live in these facilities rather than attempting to age in their own homes or be placed in a nursing home.

A reason for this choice is that assisted living facilities provide amenities that contribute to wellness. Dr. Bill Hettler of the National Wellness Institute created a model of wellness that includes six dimensions: physical, social, emotional, intellectual, spiritual, and vocational. Viewed in combination, these dimensions lead to an overall sense of health and well-being in the elderly. The physical environment is an important factor on an individual's perception of their level of personal wellness.

Sustainability and environmental issues have reached the mainstream consciousness in the United States over the past 30 years. Currently 'green' design is being applied to a variety of construction types. A connection between health and the built environment is the subject of current research around the world. Assisted living is a building type where the combined practice of sustainability and healthcare can come together to promote and enhance senior wellness.

The importance of this research is the application of environmentally sustainable building practices with a new concept of whole-person wellness in the design of assisted living facilities for the burgeoning Boomer population in the United States.

Correlation Between Urinary AICA Levels and Insulin Resistance

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Presentation Subject Area: Biological Sciences

Purpose of the Study: The ability to respond to insulin varies greatly among individuals. This resistance to the action of insulin has been linked to several important chronic diseases including diabetes and cardiovascular disease. Diet and exercise can improve insulin resistance and one of the mechanisms explaining their beneficial effect is the activation of AMPK, an enzyme regulating cellular energy balance. There are several pharmacological compounds used experimentally to activate AMPK. Among these, AICAR (5-Aminoimidazole-4-Carboximide-1- β -D-Ribofuranoside) has been used in vitro and in animal models and proved to improve insulin stimulated glucose transport by activating AMPK. AICAR is produced in small quantities in the human body as part of purine metabolism and excreted into the urine. The role for endogenously produced AICAR on insulin resistance is not known. It is conceivable that high production of AICAR measured as AICAR concentration in 24 hour urine may be related with low insulin resistance. **Research Question:** Are 24 hour urinary AICAR levels correlated with insulin resistance? **Methods:** The Glucose Disposal Rate (GDR) measured during a hyperinsulinemic euglycemic clamp in 50 healthy volunteers with different degrees of insulin resistance was correlated with 24 hour urinary AICAR levels measured with a colorimetric assay. **Results:** In a preliminary analysis on 12 subjects 24 hour urinary AICAR levels were not correlated with Glucose Disposal Rate ($r=-0.3$, $p=0.8$). **Conclusion:** Preliminary analysis suggest that 24 hour urinary AICAR levels are not correlated with GDR, suggesting endogenous AICAR production does not play a major role in insulin resistance.

Predicting Cardiovascular Disease in Stillwater, Oklahoma: Regression analysis of the Framingham risk score

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Presentation Subject Area: Social Sciences

Cardiovascular disease (CVD) has been the #1 killer in America since 1900, accounting for about 37.3% of 2.4 million deaths annually. The most recent estimates (2003) indicate that 71.3 million Americans have some form of CVD, resulting in more than 403 billion dollars in medical expenses. Oklahoma is the second leading state in the number of deaths (300.1) due to CVD (per 100,000 population), exceeding the national average by more than 67 deaths per year. In the last decade, heart disease caused 39% of deaths in Payne County. The purpose of this pilot study was to identify physiological and lifestyle risk factors that could strengthen the Framingham Risk Score (FRS) in predicting CVD in Stillwater, Oklahoma. Data was collected from cardiac patients ($n = 120$), seen between June 2006 and November 2006 at a local cardiology

practice. A standard multiple regression was conducted, with FRS simultaneously regressed on the set of 10 predictors (TG, LDL, FH, MS, AC, AL, HR, BMI, EF, and Diet). Given this predictor set, there was a significant amount of FRS variation [$R^2_{\text{frs}} = .171$; $F_{\text{cal}(10,109)} = 2.243$, p-value = .020]. Findings suggest that TG ($t = 2.852$, p-value = .005) can be added to the Framingham model in better predicting CVD. Increasing sample size may lead to additional meaningful predictors, as well as significantly increasing R^2 and the F-value. Further investigation is needed to determine the best combination of risk factors that would construct the most accurate model for predicting CVD.

The role of ERK2 map kinase in G-alpha subunit mediated signaling in Dictostelium

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Presentation Subject Area: Biological Sciences

The ability of an organism to detect and respond to extracellular signals plays a critical role in processes ranging from movement and metabolism to growth and development. In eukaryotes a sizable portion of these signals are mediated through G-protein coupled receptors and associated heterotrimeric G-proteins, as well as, down stream components including Extracellular Signal Related Kinases (ERKs a part of the MAPK family). In Dictyostelium G-protein function has shown specificity of G-alpha subunits to specific receptors associate with specific signaling pathways. G-alpha 2 mediates responses to cAMP. G-alpha 4 mediates response to folic acid. These pathways are also known to utilize ERK2 (one of two ERKs in Dictyostelium) in its signaling. G-alpha 5 is poorly characterized but has suggested an antithetical role to G-alpha 4, preventing chemotaxis to folic acid. Also G-alpha 5 contains a putative MAPK docking site, suggesting a possible interaction between G-alpha 5 and ERK2. In order to further clarify the pathways mediated by G-alpha subunits, specifically G-alpha 5, and to determine their dependence on ERK2, chemotaxis to folic acid is being studied in an ERK2-null strain. By analyzing changes in chemotaxis within a folic acid gradient, we hope to discern if ERK2 is critical for G-alpha subunits to carry out their signaling duties. In addition, ERK2 is known to migrate to the nucleus and phosphorylate transcription factors, as do many MAPKs; therefore, altered gene expression may be a result of G-protein signaling. The expression of discoidin is known to be repressed due to signaling through G-alphas 2 & 4, so the question of ERK2's involvement in discoidin expression is raised. To examine, this the expression level of discoidin will be examined in an ERK2 null background and with an over expression of G-alpha subunits.

Bringing books to life: What key literacy elements captivate young children

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Presentation Subject Area: Education

This poster is based on a small study involving three kindergarten teachers and their views and use of story-telling in the classroom. The teachers interviewed looked at books and story-telling as the same entity except that they made the books themselves come to life through story-telling approaches. I realized that this was not the avenue I had originally pursued, but have found it very exciting to follow these transformations. There will never be any dispute in the early childhood classroom about the importance of books and learning

to read. What this research offers however are elements that make those experiences with books fun and exciting for young learners.

Out of the multitude of children's books, each of the three interviewees mentioned three of the same books among their list of favorites. Those included *Brown Bear, Brown Bear, What do you See?*, *No, David*, and *The Very Hungry Caterpillar*. They also discussed key elements each of these books offered to the children. Six literacy elements that emerged from the data included: a sense of fun, colorful pictures and illustrations, age appropriate language, repetitive lines, limited number of characters, and an easily identifiable plot which is also easy for a child to relate to. I am sure there are more critical elements that help to captivate children through story, but these six in themselves can be broken down into even smaller aspects and offer a wealth of information that can be utilized by instructors to help develop a sense of joy through reading and telling stories.

An Assessment of the Research and Extension Educational Needs of Oklahoma Canola Producers

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Presentation Subject Area: Social Sciences

The Oklahoma Cooperative Extension Service has worked diligently to discover, through research, ways that canola may benefit wheat producers and other producers through several routes. To aid producers with their entrepreneurial management of producing canola, extension educational programs and field days have occurred over the last five years. Since canola is a fairly new crop to Oklahoma, it is important for OSU faculty to be aware of canola production practice problems, as well as the needs of producers. Therefore, this study was initiated to assess canola producers' production problems including insects, weeds, diseases, and soil. Producers were also queried regarding their crop management practices and extension and education needs.

Findings from the study will be used by the Entomology and Plant Pathology faculty at Oklahoma State University to plan and deliver research and educational programs for canola producers, as well to write a canola crop profile and a strategic pest management plan to submit to the Southern Region Pest Management Center.

An original 28-item survey was developed and pilot tested for face, content, and construct validity with a panel of experts in canola production. The sample was drawn from the Oklahoma office of the National Agricultural Statistics Service (OK-NASS) to include all 80 registered canola producers plus 113 wheat farmers that had a high probability of producing canola (N=193). One week later a follow-up reminder postcard was mailed to all participants. 68 surveys were returned for a 35.23% response rate. The data were analyzed using Microsoft Excel® and reported using descriptive statistics.

Out of 68 returned surveys, only 30 respondents were producers who grew canola during the years 2002-2006 which allowed for the acquirement of usable data. The 30 respondents indicated that they had used Oklahoma Cooperative Extension resources and had visited with OSU personnel to learn about canola production practices and management. 86.67% of the respondents grew canola for rotational crop benefits; 90% indicated that "maximizing yield" was their greatest concern and was rated as *very important*; and the greatest insect problem was with aphids (frequency =25). Chemicals applied to treat pests were fairly

minimal. Though other pests, including diseases, insects, and weeds, transpired, 86.67% indicated that they do plan to grow canola in the future.

Predictably, respondents want to produce the highest yields at the lowest cost in order to reap the highest financial return. The results indicate to OSU faculty a variety of Extension research and educational programs that could be conducted to assist canola producers in Oklahoma. More research should be performed so that provisions would allow more farmers to begin or continue growing canola in the future and to identify further markets and aids necessary for producers to market their crop, such as the ever growing biofuel industry.

The Effects of a Religious Message and a Credible Source on Willingness to Donate Organs

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Presentation Subject Area: Social Sciences

Willingness to donate organs has been found to vary across different social and economic factors. The present experiment assessed whether or not exposure to a persuasive communication on the importance of organ donation that varied according to the source and the religiosity of the message would differentially affect organ donation attitudes. Participants viewed a paragraph on the importance of organ donation that was ostensibly written by a priest or a non-priest (one independent variable; source credibility) that either contained biblical references or not (second independent variable; religious content). Stated willingness to donate their organs was the dependent variable in this study. As hypothesized, the group that viewed the priest (source) was more willing to donate their organs than the other groups.

Seasonal Changes in Body Weight and Quadriceps Peak Torque in Elite College Wrestlers

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Presentation Subject Area: Biomedical Sciences

The effects of rapid weight loss associated with wrestling have a history of interest with investigators. It has previously been shown that performance decrements are associated with significant weight loss.

PURPOSE: The purpose of this study was to examine the changes in peak torque (PT) to body weight (BW) ratios in collegiate wrestlers. Measurements were taken during the pre-season, mid-season, pre-nationals, and post-nationals periods. **METHODS:** Ten Division I collegiate wrestlers volunteered for participation in this study. PT and BW were recorded during the times mentioned above. The PT of the quadriceps femoris was recorded isokinetically at 180 degrees per second using a Biodex III isokinetic strength tester. A one-way repeated measures ANOVA and a Tukey post-hoc were used to determine significance. **RESULTS:** Results indicated that neither PT in the leg extensors nor BW changed over the course of the season. Subsequently, there was no significant change in PT to BW ratios. **CONCLUSION:** The results of the present study indicated no significant change in PT throughout the course of the season. This information

could be beneficial for both wrestling and strength and conditioning coaches who try to minimize strength loss over the course of the year. Results also indicated no significant change in BW as well. A possible explanation for this is that only a portion of our subjects participated at nationals, and thus were required to maintain wrestling weight, while the rest of the sample was not required to maintain wrestling weight.

