



Paper

Abstracts

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Development of Neural Networks for event probability prediction during Carbon / Carbon-dimer deposition in a CVD Process

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Presentation Subject Area: Physical Sciences & Technology

Diamond is artificially grown through CVD process. Events such as chemisorption, desorption and reflection occur during the deposition process. The probabilities of each of these events have a significant effect on diamond growth. Molecular Dynamic simulation is widely used to predict the probabilities of these events. Though Molecular Dynamic simulations give agreeable results with experimental values the calculation of the effect of different input parameters on various events involve time consuming numerical methods and hence the process is cumbersome. In our study, initially Molecular Dynamic simulations of carbon and carbon dimer deposition at a radical site on diamond (111 & 100) surfaces were performed respectively using a many body empirical potential and the probabilities of the aforesaid events were calculated by varying the input conditions. This information was used to develop neural networks for each event and train them to predict the probabilities of the events. Computational time for prediction of the events using the conventional methods was in days and implementation of neural networks reduced them to seconds. Also, statistical errors commonly found in the conventional method have been eliminated by the application of neural network principles. The true function obtained was devoid of statistical errors. The networks were also found to be capable of predicting the effects of various input parameters on the events mentioned.

Bose' Einstein condensation at OSU

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Presentation Subject Area: Physical Sciences & Technology

Bose' Einstein condensation (BEC) is a quantum state of matter predicted in the 1920s and first realized in a dilute atomic gas by Cornell and Wieman in 1995. In a BEC the atoms lose their individual identities and behave as a single wavefunction. In effect they become a 'superatom'. BEC is important because it allows the investigation of quantum mechanics on a macroscopic scale. With a BEC it is possible to create situations which were previously just theoretical concepts. In this talk I will describe what a Bose' Einstein condensate is, why there is so much interest in creating it, and how we go about making BEC at OSU.

Effect of a Direct-Fed Microbial on Plasma Concentrations of Hormones and Metabolites in Primiparous and Multiparous Holstein cows

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Presentation Subject Area: Whiteman Award Presentation

From 14 d prepartum to 175 days postpartum, 38 multi- and primiparous Holstein cows were fed one of three dietary treatments: 1) Control (n = 13), fed a base total mixed ration (TMR), 2) HP169 (n = 11) fed TMR plus 6 x 10¹¹/head/d (high dose) of Propionibacterium Strain P169; 3) LP169 (n = 14) fed TMR plus 6 x 10¹⁰/head/d (low dose) of P169. Blood samples were collected twice weekly and analyzed for glucose, insulin, insulin-like growth factor-I (IGF-I), leptin, nonesterified fatty acid (NEFA) and cholesterol concentrations. Plasma glucose was affected by treatment x parity (P < 0.001) such that glucose levels in LP169 multiparous cows were lower (59.8 ± 1.1 mg/dL) than in HP169 multiparous cows (63.3 ± 1.2 mg/dL), whereas LP169 primiparous cows had greater plasma concentrations (67.9 ± 0.9 mg/dL) than HP169 (64.2 ± 1.1 mg/dL) and Control (62.40 ± 1.18 mg/dL) cows. Plasma insulin was affected by dietary treatment (P < 0.001) such that LP169 had 11.0% less plasma insulin than HP169 and Control cows. Plasma IGF-I concentrations were greater (P < 0.02) in primiparous vs multiparous (20.13 ± 1.07 vs 16.50 ± 1.07 ng/ml) cows, but did not differ among treatment groups. Plasma leptin concentrations did not differ among treatment group, but increased (P < 0.001) between wk 1 and 3 and remained constant thereafter. Multiparous cows had greater (P < 0.001) plasma NEFA levels (0.35 ± 0.01 mmol/L) than primiparous cows (0.29 ± 0.01 mmol/L), but NEFA levels did not differ among treatment groups. Plasma cholesterol was affected by treatment x parity (P < 0.002) such that LP169 multiparous cows had 25 % greater plasma levels than multiparous HP169 and Control groups, while, cholesterol levels in primiparous cows did not differ among treatment groups. We conclude that dietary supplement of P169 may have a potential role in enhancing metabolic efficiency during early and mid-lactation.

Identification and Characterization of Protective Antigens against Ixodes scapularis Infestations

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Presentation Subject Area: Biological Sciences

Identification of protective antigens has been a limiting factor in the development of tick vaccines. The objective of this research was to identify and characterize protective antigens against *I. scapularis* infestations. Protective antigens were identified by a cDNA library screened by expression library immunization (ELI) in a tick-mouse model. CD-1 mice were immunized twice with 50 µg of plasmid DNA and then challenge with 100 *I. scapularis* larvae. cDNA that resulted in immunity against larval tick infestation were selected. Genes 4E6, 4D8, and 4F8 encoding for protective antigens were expressed in *E. coli*, and the recombinant proteins used to produce rabbit-antiserum to be used in immunohistochemistry (IHC) experiments. Paraffin sections of *I. scapularis* were incubated with immune serum against 4E6, 4D8 and 4F8 proteins. Sera from pre-immune rabbits were used as negative controls, while serum from a rabbit immunized with IDE8 total proteins was used as a positive control.

Modeling Chaotic Systems

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Presentation Subject Area: Physical Sciences & Technology

Introduction: Chaos appears in many different fields. Examples of chaotic behaviors can be found in weather forecasting, biological models, stock market index values, and industrial applications. The main characteristic of chaotic systems is their sensitivity to initial conditions. This causes chaotic systems to be both unstable and unpredictable.

Modeling chaotic systems: Most of the time all we can see from a chaotic system is a set of scalar measurements. Modeling chaotic systems is done by using these measurements only. By using a good model, we can make a more accurate prediction of future values of the system. An example of this is to forecast the weather a few days ahead. Modeling chaotic systems by using the regular modeling techniques is not possible. These techniques assume the system at hand to be stable, which is clearly not the case for chaotic systems. A modeling technique that is widely used for chaotic systems is the delay-coordinate technique. It will be covered in details in the presentation. In this presentation, we show four different techniques used to estimate the model order for a chaotic system.

Organization of the presentation:

- The presentation begins by showing different examples of chaotic systems.
- Sensitivity of chaotic systems to initial conditions will be presented by an example of a 1-D chaotic system.
- Simple comparisons between linear, random, and chaotic systems will be presented. The comparison uses regular techniques like the Fourier transformation to show the differences between the different systems.
- Modeling by delay-coordinate is discussed next and an example shows how it is implemented.
- Model order depends on the dimension of the original unknown attractor of the system.
- Brief presentation of the four different techniques that are used to estimate the model order.
- A good model depends on the accuracy of the estimation of the model order, as well as on the value of the estimated parameters of the system.

Summary: At the end of the presentation, a brief introduction to the remaining parts of the modeling process is given.

Effects of Fire and Grazing Driven Heterogeneity on Nitrogen Cycling in Tallgrass Prairie

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Presentation Subject Area: Environmental Sciences

Fire and grazing by large ungulates are important disturbances in many grassland ecosystems regulating ecosystem N availability. Fire influences grazing activity, while grazing activity influences the extent and intensity of fire. Thus, the interaction of these disturbances (fire - X - grazing interaction) are highly variable over multiple spatial and temporal scales, but most studies have focused on the main effects of fire and grazing with little attention given to their interaction in space and time. Few studies have addressed the role of fire in regulating ecosystem N dynamics in grazed grasslands. Therefore, the objective of our work was to evaluate the combined effect of fire and grazing on N availability as a function of fire - X - grazing

interaction. To address this we subjected native tallgrass prairie pastures to moderate stocked cattle and two contrasting burning regimes, i) patch-applied fire, where a different patch was burned each year in spring (patch burn - PB) and ii) homogeneously-applied fire, where the entire pasture was burned annually in spring (annual all burn - AAB). We sampled soil from upland sites in May of 2003 and 2004 and measured total inorganic N ($\text{NH}_4^+\text{-N} + \text{NO}_3^-\text{-N}$) and used a growth chamber experiment with red winter wheat (*Triticum aestivum* L. cv. Jagger) to evaluate net N mineralization. A significant spike in total inorganic N was observed in the most recently burned patch in PB treatment in 2003 and declined linearly with time since fire, while no treatment effects were observed in 2004. A significant surge in net N mineralization, as measured by total plant N concentration, also occurred in the most recently burned patch in PB treatment, but in both years. In addition, the relative change from 2003 to 2004 from each site samples were collected indicated that net N mineralization was, indeed, significantly greater in the most recently burned patch in PB treatment and not a product of spatial variability. Overall, our results suggest that infrequent fire and subsequent concentrated grazing activity under fire - X - grazing interaction provides a pulse in ecosystem N availability. This may provide a feedback mechanism that allows large ungulates to overcome N limitation in predominantly N limited grasslands.

Determination of Potential Hazardous Substances Exposures in a Research Laboratory Using Passive Sampling Techniques

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Presentation Subject Area: Environmental Sciences

The Chemical Hygiene Plan for the Robert S. Kerr Environmental Research Center has a stated requirement that exposure assessments of tasks or operations that involve the use of hazardous substances shall be performed during the initial phases of a research project. The purpose of this study is to determine what the potential for exposure to volatile organic compounds (VOCs) may be to Kerr Research Center employees. To assess employees' potential exposure, passive air samplers were used to collect VOCs, both on selected employees and in selected laboratories, during laboratory activities that involved these hazardous substances. The samplers were worn by employees for a 24-hour period, usually over a three-day work schedule, or placed in the monitored laboratories for a 72- hour period. The exposed samplers were stored in a clean refrigerator until extraction of the absorbent filters could be performed. The filters were extracted using a 2:1 ratio of acetone:carbon disulfide in a cold water bath sonicator. The resulting extract was amended with an internal standard mixture and submitted for analysis by gas chromatography/mass spectrometry to determine the identification of the absorbed VOCs. Average recoveries were near or better than 90% for all samplers used indicating little to no loss during extraction. Only compounds that could be positively identified using GC/MS, were of significant concentrations, and have potential industrial health implications set forth by the Occupational Safety and Health Administration (OSHA) were evaluated. Of those compounds, methylene chloride was the only one detected in all types of samplers. Tetrachloroethylene and hexane were both found in one lab each. All compounds evaluated were found to be well below the OSHA Permissible Exposure Limits (PEL's), indicating that detected levels of the hazardous materials monitored did not expose lab personnel to known harmful levels. The results of this study show that proper lab controls are in place to minimize exposure of laboratory personnel to hazardous materials, proper engineering controls are in place, and that lab personnel are using good lab practices in handling hazardous materials.