Relating Personality and Time Management Behavior to Perceived Stress

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Presentation Subject Area: Social Sciences

A possible explanation for why people handle stress differently may involve individual differences in personality and time management skills. In this study, the relationship between personality traits, time management behavior, and self-perceived stress were investigated using two theoretical models. The first model tested the mediating effect of time management on the relationship between conscientiousness and perceived stress. Specifically, the relationship between conscientiousness and stress was hypothesized to be completely mediated by individual differences in time management. The second model examined perfectionism as a moderating variable in the relationship between time management and perceived stress. The results from a path analysis supported the predictions of the first model: the statistically significant direct relationship between conscientiousness and perceived stress was reduced to a value near zero when the mediating effect of time management was assessed. The second hypothesized model was not supported by a regression analysis in which the interaction of perfectionism and time management was found to be non-significant. The results of this study provide a better understanding of how personality, time management and self-perceived stress are related, and suggest an avenue for helping individuals to improve their lives by reducing stress through increased efficiency in time management.

Interaction between GEF10 and ASK1 genes in Arabidopsis thaliana

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Presentation Subject Area: Biological Sciences

Guanine nucleotide exchange factors (GEFs) regulate transition of GDP to GTP-bound form of Rho family small GTPases which involve growth, development and environmental responses in Arabidopsis (Berken et al., 2005). On the other hand, Arabidopsis SKP1-like (ASK) protein is one key component of SCF ubiquitin-ligase complex in ubiquitin-mediated proteolysis; loss of function of ASK1, a member of ASK family, causes male sterility (Yang et al., 1999) and results in defects of organ development and auxin response (Gray et al., 1999). In our recent study, an F2 Arabidopsis segregation group between ask1-2 (a Ds transposon insertion mutant) and gef10 (a T-DNA insertion mutant) was examined and PCR markers were run to confirm the genotype. In the double mutants, although floral organs still demonstrate defective phenotype exactly like ask1 single mutant, male sterility conferred by ask1 was found partially rescued, with the evidences that viability of a fraction of pollen grains was recovered and reduced seed yield was observed. The rescue may be due to the presence of gef10. In addition, early leaves (mostly from first to fifth rosette leaf) in gef10 single mutant display the phenotype of polarized growth or bifurcate, suggesting GEF10 possibly plays its role by controlling Rho GTPase pathway and later loss of function of GEF10 is

compensated by other members of GEF family. Further Studies are underway to fully clarify the underlying interaction mechanism between GEF10 and ASK1.

Dynamic Modulus Testing of Oklahoma Mixes.

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Presentation Subject Area: Physical Sciences & Technology

The research project on Dynamic Modulus values (E^*) of Oklahoma mixes is on its way in the asphalt lab at OSU, Stillwater. Dynamic Modulus value is a complex number that defines the relationship between stress and strain for a linear viscoelastic material subjected to dynamic loading. This value will be used in the new mechanistic-empirical design of roads. This research project will develop a procedure where Oklahoma department of Transportation (ODOT) could approach level 1 reliability for hot mix asphalt (HMA) master curves without performing detailed dynamic modulus testing for each mix in a pavement system. This would result in improved pavement performance by providing HMA master curves with near level 1 reliability while using 2 or 3 material characterization cost.

The Effect of Relational Benefits and Commitments on Customer Loyalty

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Presentation Subject Area: Social Sciences

Establishing a strong long-term relationship with customers is vital for gaining a competitive advantage. This study adopted the relational benefits approach to understand the long-term relational outcomes. This approach views relational outcomes dependent on the customer's receiving relational benefits, including social, special treatment, and confidence benefits. While commitment has been recognized as a central construct in relationship marketing, there has been little understanding of continuance commitment compared to affective commitment on its relational outcomes in the hospitality industry. This study aims to identify the comprehensive relationship among relational benefits, affective and continuance commitments, and customer loyalty in the restaurant industry, especially for fine dining restaurants.

Examining Negative Teacher-Child Relationships and Ego-Resiliency as Predictors of Low-Income Children's School Adjustment

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Presentation Subject Area: Humanities

Many studies have shown that one cornerstone of children's adjustment is their ability to adapt to stress in socially appropriate ways. As young children make their transition from the early childcare environment to more structured schooling, their ability to manage stress due to new schooling experiences becomes increasingly important. Ego resiliency is defined as the ability of a child to modify his/her emotional reactions based on demands within the environment or 'emotional flexibility.' Research has shown that even in negative contextual environments, highly resilient children are often resourceful and can adapt to changing circumstances within various contexts, thus implying better socio-emotional adjustment; however the relationship between, resiliency and children's adjustment has not been examined within the context of a negative school environment. In response, this study seeks to examine: 1) The relationship between negative teacher-child relationships and low-income children's school adjustment, 2) The relationship between children's ego-resiliency and school adjustment, and 3) The interrelatedness among these contextual and dispositional factors. We predicted that negative teacher-child relationships will be related to more behavioral problems and less social competence in young children. Children's ego-resiliency, on the other hand, will be related to fewer behavior problems and social competence.

Effects of White Button and Maitake Mushroom Extracts on Intracellular Alpha-Defensin by HL60 Cells.

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Presentation Subject Area: Biomedical Sciences

Background: Mushrooms have been shown to possess anti-microbial activities by mechanisms that have not been fully elucidated. Their effects on defensins have not been previously investigated. Defensins are powerful antimicrobial peptides secreted by neutrophils and they regulate several immune responses associated with innate immunity.

Objective: The present study was conducted to test the hypothesis that one of the mechanisms by which mushrooms enhances immunity against infection is by induction of defensins in neutrophils. The rationale is that neutrophils are the predominant white cells in human blood and they play a central role in defense against infections.

Methods: We measured cellular levels of α -defensins 1-3 in HL60 cells, (precursors of neutrophils), (0.5×10^6 /ml) that were incubated with 0, 0.01, 0.1, 1.0, and 10 μ g/ml extracts of maitake (MM) and white (WM) - defensins were assayed α mushrooms without and with 2.5 μ g/ml for 48 h. α -defensins were assayed by enzyme immunoassay. Results were analyzed by ANOVA.

Results: In the absence of LPS, mushroom extracts increased intracellular defensin levels in a dose dependent fashion by 9%-88% for WM and 26%-132% for MM extracts ($p < 0.05$). In LPS-treated cells, the levels increased by 31%-125% and 60%-136% for WM and MM, respectively ($p < 0.05$). There was no synergy between mushroom extracts and LPS. At any concentration tested, boiling WM for 10 min or 30

min resulted in increased defensin levels in LPS-activated cells (6%-55%), but in general decreased them ($\leq 31\%$) in non-activated cells. Heat treatment of MM reduced defensin levels by 2-30%. Increased defensin levels are unlikely related to cell proliferation because mushroom extracts inhibited 3H-thymidine uptake by approximately 50% ($p < 0.05$). This is the first time that mushroom extracts (or nutrients) are shown to modulate defensin production.

Conclusion: Increased defensin levels may contribute to mushroom antimicrobial activity. Experiments are planned to identify the mechanisms involved in induction of defensins.

Source of support: NutriCore/USDA/Mushroom Council Grant # 580790706, Funds from the Dean of OSU, and the Research Institute for Children's Hospital in New Orleans.

OSU Smart Active Sensor

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Presentation Subject Area: Physical Sciences & Technology

Zigbee Wireless Sensor Technology based on IEEE 802.15.4 present in this research poster is currently under development by OSU Zigbee group from the ground up in both hardware and software. The sensors are designed to answer fundamental problems of traditional sensors such as non-standard-based, high cost, devices exhibiting low flexibility of integration. The sensors being developed by the OSU Zigbee group also emphasize extremely low power consumption, high reliability data capture and transmission, and interoperability for security and monitoring applications. The heart of the sensor hardware is the Zigbee Chipcon CC2420, Microchip PIC18 series microcontroller, and custom software based on Zigbee protocol. Zigbee Wireless Sensor Technology is being used for next generation automated manufacturing, with small transmitters in every device on the floor, allowing for communication between devices and a central computer. This new level of communication permits finely-tuned remote monitoring and manipulation never achieved before. In the consumer market, Zigbee Wireless Sensors are expanding with applications ranging from the linking of low-power household devices such as smoke alarms, to a house's central control unit, and even broader to centralizing light and security controls. Zigbee wireless sensor devices enable placement just about anywhere in your house or factory without wiring. Due to its low power consumption, a Zigbee Sensor can sustain itself on a small battery for many months to several years, making the sensor ideal for install-and-forget purposes, such as most household systems. Zigbee Wireless Sensors are currently applied in many applications here at OSU including Pipeline integrity, vibration container integrity, Chemical Mechanical Polishing of silicon wafers, and electric field probe monitoring systems.

Effects of Supplementation with Cherry on Bone Quality in a Rat Model for Ovariectomy

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Presentation Subject Area: Biomedical Sciences

The purpose of this study was to examine the antioxidant potential of cherry juice in an ovariectomized (OVX) rat model for osteoporosis. Female Sprague-Dawley rats were fed semi-purified powdered diets adequate to meet known nutrient needs of growing rats (AIN-G). At 90 days of age, they were randomly assigned to three groups. One group was sham-operated (SHAM) and two groups of rats were ovariectomized (OVX). One of the OVX groups received the same dietary treatment as the SHAM group and the other group was supplemented with 5% cherry juice from concentrate in the drinking bottle. The experimental period continued for 60 days. Rats were anesthetized, necropsied, and the tibia and 4th lumbar vertebra (L₄) were removed. Bone mineral area, content and density of the tibia were assessed using dual energy X-ray absorptiometry (DEXA) with high resolution software (Discovery QDR, Hologic, Waltham, MA). Bones were scanned at 20 micron intervals using microcomputed tomography (μ CT) (Scanco μ CT40, Scanco Medical, Ltd., Switzerland). Microarchitecture of the L₄ was evaluated on a contoured volume of interest (VOI) beginning and ending 200 microns from each growth plate. Force to compress the VOI was estimated using finite element analysis software. Data were analyzed using the Statistical Analysis System (SAS, version 9.1). A *p* value of <0.05 was accepted as significant. Based on the DEXA analysis, the OVX group fed cherry juice had significantly higher bone mineral area than the control group and tended to be higher than the OVX group fed the control diet. There was not a significant difference in bone mineral content between groups (*p*=0.18). Ovariectomy significantly reduced bone mineral density of the tibia. In the group fed cherry juice, bone mineral density was not significantly different from either the control or the OVX group. Analysis to date of cores of the L₄ using μ CT showed highly significant changes in trabecular bone microarchitecture and strength due to ovariectomy but no benefit from supplementation with cherry. Analysis of cortical bone using μ CT is underway. Consuming some fruits and vegetables inhibits bone resorption, which may be because of their antioxidant content. Cherries contain an abundance of antioxidants and were previously assumed to have beneficial effects on bone quality. Under our experimental conditions, cherry juice did not inhibit bone loss due to ovariectomy. (Supported by Niblack Research Scholars Program)

Perceptions of Personality in a Case of (Un)Ethical Decision-Making

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Presentation Subject Area: Social Sciences

The Chief Executive Officer (CEO) and the Chairman of Enron, Kenneth Lay, was recently convicted of illegal actions that cost many Enron employees substantial amounts of money through the loss of jobs, pensions, and other benefits. As Mr. Lay rose to the level of CEO of a major corporation (Enron), with corresponding growing earnings; he may have begun to sacrifice ethics for the increased earnings (and corresponding power). One hypothesis for Lay's behavior might be that he has a personality, which is prone towards valuing earnings (and power) more than the ethical treatment of people. This may be generalizable to other people, besides Kenneth Lay, to more generally explain the social psychological factors that contribute to unethical behavior. For this research, we used content analysis of media print to examine the Kenneth Lay-Enron incident by exploring how the media depicted Mr. Lay. We searched newspapers and

magazines for descriptions of Mr. Lay at various career (and earnings) stages to determine whether he was depicted as increasingly unethical over time, as his power and earnings increased.