Acute Phase Responses to Endocrine Disruption in the Pregnant Gilt

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Presentation Subject Area: Whiteman Award Presentation

In the pig, the conceptuses release estrogen to establish pregnancy on day 12 of gestation, which is temporally followed by attachment of the trophoblast to the uterine surface epithelial between days 13 to 18. Administration of exogenous estrogen to pregnant gilts on days 9 and 10 of pregnancy will cause conceptus degradation between days 15 to 18 of gestation. Conceptus degeneration is associated with a breakdown of the glycocalyx that covers the microvilli on the apical border of the uterine surface epithelium. Tumor Necrosis Factor Stimulated Gene-6 (TSG-6) is a vital linker for ECM formation. TSG-6 has been shown to be stimulated by prostaglandin E (PGE), a product of cyclooxygenase 2 (COX-2). In our lab we have identified TSG-6, inter-alpha-trypsin inhibitor (ITI), Hyaluronic Acid synthase 2, and three (Has-2/3), and Cox-2 in the pig uterus. We hypothesized early estrogen administration disrupts these factors from critical stabilization of the glycocalx. Mated gilts (4gilts/trt/day) were treated with either 5mg estradiol cypionate (EC), or corn oil (CO) on days 9 and 10 of gestation. Conceptuses were flushed from the uterine horns with 20mL Hank's Balanced Salt solution following surgical removal of the uterine horn on either days: 10, 12, 13, 15, 17 of gestation. Endometrium and conceptus tissue was snap frozen in liquid nitrogen. Total RNA was extracted using RNAwiz[®] (Ambion). TSG-6, ITI, Has-2/3, and Cox-2 gene expression was quantified by RT-PCR utilizing a fluorescence reporter and a 5' exonuclease assay system. We detected the TSG-6 protein in uterine flushings using a monoclonal antibody made in the rat against human. PGE amount was determined using an immunoassay from (R&D Systems). TSG-6, ITI, Has-2/3 gene expression was present in the uterus of pregnant gilts, but unaltered by the estrogen treatment. However, TSG-6 gene expression showed a significant status (cyclic vs pregnant) effect ($P < 0.04$). Estrogen treatment elevated Cox-2 gene expression on day 10 of pregnancy two fold over the control ($P < 0.06$). Estrogen treatment decreased Cox-2 gene expression by five fold on day 12 of pregnancy ($P < 0.02$). TSG-6 protein was present all days of gestation. In the uterine flushings PGE was highest on day 17 ($P = 0.0001$). Estrogen has been clearly shown to act as an endocrine disruptor when given before the normal appearance on day 12 of gestation. The present study shows that Cox-2 is affected by estrogen treatment. The mechanism for this is still unclear, but may be anti-inflammatory as a possible regulator of the uterine protease network.

Freshmen Flunk-outs: The role of family support in a freshman's success and failure at college.

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Presentation Subject Area: Social Sciences

The research investigated the role of family and peer support in the freshman college experience. Prior research has shown that students who routinely discuss issues with parents adapt better to the university setting than those who do not. Furthermore, students with low levels of parental and peer attachment have

been shown to have difficulty in making career decisions. Many studies have shown that students with high levels of parental and peer attachment generally high levels of self-esteem, and in separate studies, self-esteem levels have been found to be related to academic performance and the likelihood of engaging in risk-taking behaviors. The present study involving 93 participants showed that family support was positively correlated with peer support, self-esteem, and academic attitude and negatively correlated with a number of risky behaviors, including behaviors related to alcohol and sex.

Comparing Functional Fitness of Older Adult Drivers and Non-Drivers

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McNair Scholars Program

Wichita State University

Presentation Subject Area: Social Sciences

Since the aging population continues to grow at a tremendous rate, maintaining independence and quality of life are critical to the older adult population. One of the most critical activities of older adult's independence is the ability to drive. This study examines the functional fitness, physical fitness and mental health of older adult drivers and non-drivers using the Health and Lifestyle Review (HLR) assessment battery. Eighty-five older adults, (mean age of 84.89 yrs) from an independent living retirement community in the Mid-West volunteered to take the assessment. Results indicate that drivers have higher grip strength, higher level of Activities of Daily Living (ADL), and lower fear of falling than non-drivers. Given the differences found across groups, implications for interventions such as fitness programs to maintain independent living activities are discussed.

African Americans and the Need for Greater Prevalence in the Newsroom

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Presentation Subject Area: Minority Issues

The news is a very important aspect of our society. We depend on it for information, education, entertainment, and many other things. Since the news is such an important element in our lives, it is crucial that it is presented by a vast array of people so stories are given the respect and insight they deserve. The lack of interest of African Americans and other minorities to work in the field of mass communication helps to perpetuate negative perceptions and stereotypes of African Americans. By conducting interviews and examining current literature, this research helps to investigate why media coverage is perceived to be negative toward African Americans and other minorities.

The impact of tropical deforestation on river chemical pollution

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Presentation Subject Area: Environmental Sciences

This study aims at providing a quantitative description of the impact of converting tropical forests into pastures for cattle grazing in terms of the sediment, nitrogen and phosphorus concentrations at the outlet of a river basin located on the North West of Costa Rica. Twenty years of daily precipitation, maximum and minimum temperatures, and digital elevation, land cover and soil type maps were used with the Soil and Water Assessment Tool (SWAT) to model the watershed. A flow balance calibration was performed by comparing results to published measurements. Graphs for sediment, nitrogen and phosphorus concentration vs. percent area of the watershed under pasture were plotted and they showed an expected monotonic increase in pollutants as deforestation increased. Contaminant levels at the main river outlet if the entire watershed was under pasture are between 3 and 8 times higher than if the total area was forested, which could put at risk the drinking water supply and the tourism-based economy of the area. The effect of varying animal densities was also tested and resulted in small pollutant concentration differences, suggesting that the broken terrain, uneven precipitation patterns and highly erodible pastures are the main drivers of pollution, not grazing itself. A comparison of individual sub-basin contributions to total contaminant loads with current land use patterns showed the need to establish policies so that the most fragile areas are reforested. Keeping the current percent area under pasture constant but restricting pastures to the less fragile lands decreased sediment loads by more than 20%.

Assessment of the Economics and Land Quality Benefits of Using Urban COMPOST in Rural Grain Production: An Oklahoma, Winter Wheat Case Study

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Presentation Subject Area: Social Sciences

This study is aimed at urban composting and its applicability to increase crop yield. The study addresses the differences both economically and ecologically in urban compost and synthetic fertilizer. The case study portion of the thesis is directed at the results of urban composting in Oklahoma from a soil nutrient standpoint, while using software to test if the new urban waste application is economically feasible for farmers as an alternative to harsh man made fertilizers.

A Novel Electrodialysis Technique For Selection Of Binding Aptamer Species In SELEX

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Presentation Subject Area: Biomedical Sciences

Aptamers are single strand RNA or DNA oligonucleotides typically shorter than 100 bases long that recognize a target through stereochemical, non-covalent bonding, similar to antibodies. Aptamers are

selected from pools of 10^9 to 10^{13} distinct synthetic oligonucleotide species via a process termed SELEX (Systematic Evolution of Ligands by Exponential enrichment). Traditional SELEX is an iterative process that involves the cyclic exposure of a pool of ONs to a target, partitioning of target bound from unbound species, and amplification of target bound species with the polymerase chain reaction (PCR). SELEX is an iterative process typically requiring twelve to twenty rounds, until most of the non-binding or poorly binding ONs have been eliminated from the pool. As SELEX approaches completion, the pool will be nearly homogenous, with those ONs remaining exhibiting high affinity for the target. SELEX typically requires twelve to twenty rounds complete because the partitioning step is not very efficient. Partitioning strategies include biotin-streptavidin pull-down, filtration, precipitation, or chromatography. The high number of rounds required for SELEX also increase the likelihood that the SELEX pool will be lost through an operational error. Thus a SELEX method which reduces the number of required rounds required to complete SELEX would be highly advantageous. One group has attempted to solve these problems with the use of capillary electrophoresis (CE) in which very small volumes of target and ON pool are incubated in solution and separated in an electrophoretic field. This group was able to select an aptamer with high affinity for IgE (Kd 27 +/- 8 nM) in four rounds of SELEX. One problem with CE-SELEX is that the target bound ONs typically do not migrate through the CE and are difficult to locate in the capillary efflux. We are developing a novel SELEX method that uses electro dialysis (ED) to partition target-bound and unbound ONs. Like CE-SELEX, this approach takes advantage of superior partitioning of the highly anionic ONs by electro-separation, but with the added advantage that the target-bound ONs in ED-SELEX are readily located for the subsequent SELEX step of amplification. To conduct ED-SELEX, target is incubated with the ON pool in solution and after appropriate incubation time to allow binding to occur, the solution is placed in a dialysis membrane with a differential molecular weight cut off that allows the ONs to pass through the membrane while retaining larger targets and any ONs bound to target. The dialysis membrane is then placed in an electrophoretic field, unbound ONs are driven out of the membrane, and the contents of the membrane are then used directly in PCR for amplification of bound species. The use of ED allows more latitude in presentation of oligomeric or aggregated targets and direct retrieval of all bound species as compared to capillary electrophoresis SELEX. Preliminary results have shown that we have applied much greater selection pressure utilizing this method than other, more traditional, methods used in previous SELEX strategies in our laboratory.