Quality of Work Life and Perceived Mission Effectiveness Among Fire Fighters

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Presentation Subject Area: Social Sciences

Quality of Work Life (QWL) reflects the concept that employees' develop a comprehensive mindset for evaluating the ways in which work affects his or her life (Sirgy, Efraty, Siegel & Dong-Jin, 2001). This multi-faceted concept goes beyond the simple job satisfaction mindset. QWL encompasses additional issues such as economic and family needs, health and safety needs, social needs, esteem needs, and actualization needs.

A unique organizational perspective can be seen in fire departments given the amount of stress experienced by firefighters (Cowman & Ferrari, 2004). Given that firefighters engage in high-risk behaviors and work in shifts that may not be conducive to stable family involvement, management and society may be particularly interested in a research approach that systematically assesses QWL effectiveness.

The target population involved in this study consisted of 71 firefighters within a medium-sized city located in the southern United States. The QWL survey was administered through a third party, online source. Forty-two firefighters completed the survey for a response rate of 59%.

The purpose of this study was to assess the perceptions of the QWL among fire fighters with respect to their perceptions of the department's ability to effectively serve the community. Results showed that each dimension of the fire fighters' perceived Quality of Work Life was positively correlated with their perception of the department's effectiveness in serving the community. Furthermore, results of the multiple regression showed that the dimension of QWL health/safety training and the fire fighters' sense of actualization accounted for significant variance in their perceptions of effectiveness.

References

Cowman, S. E., & Ferrari, J. R. (2004). Mediating effects of social support on firefighters' sense of community and perceptions of care. *Journal of Community Psychology*, 32, 121-126.

Sirgy, M. J., Efraty, D., Siegel, P., & Dong-Jin, L. (2001). A new measure of quality of work life (QWL) based on need satisfaction and spillover theories. *Social Indicators Research*, 55(3), 241-302.

Depressive Symptoms: Aging Adults Impacted by Hurricane Katrina

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Presentation Subject Area: Social Sciences

To examine the psychological effects of Hurricane Katrina on aging adults, an analysis of depressive symptoms reported by long-term residents of Baton Rouge and surrounding areas and displaced families from New Orleans and surrounding areas was conducted. It was hypothesized that long-term residents would be less likely to report depressive symptoms than displaced individuals. The sample was comprised of 84 displaced individuals and 85 long-term residents. The majority of respondents in both categories ranged in age from 60 to 89; the mean age for both groups was 70. The dominant race for both groups was African American. Responses to the 10-item version of the Center for Epidemiological Studies Depression scale revealed that 39% of displaced adults reported rarely or never feeling lonely, having restless sleep, and being bothered by things that do not normally bother them. 36% - 37% reported rarely or never feeling depressed or feeling like they made an effort. 44% said they rarely or never had trouble focusing. 48% always felt hopeful about their future. 58% said they rarely or never feel fearful. Only 5% reported always feeling bothered, having trouble focusing, feeling fearful, and feeling like they just could not get going. 67% reported being happy occasionally or all of the time. Approximately 65% of the long-term residents reported rarely or never feeling depressed or having trouble getting going. 68% said they rarely or never feel fearful. 62% said they rarely or never feel lonely. 53% of the residents are almost always happy. 64% reported almost always feeling hopeful. 53% rarely or never have restless sleep or feel like they've made an effort. 51% reported rarely or never having trouble focusing. 58% said they rarely, if ever, are bothered by things that don't normally bother them. Findings suggest that displaced residents displayed slightly more depressive symptoms than long-term residents. However, being that the majority of the displaced residents lost everything, they seem to be resilient and able to cope with their loss.

Stressed Out Plants: ROS Induced Stress in *Arabidopsis thaliana*.

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Presentation Subject Area: Biological Sciences

When *Arabidopsis thaliana* is exposed to ozone, the result is a fluctuation in reactive oxygen species (ROS) leading to oxidative stress. Excess ROS buildup can produce visible symptoms in *A. thaliana*, such as cell death lesions. Also, accumulation of ROS leads to oxidation of proteins. Thus, *A. thaliana* can be used as a model system to characterize ozone induced stress, not only biochemically but also phenotypically. It is known that the response to ozone varies among different ecotypes of *A. thaliana*. For this experiment Wassilewskija (Ws), a sensitive variety, and Columbia (Col), a resistant variety, were used. By determining the proteins that undergo oxidation under ozone stress, we can better understand the mechanism of oxidative stress response and perhaps apply it in other fields. For this we will consider three objectives: first, ROS profiles were created for seven different time points, to determine the highest points of oxidation. Using a fluorometric based assay, it was found that ROS levels were highest at 4 hours and 16 hours following ozone exposure. After this, spectrophotometric based carbonylation assays will be performed on these time points of greatest oxidation. It is expected that carbonylation will correspond to these high ROS time points. The proteins which are being oxidized will then be determined using mass spectrometry and other techniques.

Pore Structure Analysis for Differentiation Under 3D Conditions

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Presentation Subject Area: Biomedical Sciences

The objective of this research is to grow and differentiate embryonic stem cells (ESCs) under 3-dimensional conditions (3D). The goal, in particular, is to test the differentiation of ESCs into cardiomyocytes. The problem with 2-dimensional (2D) differentiation is its inefficiency. A small percentage of target cells might be obtained, whereas the majority of the cells are discarded. With 3d differentiation, even though the experiment is done in vitro, the matrix will be more able to mimic conditions in vivo and eventually lead to a higher percentage of cardiomyocytes being derived from ESCs. Upon differentiation under 2D conditions, ESCs start dividing and forming aggregates called embryoid bodies. This enables the mass to have all 3 cell lineages (mesoderm, ectoderm, and endoderm) and depending on the presence of certain growth factors will then differentiate into a specified cell type. Embryoid body formation should be absent under 3d conditions, due to the cells binding to a porous matrix. This will allow the cells to inhabit pores which will do away with the need to form these embryoid bodies. Differentiation of embryonic stem cells in 2D shows that they have an affinity for gelatin due to its cell binding domain. One technique used to maintain undifferentiated mouse ESCs is the use of gelatin-coated tissue culture plastic in the presence of LIF (leukemia inhibitory factor). Using these results, 3D ES cell culture has been attempted. Gelatin, as a 3D matrix, is not mechanically strong. Gelatin is negatively charged, so an approach is to combine it with positively charged chitosan. Chitosan is a stable polysaccharide derived from the exoskeleton of crustaceans. By blending the two, in differing ratios, the pore structure of the dried product was analyzed via scanning electron microscope (SEM). The first step was to optimize chitosan-gelatin ratios to obtain a pore size suitable for cell growth. This is done by freezing different ratios of chitosan and gelatin at different temperatures. The solutions are freeze-dried and the formed scaffolds were analyzed for pore structure. The chitosan-gelatin scaffolds are frozen at -80°F and -20°F. An ideal pore size is in the range from 80 μm-150 μm and through SEM analysis this was optimized by freezing ratios of 1:3 and 1:5 chitosan-gelatin solutions at -20°F, then at -80°F prior to freeze-drying. Now the matrices are being seeded, and the cells will be cultured in media which will promote cardiomyocyte formation.

A Permutation Test for the Structure of a Covariance Matrix

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Presentation Subject Area: Physical Sciences & Technology

Many statistical procedures, such as repeated measures analysis, time-series, structural equation modeling, and factor analysis, require an assessment of the structure of the underlying covariance matrix. The classical parametric method of testing such a hypothesis involves the use of a likelihood ratio test (LRT). These tests have many limitations, including the need for very large sample sizes and the requirement of a random sample from a multivariate normal population. The LRT is also undefined for cases in which the sample size is not greater than the number of repeated measures. It is quite reasonable to think of many situations in which at least one of these conditions is violated. For example, in educational and medical studies, researchers frequently rely on volunteers, violating the assumption of a random sample; in psychological studies, responses are often recorded on Likert scales, violating the assumption of multivariate normality; and in studies in which experimental units are rare or costly, researchers are restricted to very small sample sizes. In such situations, researchers could benefit from a non-parametric testing procedure. In particular,

permutation tests have no distributional assumptions and do not require random samples of any particular size. This research involves the development and analysis of a permutation/randomization test for the structure of a covariance matrix. Samples of various sizes and number of measures on each subject were simulated from multiple distributions. In each case, the type I error rates and power were examined.

The Impact of an Intervention Program on the Life Skills of Elementary Students

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Presentation Subject Area: Education

Elementary students across the country have experienced problems with bullying, goal-setting, personal responsibility, and problem solving. As a result of these concerns, an intervention program was implemented in Northeastern Oklahoma to develop student's skills in these areas. This study investigated the overall success of an intervention program conducted in the schools. Results suggest that since the intervention program was implemented, students have increased skills in personal responsibility and bullying awareness.

The Impact of Arts Infusion on Student Reading Achievement

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Presentation Subject Area: Education

Student performance in education is of great concern today. In fact, with the No Child Left Behind (NCLB) Act, there has been increased pressure for students to perform well, as measured by standardized tests (Ashford, 2004). Math and reading are of particular concern since students are tested in these core areas; hence, teachers frequently focus their attention on these subjects and funds are often limited to these areas. As a result, the arts are often being neglected. When students are taught only the basic curriculum, the result is boredom, lack of achievement, and behavior problems (Respress & Lutfi, 2006). Project CREATES was implemented in at-risk schools to address student achievement through creative expression.

Project CREATES provides arts infusion to students in at-risk schools in order to improve teaching and learning strategies which may lead to academic achievement. Students who demonstrate interest or talent potential are given further instruction and opportunities. The current study examined the affects of Project CREATES, an arts infusion program, on student reading achievement.

A hierarchical linear regression was used to determine the relationship between teacher and student participation on reading achievement. Results indicate that teacher participation in Professional Development and student participation in strings Talent Development program significantly predicted student reading achievement.

A Comparison of Three Word-Based Software Programs Used for Augmentative and Alternative Communication

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Presentation Subject Area: Biomedical Sciences

We compared three different word-based software programs used in augmentative and alternative communication (AAC). These programs are made for individuals who can read and spell, but cannot use oral speech for functional communication. Information comparing these programs is needed to help make an appropriate match between the features of a given program and the skills of the potential user. Matching potential users with appropriate features of AAC systems is challenging because of the large variety of devices, software, peripherals, and manufacturers available for users of AAC. As is true for any area of high technology, specific features associated with AAC devices are constantly changing and clinicians need to be informed about new developments. This study analyzed data obtained using three AAC software programs (Word Power on the Mercury, Word Core on the Vantage, and Gateway Pro on the DV4) to better inform professionals about the programs. Twenty-seven participants were assigned to reconstruct nine sentences using each of three software programs. Units of measurement were developed to capture the efficiency and accuracy of sentence reconstruction. A series of analyses of variance were used to statistically analyze the data. Results indicated that the Word Power on the Mercury AAC device was the most efficient software program of the three software programs used in this study. Results of this study can be used to help educate AAC professionals in matching potential AAC users with word-based software programs that most closely fit their needs and abilities.