Effects of Protein Source and Metabolizable Energy Concentration on Growth Performance and Development of the Stomach, Small Intestine, and Pancreas in Weanling Pigs

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Presentation Subject Area: Whiteman Award Presentation

Spray-dried porcine plasma (SDPP) in weanling pig diets improves performance in the immediate post-weaning period. In a previous experiment, decreasing the metabolizable energy (ME) level in diets containing SDPP for weanling pigs resulted in a linear increase in body weight gain/100 kcal ME intake. To determine whether the increase in gain is due to SDPP or due to lower ME (low fat), two experiments were conducted to determine the effects of reducing the ME concentration of diets containing either soy protein concentrate (SPC) or SDPP on growth performance and development of the pancreas, stomach, and small intestine in weanling pigs. In Exp. 1, a total of 168 pigs (avg BW = 5.8 kg) were weaned at approximately 21 d and allotted to four dietary treatments (7 pens/trt) in a 2 x 2 factorial design with two CP sources (SPC vs SDPP) and two ME levels (3,523 vs 3,323). All diets contained 1.35% digestible Lys. Pigs and feeders

were weighed on d 0, 7, 14, and 18 to determine ADG, ADFI, and feed:gain (F:G) ratio. Pigs fed SDPP tended to have greater ($P < 0.08$) ADG, ADFI, F:G, and gain/ME intake than pigs fed SPC from d 0 to 18. Reducing ME had no effect ($P > 0.10$) on growth performance, but it increased ($P < 0.10$) gain/ME intake. The improvement in weight gain/ME intake associated with reducing ME of the diet tended to be greater for pigs fed SPC than for pigs fed SDPP (CP source \times ME level, $P < 0.10$). In addition, for pigs fed SPC, reduced ME decreased ($P < 0.07$) F:G ratio (d 0 to 18) and increased ($P < 0.08$) weight gain/Lys intake, but there was no effect for pigs fed SDPP. These results suggest that the source of dietary protein may affect energy (fat) utilization. In Exp. 2, a total of 100 pigs (avg BW = 6.1 kg) were weaned at approximately 18 d and allotted to four dietary treatments as in Exp. 1. Pigs were housed in metabolic chambers (5 pigs/pen) for 14 d. On d 3, 7, and 14, one pig was removed from each pen, weighed, and slaughtered. The pancreas was carefully removed and weighed. The stomach and small intestine were excised, emptied, washed, and weighed. All organ weights were computed in g per kg body weight (g/kg BW) of the pig. The ME level did not affect ($P > 0.10$) the development of the pancreas, stomach or small intestine on any day. On d 7, the small intestine weight (g/kg BW) was lower ($P < 0.05$) in pigs fed SDPP compared to pigs fed SPC diets. On d 14, both the individual and combined weights of the stomach and small intestine tended to be lower ($P < 0.05$) in pigs fed SDPP compared to those fed SPC. These results support previous studies that reported reduced intestinal growth in pigs fed SDPP diets. However, the effect of protein source on fat utilization remains to be elucidated.

Creating economic value added (EVA): The case of the U.S. airline industry

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Presentation Subject Area: Social Sciences

The purpose of this paper is to outlay the facts and figures that can illustrate the value destruction in the U.S. airline industry for the period of 1990-1999. The objective of the study is to argue that rather than using accounting return figures, such as net income, the measurement of value creation of the company should have been the main performance indicator. Thus, the value creation measure could have been signaling the present financial distress in the airline industry beforehand. The paper is organized as follows: a brief report on the current status of the airline industry, explanation of the concept of economic value, and use of value creation analysis in assessing firms' or industry's performance.

Economic profit can be expressed as: $\text{Economic Profit (EP)} = \text{Invested Capital} * (\text{ROIC} - \text{WACC})$, where ROIC is the return on invested capital and WACC is the weighted average cost of capital (Copeland, 2000). In order to create economic value the investments should earn a ROIC that is higher than WACC (Rappaport, 1998). The economic profit can also be viewed as the difference between the net operating profit less adjusted taxes (NOPLAT) and capital charge which is the product of the ROIC and WACC.

The analysis in this paper is based on the performance of the nine major U.S. Airlines between 1990 and 1999 as reported by Pettit and Goldberg (2000). Based on this information one would have expected that the airlines with the highest NOPLAT were expected to be a sound investment for the future. However, EVA analysis tells us a totally different story.