Benzo-Fused Heterocycles and Carbocycles by Intramolecular SNAr and Tandem SN2-SNAr Reactions

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Presentation Subject Area: Physical Sciences & Technology

Benzo-fused heterocyclic and carbocyclic systems have been synthesized by intramolecular SNAr and tandem SN2-SNAr reactions. Alcohol precursors for the synthesis of oxygen heterocycles were prepared in high yield from 2-fluoro-5-nitrobenzaldehyde using standard methods. Conversion of the alcohols to the bromides generated substrates for the preparation of nitrogen and carbon ring systems. Treatment of the alcohols with sodium hydride in dimethylformamide gave the benzo-fused six- and seven-membered heterocycles in 70-80% yields by an intramolecular SNAr reaction; five-ring closure was not successful. Treatment of the bromides with benzylamine in dimethylformamide gave the corresponding five-, six- and seven-membered nitrogen heterocycles in 35-98% yields by a tandem SN2-SNAr reaction. Finally, in a similar process, reaction of the six-ring bromide precursor with the dianion derived from dimethyl malonate gave the 6-nitrotetrahydronaphthalene-1,1-dicarboxylic ester derivative in 40% yield. The poster will summarize our results and give a mechanistic rationale for the observed yields.

Characterization of Oligonucleotide and Lipid Interactions

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Presentation Subject Area: Biomedical Sciences

Oligonucleotides or polymers with two to twenty nucleotides possess a negatively charged backbone. The negative charge of the backbone restricts oligonucleotides from gaining access to negatively charged cell membranes. In order to bypass cell membranes, the neutralization of the negatively charged backbone must be accomplished. Several methods are available to achieve this; however, the experiment will focus on the lipofection method to test the effectiveness of transfection.

Characterization of nucleic acids and lipids is done using fluorescence analysis technique. The QuantiT (TM) OliGreen(R) ssDNA Assay Kit is used to investigate the effects that caging nucleic acids will have on lipoplexing. In addition, different lipid to nucleic acids ratios are used to determine the amount of lipid needed to competitively bind the nucleic acid that would completely block the OliGreen(R) and nucleic acid interaction.

Alternative Mechanism of Translation in Cell Cycle Regulation

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Presentation Subject Area: Biological Sciences

Most yeast genes have short 5' untranslated regions (UTRs) (median length = 68 nucleotides). In contrast, many genes involved in cell cycle regulation have unusually long 5' UTRs of up to 300 nucleotides, suggesting they may be inefficiently translated by the typical, cap-dependent initiation pathway. To test whether these genes use an alternative translation mechanism involving Internal Ribosomal Entry Site (IRES), we used a bicistronic reporter that contained a cap-dependent translation Renilla luciferase (R Luc) and an IRES dependent Firefly luciferase (F Luc) to test sixteen cell-cycle genes for IRES activity. We found that eleven out of sixteen do in fact contain IRESs. We wished to know if the IRES activity of these genes is constant across the cell cycle (G1, S, G2 and M), or is restricted to a specific phase, which would suggest a possible role for translational regulation in cell-cycle control. These experiments are currently underway.

Laboratory and field evaluation of three organic insecticides for managing Harlequin bug, *Murgantia histrionica*, populations on leafy greens

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Presentation Subject Area: Biological Sciences

The Harlequin bug (HB), *Murgantia histrionica*, is a key pest of Brassica crops in North America. Populations in commercial production fields have been managed through use of synthetic insecticides. Numerous field and laboratory studies have shown that various synthetic pesticides effectively suppress

Harlequin bug populations. The HB has potential of becoming a serious pest in the absence of synthetic insecticides, as the case in organic production. Currently, organic producers have no reliable method of managing populations of this pest. Laboratory bioassays were conducted to determine response of the HB to three organic insecticides, Neemix 4.5, Entrust, and Pyganic EC 1.4. These studies were conducted in conjunction with field efficacy trials to verify results of the laboratory studies. Results indicated significant differences in response to the three insecticides. These results will be used in developing IPM programs for organic producers.

A comparison of emotional labor related behaviors between university food service student and non-student employees.

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Presentation Subject Area: Humanities

As the economy has shifted from one of manufacturing to more service oriented industries, job skills have changed as well. While employees are often hired for physical skills in factories, employees in service-related firms are hired for their ability to provide care for customers or guests. Restaurants or hotels do not only sell meals and rooms; they also sell service. Due to the nature of the service industry, the moment of interaction between a customer and an employee is a crucial factor determining the perceived quality of service. In most service jobs, employees need to perform intellectual, physical and emotional labor to provide the service product. Emotional labor is the management of displayed feelings as perceived by others. Emotional labor requires the worker to create an outward display of the desired emotional state. Some emotional labor has become such an integral part of job performance, that it is the focus in many job-training programs. Emotional labor is a form of emotional management that requires the employee to consciously make an effort to control his or her behavior toward another in order to perform their job. There are several reasons that emotional labor is particularly relevant. First, since service is produced and consumed simultaneously, the service encounter can be the quality determinant of the product. Second, because the service is intangible, the quality of service is not a given and cannot be guaranteed in advance. Third, service transactions are often face-to-face interactions. These factors demonstrate the importance of the employee's behavior at the time of encounter. In addition, this behavior often affects customers' perceptions of product quality. A limited amount of research has been conducted to examine the degree of employees' emotional labor in hospitality areas. The effects of individuals and organizational consequences have been overlooked despite the significant impact on other service industries. Past research has been conducted on behavior of hospitality employees. This resulted in the theory of emotional labor. Few studies, however, have sought to provide verification of differences in emotional labor by the hospitality segment or type of hospitality employee. This study aims to visit the idea that differences exist in the emotional labor between full-time permanent employees in university food service and students who work while attending school to pursue other aspirations. We plan to investigate and compare the degree and types of emotional labor employees use in their service provision. Fifty service providers in each segment will be randomly selected and surveyed regarding emotional labor and their work encounters. With the importance emotional displays and acts of caring that hospitality guests desire to consider their experience successful, it is vital that hospitality managers be able to evaluate the genuine concern for guests that their employees display. This information can be used in an effort to improve the guest experience.

Structural Studies of Anti-Cancer Drug Targets in Complex with the Human Retinoic Acid Receptor Gamma Ligand-Binding Domain

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Presentation Subject Area: Biological Sciences

Retinoic acid exerts its many biological functions (such as inhibiting the growth of human tumor cell lines) by interacting with the retinoic acid receptors, which are ligand-dependent transcription regulators. The human retinoic acid receptor gamma (hRAR γ), is a target for anti-cancer therapies. The ligand binding domain (LBD; residues 178-423), which is the portion of hRAR γ that specifically binds retinoic acid or drug homologs, has been cloned with a six-residue N-terminal histidine tag and over-expressed in *Escherichia coli*. The tag allows for purification of the protein using immobilized nickel absorption and gel filtration chromatography. Currently, expression and purification are being optimized and preliminary crystallization trials are underway with the LBD in complex with all-trans retinoic acid. The ultimate goal is to obtain X-ray crystal structures of the LBD in complex with novel heteroarotinoids, which have been shown to be affective anti-cancer agents against certain human cancer cell lines. Atomic resolution of the drugs interactions with the protein will aid in optimization of the drugs.

Growth of *Francisella tularensis* in hepatocyte cells

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Presentation Subject Area: Biomedical Sciences

The objective of this study was to establish an in vitro model of intracellular replication of *Francisella tularensis* in hepatocytes. *Francisella tularensis*, the etiologic agent of tularemia, is recognized as a virulent and highly infectious gram-negative coccobacillus. The pathogenesis of tularemia has not been elucidated although the organism's ability to invade and replicate within host cells appears to be the major cause of its virulence. The liver is a major target for this agent, and hepatic necrosis is a common finding in tularemia. Mouse hepatocyte cells, ATCC CRL 2390, were infected with either a virulent strain (Schu4) or an attenuated strain (LVS) of *F. tularensis* at MOIs of 250 or 500 for either 3 or 6 hours at 37°C in 5% CO₂. Following infection the cells were incubated for one hour with 10 µg/ml of gentamicin to kill extracellular bacteria after which the cells were washed and fresh medium added to each well. Hepatocyte cells were lysed with sodium deoxycholate at times 0, 24, and 48 hours and CFU counts were determined on each well. Both strains grew within hepatocytes. Although there were no significant differences in the number of intracellular bacteria immediately after infection, the Schu4 strain replicated to higher numbers within hepatocytes at both 24 and 48 hours post infection. Intracellular numbers of Schu4 were at least 10 fold higher than LVS at 48 hours. These results support the use of the mouse cell line (CRL 2390) as a model of in vitro intrahepatic replication by *F. tularensis*. Although both attenuated and virulent strains of *F. tularensis* were able to replicate within the cells, there was a significant increase in the intracellular replication of the virulent Schu4 strain compared with LVS. This model may be used to study mechanisms for cell entry, replication, and damage to hepatocytes by *F. tularensis* and has the potential to discern differences in strain virulence.

Sensor Based Modeling Of Copper Chemical Mechanical Planarization

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Presentation Subject Area: Physical Sciences & Technology

The complex process of Copper Chemical Mechanical Planarization is investigated. Primary application of this process is in the semiconductor industry. The yield of this process plays a pivotal role in deciding the “profit” of the organization.

Detailed study of the “Proprietary” chemical aspect of the process is carried out. A Taguchi L 12 experimental matrix is designed and implemented to investigate the effects of various process parameters on the Material Removal Rate (MRR) of the process. Two vibration sensors (accelerometers), one wired and one wireless are mounted on the polisher to monitor the dynamics of the process. Sensor data is acquired through a LabView DAS on a Personal Computer and analyzed offline. The surface quality of the polished wafer is measured using a MicroXAM, a Laser Interferometric Microscope.

A linear regression model is formulated which would help in predicting the MRR of the Planarization process. Key features are extracted from the sensor data, some of which can be used as surrogates to track the variations in the actual process parameters, which otherwise are not easily measurable.

The Principles of Non Linear Dynamics shall be used to come up with more faithful model for the same.

Aryl hydrocarbon Receptor and Dioxin Exposure Influence Hippocampal Neurogenesis in Adult Mice.

Joseph Point Du Jour

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Presentation Subject Area: Biological Sciences

Dioxin (2,3,7,8 tetrachlorodibenzo-p-dioxin; TCDD) is a ubiquitous and persistent environmental contaminant that mediates toxicity through interaction with the aryl hydrocarbon receptor (AhR), a ligand activated bHLH/PAS transcription factor known to regulate the expression of drug metabolizing enzymes and growth regulatory molecules. TCDD exposure has been shown to produce neurobehavioral ailments that are associated with cognitive and physiological systems, which raises public health concerns. This study tested the hypothesis that AhR is important for regulating neurogenesis in the adult hippocampus, where neurogenesis actively takes place in the dentate gyrus region throughout ontogeny. Additionally, it was hypothesized that TCDD exposure interferes with this process. To address the first hypothesis, newly born neural cells were quantified in the hippocampus of adult AhR null mice. Adult male wildtype and AhR knockout mice were injected with BrdU to label proliferating cells. BrdU immunoreactive cells were quantified 24 hours following the injection. Results showed that there were approximately 36% fewer BrdU-positive cells in AhR homozygous knockout mice compared to wildtype controls. These findings suggest that AhR serves to positively regulate the process of neurogenesis. Because males and females have been shown differential responses to TCDD exposure in certain paradigms, this project also evaluated whether TCDD exposure is associated with a sexually dimorphic effect on neurogenesis in the dentate gyrus. Adult male and female mice were exposed to a single oral dose of vehicle (olive oil), 500 ng/kg, or 1000 ng/kg TCDD, followed by four BrdU (50 mg/kg) injections on the following day. BrdU-positive cells were significantly reduced by approximately 30% in both male and female animals. These data show that

TCDD decreases neurogenesis in the hippocampus, and that this effect may be mediated through interaction by the aryl hydrocarbon receptor. The observations that TCDD suppresses cell production in the hippocampus leads to the speculation that dioxin-exposure may impede the adaptive response to brain injuries, such as in ischemic stroke and epilepsy.

Localization and Developmental Regulation of GABA Receptor γ_2 Subunit in the Lung

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Presentation Subject Area: Biomedical Sciences

Chloride transport is one of the physiological mechanisms crucial for maintaining fluid homeostasis in the lung and the development of fetal lungs. GABA receptors are known for their role in chloride transport within the central nervous system, and function in mediating inhibitory neurotransmission. We have previously found the expression of various GABA receptor subunits in the lung. We have also demonstrated that GABA receptors secrete chloride from alveolar epithelial cells and participate in alveolar fluid homeostasis. The goals of this study were to determine whether GABA receptors were developmentally regulated in the lung and which types of lung cells express GABA receptors. Western blot analysis was employed to determine GABA receptor protein levels in rat fetal lungs of different gestational days, newborn and adult lungs. Results indicated a higher expression of GABA receptor γ_2 subunit in the fetal lungs than adult lungs. ABC immunostaining indicated that GABA receptor γ_2 subunit was mainly expressed in airway epithelial cells, but not in blood vessels or the plural membrane. A negative control using normal IgG did not show any signal. Our results suggest that GABA receptor γ_2 subunit may play a significant physiological role in alveolar fluid transport during development of the fetal lungs.

Advanced Micro-architecture Simulator for Design, Verification and Synthesis

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Presentation Subject Area: Physical Sciences & Technology

The computing power of new generation computing machines has increased tremendously in recent years. Computer manufacturers including Intel, AMD and SUN have introduced multi-core and multi-threaded microprocessors with more than 50 million transistors in a chip. To simulate and test computer architecture designs with such high complexity requires both powerful and flexible hardware simulators. Through this study, a new powerful computer architecture simulator is developed.

It is known that the cycle-time based simulators like SimpleScalar are capable of simulating and verifying advanced computer architecture designs in a reasonable execution time. On the other hand, the computer architecture designs developed under event based hardware description languages like VHDL, Verilog and SystemC provide better code modularity, but are extremely slow. The new simulator inherits the nature of the cycle-time simulator together with code modularity. Complete SPEC test benchmark programs that

were previously not possible to execute in an event based simulator can be executed using the new simulator.

The syntax of the simulator is constructed to ensure code compatibility with SystemC. This provides access to the rich hardware-signal library and also to the synthesis tools that are developed by the Open SystemC Initiative (OSCI). A simple scalar pipeline model was tested with SPEC 95 benchmark programs and results showed that the new simulator took less than 1/10th of the execution time of the event based simulator. An open source repository of basic computer architecture building blocks is under development to reduce the design time and to increase code reusability.

Developing a Measure of Care-Efficacy

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Presentation Subject Area: Education

Care-Efficacy, a person's perception of their ability to help another person in need of assistance, is one component of a new model of the Care dimension of moral theory. This form of perceived efficacy is believed to be important due to its implications regarding a person's caring behavior toward other individuals. As such, the purpose of this study was to develop and test a psychometric measure of this newly developed construct. Two hundred and thirty-eight participants (33.2% male, 68.8% female) were recruited from undergraduate courses at a large mid-western university. The General Self Efficacy Scale (GSES) and the Marlowe-Crowne Social Desirability Scale (M-CSDS) were administered in conjunction with the 30-item Care-Efficacy Scale (CES) to examine validity.

Twenty-three items were retained for the final scale, which was analyzed with principal axis factor analysis, resulting in a one-factor solution representing the construct of Care-Efficacy. The reliability of the scores was high ($\alpha = .943$) and the CES was negatively correlated with the M-CSD ($r = -.337, p < .001$), providing evidence of discriminant validity, and positively correlated with the GSES ($r = .551, p < .001$), providing evidence of convergent validity. Implications for future research will be discussed.

Measuring Creativity: A Psychometric Analysis of the Goff-Torrance Creativity Identifier

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Presentation Subject Area: Education

Research regarding human creativity has been conducted for over fifty years. Within creativity theory, however, numerous definitions persist, and each definition has resulted in a wide variety of measurements (Shaughnessy, 1995). Due in part to these varying definitions, some theorists (e.g., Baer, 1993, 1994; Crockenberg, 1972; Kogan, 1983) argue that creativity cannot be accurately measured. Yet other theorists are confident that measuring creativity can be highly beneficial provided the utilization of the results remains consistent with the intent of the developer (e.g., Crammond, 1994; Kim, 2006; Torrance, 1966).

The Torrance Test of Creative Thinking (Torrance, 1966, 1990) is one such measure of creativity, emphasizing the divergent production of the examinees. Due to the length and difficulty of scoring, a shorter Brief Demonstrator version (BD-TTCT) was developed (Goff & Boyle, 1998) and revised (Goff, 2005). The purpose of this study, therefore, was to provide analysis of the modified BD-TTCT, the Goff-Torrance Creativity Identifier (GTCTI).

Data for this study was provided through archival records of the test author. Participants included 266 students at two suburban elementary schools in a Midwestern state. Preliminary results indicate that the GTCTI measures one general construct, understood to be creativity as defined by Torrance (1966). Additionally, the reliability of the scores were assessed, resulting in Cronbach's alpha of 0.681, which is much lower than the reported alpha levels of the original TTCT ($\alpha = .89$ to $.94$; Torrance, 1998). Additional validity analyses will be conducted, and implications for future research will be discussed.

Making Sense of the Mozart Effect: Correcting the Problems Created by Null Hypothesis Testing

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Presentation Subject Area: Social Sciences

The present study is a replication that investigated the relationship between music and how it may affect spatial-temporal ability. Rideout and Laubach, (1996) found that results of the Paper Folding and Cutting Task were higher following music than a relaxation exercise, thus supporting the existence of the Mozart effect. On the other hand, Nantais and Schellenberg (1999) found no statistical difference when changing the control condition to a Stephen King passage, thus providing support that the Mozart effect does not exist. The goal of this study was to exhibit the impact that additional experiments have on an existing literature by utilizing null hypothesis significant testing and a meta-analysis approach. The participants of this study were 21 college students from the Notre Dame McNair Scholars Program and a summer psychology course. According to Rauscher, Shaw, & Ky (1993), the Mozart Effect is the name giving to a research finding that had a substantial impact on the importance of music as it relates to spatial-temporal ability. In this study, how well one performed on a spatial-temporal ability task was dependent on music. The present study tested the hypothesis that participants who are exposed to a Mozart sonata will increase performance on a spatial-temporal task. However, results determined that the control group performed better on the Paper Folding and Cutting Task than the treatment group with a mean difference of $-.02$; therefore, there were no statistical significant differences. Several issues reflect the limitations in this study; if time had permitted more data could have been collected. Also, the sample size was convent, since majority of the participants were from the McNair Program. For future implications, I would like to conduct more studies, test enhancement of the Mozart sonata during performance, take a Bayesian approach, and add conditions (e.g. relaxation exercise, jazz, and gospel music).

Service Utilization and Awareness among Grandparents Raising Grandchildren: An examination of Ethnic Differences

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Presentation Subject Area: Social Sciences

As the lifespan increases, becoming a grandparent has emerged as a common role for older adults, and, increasingly, more and more grandparents and other relatives have assumed the role of caregiver for their grandchildren/relative children. Though the majority of research has noted similarities among relative and grandparent caregivers, grandparents raising grandchildren are a diverse group, as custodial grandparents/relatives and their families are from a variety of ethnicities and economic statuses. Because beliefs, decisions, and awareness are affected by culture and ethnicity, these factors are likely to have an affect on taking on the care giving role as well as on service utilization and awareness. The purpose of this study will be to determine if minority status is associated with the service utilization patterns and policy recommendations of grandparents raising grandchildren in Oklahoma. Data were collected using a survey made up of five original scales that assessed demographic, service utilization, barriers to service, needs, and well-being variables. A total of 323 people participated in the study (167 grandparents raising grandchildren, 156 other relatives raising relative children). Subjects range in age from 24 to 92 years of age. The hypotheses for this study are as follows: 1) Minority grandparents raising grandchildren informal service utilization scores will differ from their non-minority counterparts; and 2) Minority grandparents will have qualitatively different recommendations for public policy changes than their non-minority counterparts.

Impacts of oregano oil on invitro organic matter digestibility of alfalfa hay.

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Presentation Subject Area: Biological Sciences

Carvacrol an aromatic phenolic compound is the most active ingredient in pure oregano oil. This chemical has many antimicrobial, protozoal and viral activities and has been shown to have potent anthelmintic activity. Currently, *Haemonchus contortus* is the single most economically important internal parasite impacting the goat industry in the US. Additionally, no anthelmintic currently on the market is effective in controlling this particular parasite, leaving small ruminant producers with limited technologies to managed parasite loads in their flocks. This study was designed to look at the impact of oregano oil on organic matter digestion in an invitro digestion system. The ruminant poses a unique issue as they depend heavily on microbial fermentation of grazed forages. Carvacol while beneficial as a potential anthelmintic may also reduce rumen microbial fermentation and therefore reduce animal performance. To evaluate the impacts of oregano oil on organic matter digestion an invitro experiment was performed following an adapted Tilly and Terry procedure. All treatments were run in triplicate and following the initial incubation all samples were frozen the subjected to a NDF procedure. Treatments were the addition of 0, 10, 30, 50, 90, 110, 130, 150 and 400 ul, respectively, of oregano oil to their tubes. Oregano oil decreased ($P < .01$) organic matter digestibility in a quadratic manner ($y = -.0054x^2 + .0205x + .6266$). Following break point analysis it would appear that around 75 ul was the point at which there was a significant decline in fiber digestion. Overall, oregano oil can be utilized at low levels without any significant decreases in invitro organic matter digestion. However, it is unclear whether these small levels will translate (invivo) into a level post rumen that will have a significant impact.

Emotional Intelligence Differences in Culturally Diverse Populations

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Emotional intelligence (EI) appreciably influences success in the hospitality industry work place. Recognizing the differences in EI related to the diversity in the workforce can be beneficial in developing training programs in an effort to aid individuals in adapting and adjusting their behavior to achieve positive results at both work and in their personal life. With hospitality being a diverse industry, in terms of the clientele and employees, managers with high EI are more likely to effectively interact with socio-economic, multicultural, and educationally dissimilar populations. EI is often the difference in success or failure in managing encounters with both internal and external guests. The EI skills needed for leadership success include empathizing with subordinates; accurate assessment of their own and others' emotions, as a tool for choosing strategies to maximize results and produce positive outcomes; communicating vision and enthusiasm; and creating constructive relationships with followers. While most of these behaviors are not considered unusual in western cultures, they are not typically the norm in eastern cultural behaviors. This study found significant differences in EI levels of hospitality undergraduate students based on their cultural backgrounds indicating a need to tailor training specifically to different cultures based on their belief systems and ingrained values.