Strategic Thinking for Taiwan's Tourism and Hospitality Industry - Sustaining Viability and competitive Advantage in Post SARS

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Presentation Subject Area: Social Sciences

The SARS (Severe Acute Respiratory Syndrome) epidemic had a negatively profound impact on tourism around the world. Therefore, more than 110 countries placed travel ban or travel restrictions on Asia (McKercher and Chon, 2003). Pine and McKercher (2004) noted that the mainly through loss of inbound traffic plus a decline of personal and business travel as well as postponement of capital investment.

The hospitality and tourism industry in Taiwan also had badly affected by the SARS outbreak. The purpose of this study is to provide a strategy framework on the basis of the co-alignment principle for firms' future strategy formulation and implementation after reviewing the impact and the responses. Following the thinking of the framework, the firm will be able to adjust its vision of business plan, establish the variety of products and services, redefine the concept of value, and ride with the wave of IT (Information Technology) innovation. Hence, the firm is likely to have the capability in handling an environmental threat and underlying crisis in the future.

Ultimately strategies formulated from the vision, variety, value and information technology should win in the long term. First, the integration combines the information and traditional competitive advantages and ways of competing. Secondly, most investors will see the stable investment climate in Taiwan as soon as the industry established its vision of global positioning. Thirdly, most customers will value the variety of products or service with distinctive quality over the discounted prices. Finally, the economic value added will set the right course for the development and help sustain the competitive advantage.

Toward E-Commerce in the Hospitality and Tourism Industry: An Exploratory Survey of Customers Perception

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Presentation Subject Area: Social Sciences

The Internet revolution has rapidly changed the distribution of information and the way people do business as well as fostering an alternative way for customers to shop. Its impact has been seen in the tourism business (TIA, 2000; Weber and Roehl, 1999) as the information search is an influential process in a customer's purchase decision-making. The firms in the hospitality and tourism industry are moving towards electronic commerce (e-commerce) in hopes of achieving higher profits.

The questionnaire was developed via a series of focus group interviews utilizing open-ended questions to obtain thirteen elements that are believed to influence customers' willingness to conduct an online purchase. Respondents' online experiences were controlled and a pretest was conducted prior to the final questionnaire. The sample size was 227 and an exploratory factor analysis was conducted to analyze the underlying structure of the data matrix. Multiple regression analysis was also called later for explaining the variance accounted for by each factor with regard to the satisfaction of using online application systems.

The purpose of this study is to analyze the underlying structure of the customer's perception regarding using the online application systems in the hospitality and tourism industry. The four factors found reveal the

concerns of the online customers and are likely to influence their purchasing behavior. The findings suggested that many customers indeed are image-oriented and very sentimental and practical as well. The security issue in general is believed as an important element but is found not the primary concern in the study. In general, the findings provide a typology of the online customers for the firms to develop a more effective marketing strategy in the competitive e-commerce environment.

Characterization of the Spiroplasma P58 Multigene Family

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Presentation Subject Area: Biological Sciences

Spiroplasma kunkelii and *S. citri* are prokaryotic phytopathogens transmitted primarily by insect vectors. Among the nucleic acid sequence differences between the genomes of an insect transmissible *S. citri* BR3-3X line and a non-transmissible derivative line BR3-G was the absence, in the derivative, of a gene encoding a 58 kDa membrane protein. At least two P58-like gene sequences are present in *S. citri* BR3-3X, and at least seven P58-like gene sequences are present in *S. kunkelii* CR2-3X. Because spiroplasma genomes have evolved to be reduced in size, retention of a multigene family is unexpected. Alignment of the P58-like sequences revealed different types of N-terminal and C-terminal ends, suggestive of one or more recombination events. A PSI-BLAST analysis indicated that P58 is related to bacteriophage terminases, suggesting a bacteriophage origin, but at least one P58 is present as a surface exposed membrane protein, a context unusual for a terminase. Recombination events, such as the one described here, may have implications for *Spiroplasma* evolution and niche adaptation.

Effects of Roughage Level and Fibrozyme Supplementation on Performance and Carcass Characteristics of Finishing Beef Steers

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Presentation Subject Area: Whiteman Award Presentation

The objective of this experiment was to determine the effects of roughage level and Fibrozyme supplementation on performance and carcass characteristics of finishing beef steers. One hundred eighty-four yearling steers (initial BW = 343 ± 42.1 kg) were used in a randomized complete block design with a 2 x 2 factorial arrangement of treatments. Steers were fed dry rolled corn-based finishing diets; treatments (8 pens/treatment) included (DM basis): 1) 9.0% alfalfa hay without Fibrozyme (9N); 2) 9.0% alfalfa hay with Fibrozyme (10 g·steer⁻¹·d⁻¹) (9Y); 3) 4.5% alfalfa hay without FibrozymeTM (4N); 4) 4.5% alfalfa hay with Fibrozyme (10 g·steer⁻¹·d⁻¹) (4Y). Steers in the heaviest weight block were harvested on d 126; steers in the remaining three weight blocks were harvested on d 159. Steers were implanted (Component E-S) at the initiation of the trial and reimplanted (Revalor-S) on d 56. Fibrozyme supplementation increased (P = 0.05) carcass-adjusted final body weight (BW). From d 0 to harvest, neither dry matter intake nor average daily gain (ADG) was affected (P ≥ 0.13) by treatment; however, enzyme supplementation increased (P = 0.10) carcass-adjusted ADG. Roughage level x Fibrozyme supplementation interactions were detected (P ≤ 0.08) for carcass adjusted final BW, carcass-adjusted ADG, and carcass-adjusted gain efficiency. These