Blending Chitosan with Polycaprolactone: Porous Scaffold Generation and Cytocompatibility

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Presentation Subject Area: Biomedical Sciences

Tissue engineering aims at creating new tissues or regenerating natural tissues. New tissues could be created using the knowledge of clinical medicine, biotechnology, biological cells, and biomaterials. To form functional tissues biomaterials are designed to direct the organization, growth, and differentiation of cells by providing chemical compatibility and similar mechanical properties matching those of the tissues at the site of implantation. For this purpose, tissue engineering techniques require the use of scaffolds with open pore morphology to ensure the cells and nutrients could pass into and out of the scaffolds while also supporting the structure of the tissue where it is implanted. Strategies for developing new biomaterials that exhibit unique and desired properties in tissue regeneration applications would be greatly aided by blending polymers. By blending polymers we could complement them and overcome the individual deficiencies either polymer might have. Previously, a study on blending chitosan, a naturally derived polymer, with ϵ -polycaprolactone (PCL), a synthetic polymer, was conducted using a 77% aqueous acetic acid solvent dissolved in 25:75, 50:50, and 75:25 chitosan to PCL ratios. However, when we tried to form scaffolds from the blend by lyophilization, it lacked structural integrity. In this study, 25% aqueous acetic acid solvent with the same mass ratios were used to prepare porous scaffolds from chitosan-PCL blends in order to improve the stability and strength of the scaffolds. For this purpose, we explored freeze extraction, freeze gelation, and freeze drying techniques. Freeze extraction of chloroform from frozen 80kDa and 42.5kDa PCL with acetone resulted in stable scaffolds that appeared like white disks. Observations from the SEM analysis exhibited increasing the concentration of PCL increased the number of the spherical particles. However, the structural stability of the scaffold had no observed significant difference from 42.5kDa and

80kDa. Porous chitosan-PCL blend scaffolds made with the 77% aqueous acetic acid solvent lacked structural integrity. However, chloroform assisted dissolution of PCL in conjunction with 25% aqueous acetic acid solvent resulted in formation of structurally stable scaffolds via lyophilization. These scaffolds were tested for cytocompatibility using chicken chorioallantoic membrane (CAM) assays *in situ*. The observed 3D morphology and formation of vasculature suggests these scaffolds are cytocompatible.

Effect of Bitter Melon on Inflammatory Molecules Induced by Lipopolysaccharide on Murine Macrophages

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Presentation Subject Area: Biomedical Sciences

Bitter melon, or *Momordica Charantia*, is a widely consumed vegetable in South Asia. It has been used traditionally for its antibacterial, antiviral, anti-HIV, anticancer, and immunomodulatory properties. The most investigated health benefit of MC is its role in lowering blood glucose in animal models of diabetes and in a few clinical trials. The objective of this research is to explore the anti-inflammatory properties of bitter melon using an *in vitro* system. Bitter melon was deseeded, the edible portion was blended, and the pulp was separated to obtain the juice. Approximately 10,000 murine macrophages (RAW 264.7)/well were seeded in a 96 well plate and treated with different concentrations of bitter melon juice (0.005-1% in cell culture media) (4-8 wells/ treatment) for 24 hours. Twenty-four hours later, the cells were stimulated with 500 ng/mL of lipopolysaccharides (LPS) and after 24 hours, the supernatants were collected for determination of nitric oxide (NO) production using the Griess Assay (Promega, Madison, WI). The viability of the cells was assessed using a resazurin-based assay (Sigma Aldrich, St. Louis, MO). Each experiment was repeated three times. No differences were detected between bitter melon treatments with the resazurin assay suggesting that cell viability was not affected by any of the bitter melon juice concentrations used. As expected, LPS stimulated NO production and bitter melon juice dose-dependently down-regulated this inflammatory response. Our findings indicate that bitter melon may be useful in alleviating inflammation-related disorders, such as diabetes. The effect of bitter melon on protein levels of two enzymes that play a role in the inflammatory response, iNOS and COX-2, are currently being investigated.

What are the Most Important Challenges Facing Hotel General Managers Today?

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Presentation Subject Area: Humanities

The hospitality industry is rapidly changing. Events and issues, such as the terrorist attacks on September 11, 2001; a 'green' grass roots movement for a cleaner environment; massive global unrest; a volatile economy; and technological advances, drastically impact the overall climate of the hotel and travel industry. Other issues including brand extension and renovation also influence the daily operational decisions of the hotel and travel industry, although on a smaller scale. Since hospitality management undergraduate programs are in the business of training the hospitality managers of tomorrow, it is imperative that the decision makers in these programs understand and embrace issues currently faced by managers while

developing curricula. Armed with this knowledge they can effectively prepare their students for successful careers in the hospitality industry. In this study, researchers will survey hotel general managers to determine what critical issues the managers currently face in the daily operation a hotel. Based on the information received, hospitality course designers will be able to determine if their current offerings are satisfying the needs of the hospitality industry today. Future research could include a review of the curricula of nationally ranked hospitality undergraduate programs to compare course offerings to the critical issues affecting the industry. Gaps will indicate areas in which new courses should be offered or existing courses modified.

Determining the Proper Curricula for Pre-School Children

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The purpose of this study is to suggest curriculum modifications for 19 pre-school children enrolled in a federally funded pre-kindergarten program. Children's assessment results for Fall 2006 will be categorized according to patterns of academic needs and strengths. Curriculum modifications will be suggested based on patterns and provided to teachers to improve children's skills in (a) language and communication and (b) early mathematics.

A Hybrid Image Classification Technique for Mapping the Land Use and Land Cover in the Little Washita Watershed

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Presentation Subject Area: Environmental Sciences

Changes in the environment due to human activity have increased tremendously over the years. Keeping track of these changes and development has necessitated the use of change detection techniques involving remotely sensed data. Land use and land cover classifications, are therefore required to be accurate for effective change detection analysis. While the Supervised and Unsupervised techniques of classification have in many cases fallen short of the desired levels of accuracy, a hybrid form of classification (involving both supervised and unsupervised forms of classification) has been developed to improve the accuracy of land use and land cover classification for the Little Washita Watershed located in Southwestern Oklahoma.

This technique which incorporates aspects from both supervised and unsupervised classification is unique in that individual land use/ land cover types are extracted using a recoding and masking process for further classification. Preprocessing of the Landsat images included correction for atmospheric interference using the COST algorithm developed by the Remote Sensing center of the Utah State University. Other processes performed were the clump/eliminate on groups of pixels < 2 , and a Boolean operation ("AND" and "OR") to overlay the different land use layers. The hybrid technique was applied to a March 9, 2005 Landsat TM data for the Little Washita Watershed. The results of the analysis indicate that native range/ pasture cover about

41% of the total watershed area, while 20%, winter wheat and forest/shrub land occupy about 20% and 24% of the watershed respectively

Effects of Calcium Depletion and Repletion on the Density and Microarchitecture of Bone in Young Female Rats

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Presentation Subject Area: Biomedical Sciences

Calcium is an essential nutrient in the formation and maintenance of bone. The purpose of this experiment was to examine the effects of different levels of calcium and food intake on bone quality. In this experiment, ten Sprague-Dawley female rats were assigned to each of five treatment groups.

Group 1	1 g Ca/kg diet for 12 wks
Group 2	1 g Ca/kg diet for 6 wks and 5 g Ca/kg diet for 6 wks
Group 3	5 g Ca/kg diet—pair-fed to Group 1 for 12 wks
Group 4	5 g Ca/kg diet—pair-fed to Group 2 for 12 wks
Group 5	5 g Ca/kg diet— fed ad libitum for 12 wks

After 12 weeks of feeding, the rats were necropsied and the bones were isolated and frozen. Bone mineral area, content and density of the distal femurs were assessed using dual energy X-ray absorptiometry (DEXA) with high resolution software (Discovery QDR, Hologic, Waltham, MA). Microarchitecture of the trabecular core of the 4th lumbar vertebra was analyzed using microcomputed tomography (μ CT) (Scanco μ CT40, Scanco Medical, Ltd., Switzerland). The vertebrae were evaluated on a contoured volume of interest (VOI) beginning and ending 165 microns from each growth plate. Data were analyzed using the Statistical Analysis System (SAS, version 9.1). A p value of <0.05 was accepted as significant. Based on the DEXA analysis, Group 1 had significantly reduced bone mineral content and density as compared to Group 3 showing the detrimental effects of calcium restriction. There was no significant difference between Group 2 and Group 4 showing calcium repletion with the change to the 5 g Ca/kg diet. Significant change was also observed in bone mineral content and density between Group 3 and Group 5 as an effect of food restriction. Data from the μ CT showed significant differences in bone volume fraction, trabecular thickness, trabecular separation, and connectivity density in Group 1 as compared to Group 3. There were no significant changes in bone microarchitecture between Groups 2 and 4 or between Groups 3 and 5. Overall, the decreased calcium intake was very damaging to the bone microarchitecture. The rats with replenished calcium intake demonstrated that bones were able to be restored to the level of the adequate diet. Food restriction had less effect on microarchitecture than on bone density, although the food restriction led to reduced connectivity density. The results demonstrate the positive effects of a higher calcium intake as well as the negative effects of food restriction on bone quality.

Cadmium-Induced Bone Loss in Ovariectomized Rats Was Exacerbated by Potassium Phosphate and Moderated at Some Levels by Dried Plum.

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Presentation Subject Area: Biomedical Sciences

Cadmium (Cd) is a toxic heavy metal that has detrimental effects on bone mineral density (BMD). Chronic phosphorus (P) supplementation decreases bone mass through a decline in serum calcium concentration and resultant hyperparathyroidism. The purpose of our study was to examine the effects of Cd and P on bone and to test the hypothesis that dried plum would ameliorate the detrimental effects of Cd and P on bone. Fifty, 90 day-old Sprague-Dawley rats were ovariectomized (Ovx) and assigned to the following five treatments (n=10): 1) control, 2) 50 mg Cd/kg diet, 3) 50 mg Cd /kg diet with 1.2 % potassium phosphate (KPhos), 4) 200 mg Cd/kg diet, and 5) 200 mg cadmium/kg diet with 1.2 % KPhos. After 45 days of treatment, half the rats in each group had 15% dried plum added to their diets. This second phase of the experiment continued for an additional 3 months. At necropsy, the distal femur was scanned using microcomputed tomography (uCT) to assess microarchitecture of the trabecular bone and cortical thickness at the midshaft. In the distal femur a volume of interest beginning 25 slices below the growth plate and consisting of 100 slices at 16.5 micron intervals was contoured and evaluated. Bone volume fraction was significantly lowered by Cd and by KPhos ($p < 0.0001$ and $p < 0.0004$, respectively). Trabecular number was decreased by KPhos ($p < 0.04$) while trabecular thickness (Tb.Th) and trabecular separation (Tb.Sp) were significantly increased by KPhos. Significant interactions affected connectivity density (ConnD). In rats fed Cd, feeding KPhos reduced ConnD. Dried plum was beneficial in rats fed 50 ppm Cd but detrimental in those fed 200 ppm Cd with KPhos. Cortical thickness was decreased by cadmium and by KPhos ($p < 0.0001$) but increased by dried plum ($p = 0.002$). Our results indicate that Cd causes loss of both trabecular and cortical bone. KPhos increased those losses. Dried plum increased cortical thickness; effects of dried plum on trabecular microarchitecture varied depending on the levels of Cd and the presence or absence of KPhos.

Structural Studies of E. coli Alpha-Galactosidase

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Presentation Subject Area: Biological Sciences

In Escherichia coli K12, the 451-residue alpha galactosidase protein is produced by the gene Mel-A, which is located on the chromosomal DNA. This protein is responsible for the melibiose hydrolysis in E. coli whereas in eukaryotes the gene product is involved in various other functions including glycosphingolipid metabolism in humans. Mutations that abolish the function of human alphagalactosidase result in Fabry disease. The goal of this project is to express, purify and find the crystal structure of alpha galactosidase from E. coli K12 and, thus, compare the prokaryotic protein structure with known structures of eukaryotic originated alpha galactosidases. The E coli K12 Mel-A gene has been cloned to a pET TOPO plasmid vector that attaches a 6-residue N-terminal histidine tag and transformed for over-expression in a BL21* E. coli system. The protein is isolated and purified using a HisTrap HP-Ni column and concentrated using gel filtration. The purified protein has been subjected to initial crystallization trials and will be used to discover its enzymatic function.

The Decline of African-Americans in Major League Baseball.

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Presentation Subject Area: Humanities

This study continues a line of research that aims to examine the decline of Afro-Americans in major league baseball. Of particular interest is the sheer loss of black players in the sport. In the latter half of the 20th century, baseball had seen the rise and decline of Afro-Americans players in the sport, with most recently, a drastic decline of black participation. Whereas Latin-Americans have come en masse to participate in baseball, Afro-American participation in the sport has become stagnant. Analyzing the absence of black managers in the sport is equally important as this could be a correlate of the decline of black players. The study will also examine Afro-Americans' penchant America's other two major sports-- basketball and football. Some would contend that Afro-Americans' own apathetic disposition towards baseball translates into their overall declension in the sport. Afro-Americans' nonchalant temperament is not the lone contributor to their decline in the sport. There are a score of factors that are conducive to the decline of black participation in major league baseball. This study will examine those factors. In the extant landscape of baseball, it is evident that minorities--not just blacks-- are overrepresented in performance facets of the game, when compared to the managerial ranks. Apparently there is some disconnect between brimming levels of performance yet virtually no role in the executive ranks. Analyzing this disconnect is pertinent in trying to understand the aggregate absentia of blacks in the sport. As with that case, this study will briefly examine the prevalence of occupational segregation in baseball and its potential effects on falling numbers of Afro-American players within the league.

Religious Implications for the Development of Conscience in Preschoolers

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Presentation Subject Area: Environmental Sciences

Researchers in child development have long pondered the structure and stability of conscience during the early preschool years. How do children come to experience moral emotions and begin behaving according to rules and values with no need for external monitoring? During early childhood, several emotional and behavioral milestones that are relevant to children's conscience emerge. It is during this time that preschoolers acquire the capacity to regulate their actions and emotions in contextually appropriate ways.

This study explores the role of religious training in the development of conscience in preschool-age children. It specifically focuses on the impact of the church and Bible class attendance of preschool age children on conscience. A group of preschoolers from local preschools was studied in order to examine links between measures of conscience and church attendance.

The Relationship of Teachers Opinions about the Arts to Students' Attitudes toward School

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The goal of arts programming is to change the educational culture and the way in which teachers teach. In traditional classrooms teachers disseminate knowledge and learning is outcome based. However, teachers using arts integrated curricula enable students to be active participants in the construction of knowledge. (Eisner, 2004). Research indicates that students who are engaged in this type of process based learning demonstrate more interest in and enjoyment of school (Luftig, 1994; Torff, 1995). Increased positive attitudes such as these are associated with a greater commitment to learning and the value of personal effort toward achievement (Catterall, 1995;).

Arts integration emphasizes engaging students in learning through hands on experiences to connect ideas within and across subjects through the arts. Teaching in this manner is not merely dependent on teachers' knowledge and skills, but often involves a great deal of creativity. Thus teachers using arts integrated curricula demonstrate varying levels of commitment toward arts usage in the classroom. Arts integration has a significant effect on students' attitudes toward school; however, little is known about the impact of the attitude of teachers using an arts integrated curriculum on students' perceptions of school.

The purpose of this study is to examine the relationship between teachers' opinions toward using arts in the classroom, as measured by the Teacher Opinion Scale, and students' perceptions of their classroom experience, as measured by My Class Activities. Regression analyses will be performed and implications for future research will be discussed.

Intranasal Vaccination of Dairy Calves with Mannheimia haemolytica Chimeric PlpE-LKT (SAC89)

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Background - Mannheimia haemolytica is the most common cause of severe bacterial pneumonia and eventual death in stressed cattle. Immunity against M. haemolytica requires antibodies to surface antigens and antibodies that neutralize the leukotoxin (LKT). One of the most immunologically important surface antigens is an outer membrane lipoprotein termed PlpE. Because M. haemolytica first colonizes the nasal passages before colonizing the lungs and causing pneumonia, we undertook this project to determine if intranasal vaccination with a chimeric PlpE-LKT (SAC89) protein would stimulate nasal and systemic antibodies that would protect cattle against infection. Therefore, the purpose of this study was to determine the nasal and serum antibody responses of dairy calves following intranasal immunization with various doses of the SAC89 with Cholera-toxin (CT) as the adjuvant.

Methods - A total of 11 dairy calves were divided among three groups: Group 1- control (3 calves), Group 2- 50 'g SAC89/CT (4 calves), and Group 3- 100 'g SAC89/CT (4 calves). Calves were vaccinated intranasally on days 0 and 14 of the experiment. Sera and nasal secretions were collected on days 0, 14, and 28 of the experiment. Nasal IgA and serum IgG antibodies against PlpE, LKT, and SAC89 were determined

by an enzyme-linked immunosorbent assay (ELISA). Complement-mediated killing and LKT neutralization responses of serum were also determined.

Results - Anti-PlpE, anti-LKT, and anti-SAC89 nasal IgA antibodies were detected on day 14 and reached a maximum on day 28 after initial SAC89 vaccination. The 100 µg group had the highest responses. Serum antibody responses were not as obvious because of maternal antibodies in sera of calves at day 0 of the study.

Conclusions - Intranasal vaccination of dairy calves with chimeric PlpE-LKT (SAC89) evokes both nasal IgA and serum IgG antigen-specific antibody responses in young dairy calves. A definite dose response in the nasal IgA levels was detected.

Characterization of Gene Expression Among Unique ORFs of the *Coxiella burnetii* QpH1 Plasmid

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Coxiella burnetii is an obligate intracellular bacterium and the causative agent of acute Q Fever and chronic diseases. Four distinct plasmids (QpRS, QpH1, QpDV, and QpDG) have been isolated from *C. burnetii* strains. These plasmids have been implicated in influencing disease outcome (chronic vs. acute), depending on the plasmid type and strain. The plasmids possess a number of open reading frames (ORFs) with shared homologies as well as ORFs unique to each plasmid type. Seven ORFs unique to the QpH1 plasmid were identified by sequence comparisons of the plasmids. They are designated QpH1 ORFs p15, p16, p17, p18, p19, p20, and p21. We have shown that the genes are transcribed as three transcriptional units (p21-p20, p19, and p18-p16-p15). ORF p17, located within p16 and in the opposite orientation, is not expressed. In this study we characterize the relative expression levels of these transcripts during *C. burnetii* Nine Mile II infection of host cells. *C. burnetii* total RNA was isolated following a crude bacterial purification from infected Vero cells (5 weeks post infection). To prevent RNA degradation, the bacterial purification was performed in the presence of an RNA stabilizing reagent (RNA/DNA Protect). The total RNA was analyzed using reverse transcriptase real-time-PCR (RT-PCR) and primers designed within QpH1 ORFs p15, p19, and p21 as well as the *C. burnetii* outer membrane protein gene, *com1*. The ratio of the three transcriptional units was determined by analysis of the 5 prime gene within the two operons (QpH1 ORFs p15 and p21) and ORF p19. RNA levels of the stably expressed *com1* gene were analyzed simultaneously within each sample as a comparative reference standard for the QpH1 ORFs. The resulting data demonstrates that ORFs QpH1 p19, p21, and p15 are expressed at a ratio of 1:10:20 (p19:p21:p15) during infection, indicating that the unique ORFs within the QpH1 plasmid are differentially expressed during infection. Temporal expression analysis of these unique plasmid ORFs as well as characterization of the other genes within the two operons will add to our understanding of gene regulation within this obligate intracellular pathogen.

Reduction of Methylcholanthrene-Induced Fibro Sarcomas Caused by Factor in the Blood of Western Fence Lizard (*Sceloporus Occidentalis*)

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The serum of the Western fence lizard (*Sceloporus occidentalis*) was studied to determine its effects on the growth of Methylcholanthrene-induced fibro sarcoma (Meth A) tumor cells in vitro. Treatment of Meth A tumor cultures with dilution of 10% lizard serum resulted in measurable inhibition of growth of Meth A tumor cells. Through use of the MTT assay, a standard colorimetric assay measuring cellular proliferation (cell growth), a 20% decrease in the growth of Meth A tumor cells was revealed. The capacity of lizard serum to inhibit tumor cell growth was heat sensitive when preheated to (70 °C for 20 min), and was not found to be inhibited by ethylenediaminetetraacetic acid (EDTA). Centrifugal filtration showed that the factor within the serum is greater than 30-kDa. These characteristics strongly suggest that the inhibitory properties of the lizard serum can be attributed to one or more proteins.

Evaluating the Influence of a Science Teaching Case Narrative on Preservice Elementary Science Teacher Efficacy

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Presentation Subject Area: Education

Teacher efficacy has been defined as the extent to which the teacher believes he or she has the capacity to affect student performance or a teachers' belief or conviction that they can influence how well students learn, even students who may be difficult or unmotivated. Albert Bandura suggests vicarious experiences are one of the four main sources that influence the efficacy of the individual teacher. However, little research has been done to evaluate the impact of a vicarious learning experience on preservice teacher science efficacy beliefs. Thus, the purpose of this randomized study was to assess how two different science teaching case narratives (i.e., vicarious experiences), one positive and one negative, impacted preservice elementary school teacher's science efficacy beliefs. Statistical analyses revealed that the preservice teachers cognitively processed the negative case narrative as negative and the positive case narrative as positive, but neither case narrative (i.e., vicarious experience) had an effect on the preservice teachers perceived efficacy levels.