interactions resulted in steers being fed the 4Y diet having greater performance ($P \leq 0.07$) than steers fed the 4N diet; no differences were observed ($P \geq 0.55$) between steers fed the 9Y or 9N diets. An enzyme effect ($P = 0.05$) and roughage level x enzyme supplementation interaction ($P = 0.08$) were detected for hot carcass weight (HCW). Steers fed the 4Y diet had heavier ($P = 0.01$) HCW than those receiving the 4N diet; however, no difference was detected ($P = 0.86$) between steers fed the 9N and 9Y treatments. A roughage level x enzyme supplementation interaction was also detected ($P = 0.06$) for USDA Yield Grade scores. Steers fed the 4N diets had lower ($P = 0.04$) yield grades than steers fed the 4Y diets; steers fed the 9N and 9Y diets did not differ ($P = 0.53$). No other carcass measurements were affected ($P \geq 0.17$) by treatment. When dry rolled corn-based finishing diets are fed, it appears that Fibrozyme supplementation was more efficacious in diets containing 4.5% alfalfa hay than those containing 9.0% alfalfa hay.

Evaluation of beta-glucan and antibiotics on growth performance of weanling and finishing pigs

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Presentation Subject Area: Whiteman Award Presentation

The use of sub-therapeutic antibiotics in animal diets is a topic of increasing controversy worldwide. Therefore, the identification of alternatives to antibiotics is warranted in the event of a ban on the use of sub-therapeutic antibiotics. One such alternative is beta-glucan. Beta-glucan is a yeast-derivative, which functions as immunomodulator that helps boost and activate the immune system. Benefits of beta-glucan that have been proposed include combating challenges from disease-causing organisms, controlling clinical infection and maintaining growth processes. To test the efficacy, two experiments were conducted to determine the effects of beta-glucan (BG) on growth performance of pigs. In Exp. 1, a total of 176 pigs (21 d; average BW = 5.63 kg) were allotted randomly to four dietary treatments (8 pens/trt): 1) No antibiotic or BG (negative control); 2) 0.25% carbadox; 3) 0.2% BG; or 4) 0.4% BG. Pigs were fed in three dietary phases (1.6, 1.4, and 1.2% lysine) during the 42-d study. Pigs and feeders were weighed weekly to determine average daily gain (ADG), average daily feed intake (ADFI) and feed to gain ratio (F:G). In Exp. 2, a total of 144 pigs (20 d; average BW = 5.39 kg) were blocked by weight and allotted randomly to four dietary treatments (6 pens/trt; 6 pigs/pen) in a 2 x 2 factorial design with two levels of carbadox (0 vs 0.25%) and two levels of BG (0 vs 0.20%). Following the 42-d nursery phase, four pigs from each nursery pen were randomly chosen, allotted to pens, and fed the same dietary treatments with chlortetracycline (CTC; 0.10%) replacing carbadox as the antibiotic until a final weight of approximately 105 kg. Pigs and feeders were weighed every 2 weeks. Carcass traits were collected from two pigs per pen. In Exp. 1, there were no differences ($P > 0.10$) in ADG, ADFI and F:G of pigs fed diets with carbadox or 0.2% BG. The pigs fed diets with 0.4% BG had ADG and ADFI similar to negative control pigs, but lower ($P < 0.10$) than those fed diets with carbadox or 0.2% BG. In Exp. 2, there were no interactions ($P > 0.10$) between BG or carbadox inclusion. The addition of carbadox or BG tended to increase ($P < 0.06$) ADG, but had no effect ($P > 0.10$) on ADFI and F:G. During the finishing phase, there were no effects ($P > 0.10$) of dietary treatments; however, the inclusion of either CTC or BG numerically improved ADG by 4 and 6%, respectively. For the entire period, ADG was improved by 4 to 5% with addition of antibiotic or BG. Carcass traits were not affected ($P > 0.10$) by dietary treatment. These results suggest a potential for beta-glucan to serve as an alternative, or in combination with antibiotics, to improve growth performance of weanling to finishing pigs.