Aqueous-Based Polycaprolactone Matrix Synthesis for Use in Tissue Regeneration

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Presentation Subject Area: Biomedical Sciences

In this study, a novel process of generating Polycaprolactone (PCL) matrices in aqueous media was tested and the generated matrices from different MW (80 kDa, 42.5 kDa, 10 kDa) were analyzed for the biomechanical properties. Ten percent (wt/v) PCL was dissolved in glacial acetic acid. Films and tubular

scaffolds were made either i) by injecting PCL solution into a water bath and allowing the PCL to spontaneously precipitate or ii) by layering the solution in a dish and then adding water slowly. Forming scaffolds in a bath of NaHCO₃ and ethanol were also tested. Although PCL did not precipitate in an ethanol bath, thick scaffolds were formed using NaHCO₃ solution. Scanning electron microscopy analysis revealed increased roughness of these matrices relative to matrices formed after dissolving in chloroform. Tensile properties of matrices were measured in wet conditions at 37 degrees Celsius which showed that the tensile strength decreased with MW of PCL. Scaffolds formed from 0:1:0 (80:42.5:10) kDa blend solution had the highest stiffness. Formed tubular scaffolds (<6 mm diameter) were analyzed for dimensionality changes using a fluid flow-loop over a pressure range of 0-250 mmHg at room temperature. Calculated compliance ($C=(\text{change in } V/V) / \text{change in } P * 100$) values showed that decreased MW increased the compliance of the vessels and higher than a native artery. A four-week study on 80 kDa scaffold degradation at 37 degrees Celsius in 5% CO₂/95% air, in phosphate buffer solution (pH=7.4), indicated no major changes in weight. To test the effect on cellular activity, mouse embryonic fibroblasts were cultured for four days. These results showed that the matrices are not toxic and support cell growth as assessed by Resazurin assay. Cytoskeletal actin staining showed cell adhesion and spreading on all matrices. In summary, PCL matrices can be generated in aqueous media while maintaining favorable biomechanical properties, which is useful in various biomedical applications.

Design of Large Wood Structures in Sand-Bed Streams

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Presentation Subject Area: Environmental Sciences

Large wood structures (LWS) are an efficient and cost effective way to protect streambanks from erosion while enhancing the aquatic habitat. While LWS are successful in the Pacific Northwest when ballasted with rock and gravel, the failure rate in sand-bed streams typical of the mid-continent is a concern. Recently built structures in Mississippi experienced a 33% failure rate two years following installation. From earlier reports, it is known that a large portion of the failures were due to overloading the anchors and not having the optimal structure orientation or configuration. Model tests made from fresh-cut hardwood saplings on a 1:9 scale were run in a 6-foot wide concrete flume at the USDA-ARS Hydraulic Laboratory in Stillwater, Oklahoma to determine the magnitude of the forces being placed on the LWS anchors and to study the effectiveness of the structure in reducing near the bank velocity. The yaw angle, structure configuration, flow depth, and flow velocity were varied over several runs to analyze tie-down cable loadings. Flow velocity profiles were recorded and flow visualization was performed to further study the effects of flow on the different structure configurations and orientations. These results should provide better design parameters to allow successful LWS installation in sand-bed rivers, without the need for rock ballast.

Evaluating the Ethno-geographic Origin of a Randomly Selected Group of Students at Oklahoma State University Using Their Y Chromosome Haplotypes

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Presentation Subject Area: Biological Sciences

DNA technology and its use in the field of genetics have rapidly evolved during the last decade. A new innovative technique involves tracing human migratory patterns using naturally occurring polymorphisms found in the human genome. Y chromosome haplotyping is the study of patrilineal origins of humans based on polymorphisms found in the Y chromosome. Haplotyping has found a niche in several areas of science, including migratory anthropology and forensic science. The Y chromosome is passed paternally from father to son and does not undergo recombination; this allows for construction of haplotypes that characterize paternal lineage, which aid in identifying the ethnic and demographic history of the modern-day man.

In this study, paternal lineage of male students on the Oklahoma State University campus was determined through use of Simple Tandem Repeats (STR) markers found on the Y chromosome. We have amplified 20 highly polymorphic markers present on the human Y chromosome. These 20 markers include the European 'extended haplotype' set of genetic markers and several other highly polymorphic Y chromosome STRs. The DNA was collected from volunteer students of diverse ethnic and geographic background and was amplified using the Polymerase Chain Reaction (PCR) and fluorescently labeled primers. The amplified markers were then analyzed on an ABI 3130 genetic analyzer to identify the haplotype of each individual. The haplotypes generated were compared with YHRD-Y Chromosome Haplotype Reference Database (<http://www.yhrd.org/index.html>), Family Tree DNA Y Search (<http://www.ysearch.org/>) and DNA Heritage Y base (<http://www.ybase.org/>) to identify Y chromosome lineages.

Visualizing Discoidin Expression Using a GFP Reporter Gene

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Presentation Subject Area: Biological Sciences

Dictyostelium cells remain in a single-celled vegetative state while feeding on a bacterial food source. As the food source depletes, Dictyostelium cells undergo a developmental program in which cells will stream together to form multi-cellular aggregates and then develop fruiting bodies. As cells begin to starve, an autocrine factor, PSF, induces the expression of several genes whose products are needed for cAMP signaling and cell aggregation. Among these genes are discoidin I. The discoidin I gene family is induced by PSF and proposed to play roles in adhesion of cells to the substratum and in cell streaming. When Dictyostelium cells begin to establish specific cell-cell contacts, discoidin I mRNA begins to decline. By the tight-aggregate stage, discoidin I mRNA is barely detectable. In axenically growing cells, the pre-starvation response occurs at much lower cell densities. A discoidin:GFP fusion protein has been expressed in wild-type and mutant strains of Dictyostelium. The expression pattern of the discoidin:GFP reporter gene is being analyzed in wild-type strains to determine if the reporter gene is regulated the same as the endogenous gene when cells are exposed to external signals. The reporter gene will then be used to assess gene induction in a variety of signaling mutants, based on previous studies. Recent work has shown that for each clonal strain, the GFP level is heterogeneous within a population of cells. The heterogeneous expression is being analyzed to determine if it is caused by physiological or gene copy number differences.

Techniques such as following cells through development, growth on bacteria, and exposure to folic acid are being employed to characterize the regulation of this gene.

Characterization of Dictyostelium G protein Subunit and MAP Kinase Interactions Using a Yeast 2-Hybrid System

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Eukaryotic organisms use G protein-coupled receptors to detect a wide variety of signals such as light, odors, hormones, neurotransmitters, and chemoattractants. The soil amoebae *Dictyostelium discoideum* uses this type of receptor and corresponding G proteins to search for food and to undergo multicellular development. The *Dictyostelium* genome contains genes for over 50 different G protein-coupled receptors and 12 different heterotrimeric G proteins (i.e., 12 G α , 1 G β , and 1 G γ subunits). Previous studies of *Dictyostelium* G protein function indicate that different G α subunits recognize specific receptors and play distinct roles in chemotactic and development responses. The G α 4 subunit mediates chemotaxis to folate allowing cells to find bacterial food sources and the G α 4 subunit also plays an important role in the development of spores in multicellular aggregates. However, the closely related G α 5 subunit plays an opposing role by inhibiting folate chemotaxis and promoting stalk cell development. One distinction between the G α 4 and G α 5 subunits is the presence of a putative MAP kinase docking site on the G α 5 subunit suggesting that interactions with MAP kinases might account for some of the differences between G α 4 and G α 5 function. Interactions between G α 5 and the Erk2 MAP kinase are being analyzed using a yeast 2-hybrid system. The G α 5 and G α 4 subunit genes were individually fused to the yeast Gal4 DNA binding domain sequence and the *Dictyostelium* MAP kinase gene *Erk2* was fused to the Gal4 activation domain sequence. If the G α subunit and Erk2 fusion proteins interact to create a functional Gal4 transcription factor hybrid then the expression of specific reporter genes will be induced in yeast.

Characterization of Melusin Hsp90 Interactions

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The Purpose of the project is to investigate interactions of Hsp90 and Melusin. Hsp90 is an abundant protein chaperone essential to cellular function and comprises 1-2% of all cytosolic protein. Its primary functions are folding of protein kinases and hormone receptors. It is regulated by numerous protein co-chaperones such as CDC37 to recruit client proteins and to effect changes in them. Hsp90 has gained interest from the findings that its inhibition by various drugs selectively causes apoptosis in certain types of cancer cells. If Hsp90 is to be used as an anti-cancer drug in the future, it will be important to characterize the clients and co-chaperones and the effects of their concentrations during Hsp90 inhibition. One suspected client of Hsp90, Melusin is a cystine rich muscle specific protein which is highly conserved in invertebrates and vertebrates. Over expression of melusin has been shown to cause cardiac hypertrophy in mice and prevent cardiac failure from long term heart stress. Thus far, TNT reactions analyzed by western blot have not

yielded significant evidence due to strong non-specific binding. This can likely be counteracted by determining the correct concentrations of the salt wash used to bind antibodies. However, if one is not found it is hypothesized that the addition of calcium and or deletion of parts of N-terminal may increase binding affinity.

Determining the Structure and Function of the Fibronectin type III domain of the Midline-1 protein associated with Opitz Syndrome

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Midline-1 (MID1) is an ubiquitin, or a molecule that attaches to a small protein in eukaryotic cells, which participates in the destruction of defective proteins and in the synthesis of new proteins. During this regulatory process, MID1 aids in cellular distinction along the midline during the formation and development of the embryo. When mutations occur in MID1 there can be structural flaws along the midline including cleft lips and palate, wide spaced eyes, and complications in the brain and heart. These faults can be portrayed as X-linked Opitz GBBB syndrome. Defects in the MID1 gene are also accredited to affect other human genetic syndromes. There are six distinct domains comprised in MID1, including RING Finger, B-box1, B-box2, Coiled Coil, Fibronectin type III, and SPRY(B30.2). The fifth domain, Fibronectin type III (FN III), is the focus of my research. Fibronectins are extra-cellular matrix proteins that provide anchorage and have regulatory functions in cell adhesion, motility, and the cell cycle. Although it is usually found on the outside of the cell, interestingly enough in some cases, the FNIII domain is found to be intracellular or inside the cell. In order to know more about the structure and function of FNIII, my goal is to create mutations so that FNIII can be studied in different forms. My project involves efforts guided by Michael Massiah, Ph.D. His lab focuses on the use of Nuclear Magnetic Resonance (NMR) spectroscopy to determine the structure and function of Midline-1.

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Teachers Opinions on Art Infusion in Classroom Activities

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The purpose of this study was to explore the differences of opinions toward the arts between two groups of teachers, those who participated in an arts infusion program and those who did not. The function of art in education is a recurring issue. Consistent with other areas of educational theory the role of the arts in education has continued to change over time. There have been times when art is heralded as remedies for school violence and disruption. As new policies change education priorities, however, the role of art is again in question. For example, the current promotion by the federal government of science as a unitary paradigm for both education and educational research places art in an inferior position. Along with this national

emphasis is the growing disinterest among educators regarding art due to its not-so-explicit rewards as compared to science. To help redefine the role of art in education, a grant-funded study called Project CREATES has been conducted in four elementary schools in Tulsa, Oklahoma. Teachers were invited to participate in professional development, to be mentored by arts coaches, and work with community artists in their classrooms. As part of the larger study, a Teacher Opinion Survey (TOS) was conducted to identify any differences in teacher's attitudes toward arts in improving the student outcomes between those teachers who chose to participate and those who did not. The data were analyzed by running a one-factor between subjects ANOVA analysis. The results indicated significant differences in teachers' attitudes ($F_{(1, 71)} = 12.996; p = .001$) for the ways they think art infusion in curriculum helps student outcomes. Specifically, teachers who were involved in Project CREATES had more positive attitudes toward the impact of art in improving student outcomes ($M = 2.35, SD = .53$) than those who did not participate ($M = 1.88, SD = .52$). Further implications of the research are discussed.