Societal-based Computational Intelligence: New Approaches in Optimization

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Presentation Subject Area: Physical Sciences & Technology

In light of inspiration from nature metaphor, in this paper, we propose the uses of sociology based algorithms to build computational models in order to solve engineering optimization problems. Motivated from the societal relationships among the animal or human societies, it is becoming one of the newly emerging intelligence-based paradigms, showing a great promise. While research in some of the computational-intelligence areas such as neural networks and evolutionary computations can be dated back to some decades ago, the novel idea rooted in the societal based algorithm had barely surfaced within a few years. Particle swarm optimization as one of the first algorithms using the relationship between flying birds attracted a lot of attention in solving engineering optimization and decision-making problems. Ant colony optimization which is based on the pheromone deposition from natural ant colony was proposed to solve some similar problems including combinatorial optimization problems. Most recently, research was further extended to incorporate relationships among human societies, nations, governments, and civilization. In this paper, we first briefly review literature about the societal based paradigms. Built on the existing paradigms, we propose some modifications whose idea is inspired from the relationship within the human society. We then demonstrate the great promise and efficient results of the proposed societal-based computational algorithms in single-objective and multi-objective optimization problems by applying into some hard benchmark real-world engineering problems.

Using Neural Networks And Trajectory Calculations As Tools For Fitting The Potential-Energy Hypersurface Of The Gas-Phase Unimolecular Decomposition of Vinyl Bromide

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Presentation Subject Area: Physical Sciences & Technology

A neural network / trajectory approach is utilized for the development of accurate potential-energy hypersurface that is then employed to conduct *ab initio* molecular dynamics (MD) of gas-phase chemical reactions. The important regions of configuration space are determined using an integration of *ab initio* electronic structure calculations with importance sampling techniques that involve an integration of MD calculations with neural networks that accurately interpolate the computed *ab initio* energies. The results show that the sampling methods permit the important regions of configuration space to be easily and rapidly identified, that the convergence of the neural network fit to the *ab initio* database can be easily monitored and that the interpolation of the neural network fit is excellent even for a system as large as vinyl bromide. This robust approach is relatively easy to implement and permits a substantial advantage over existing methods in both computational speed and accuracy.

Habitat Use and Ecology of an Urban Population of the Texas Horned Lizard

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Presentation Subject Area: Biological Sciences

The response of reptile populations to urban development is poorly understood compared to other classes of vertebrates. An understanding of the unique management issues of urban populations is especially important for species, such as the Texas horned lizard (*Phrynosoma cornutum*), which is known to decline in abundance following urban and agricultural expansion. However, because Texas horned lizards have small spatial requirements, populations can survive in protected areas within an urban environment. We used radio telemetry and fluorescent powder-tracking to collect preliminary data on micro- and macrohabitat use, home range, seasonal movements, and survival rates of *P. cornutum* at Tinker Air Force Base in Oklahoma City. We captured 26 females, 23 males, and 5 hatchlings in 2004. Thirteen lizards were released with transmitters and relocated using radio telemetry for 1- 7 months. We collected habitat data for 704 capture locations and paired random, available locations. Microhabitats used by lizards had more bare ground than available microhabitats. Therefore, horned lizards within the study site may benefit if more open area was available, although areas of dense vegetation are still required. At a macro-scale, lizard locations appeared tied closely to trails and disturbed ground. Characteristics of sites selected for nesting and hibernation were determined. Average home range size (100% convex polygons) was 0.47 ha for adult females and 1.16 ha for adult males. There was little overlap between home ranges of lizards, especially among males.

The role of phonological and semantic information in tip-of-the-tongue states: Evidence from Spanish-English bilinguals

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Presentation Subject Area: Social Sciences

TOT is a phenomenon in which a person knows a word but is unable to produce it. Prior research has shown that TOT rates are influenced by phonological (sound) processing. The present research tested the hypothesis that both phonological (sound) and semantic (meaning) processing influence TOT. In the experiment, Spanish-English bilinguals named English words when cued with written definitions. When the correct word was not produced, a secondary task was performed in which a Spanish word was rated on its ease of pronunciation. Half of the time, the Spanish word was similar to the English word; the words were similar 1) both in sound and meaning; 2) in sound only; or 3) in meaning only. The results confirmed the hypothesis, showing that more correct responses occurred when the Spanish word was similar to the English target word in both sound and meaning than when the Spanish word was similar in sound only or meaning only.

Selection of an Aptamer against Surface Exposed Targets on Yersinia pestis

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Presentation Subject Area: Biomedical Sciences

Yersinia pestis (Yp), causative agent of plague, is one of the CDC 'category A' agents of priority for biodefense interests. There are no effective rapid diagnostic tools for detection of this pathogen in affected individuals. Thus development of a rapid, highly sensitive, specific, and feasible diagnostic approach for identification of Yp is a high priority. Aptamers are short oligonucleotide sequences of DNA or RNA that bind to specific targets in a manner that is analogous to an antibody-antigen interaction. Aptamers are isolated from a complex library of 10¹¹ to 10¹⁵ molecules by Systematic Evolution of Ligands by Exponential Enrichment (SELEX), which is an iterative process of adsorption, recovery and amplification of target bound oligonucleotides. Major virulence factors of Yp include the lipo-oligosaccharide (LOS), F1 capsular antigen, Type III secretory system and V-antigen. The F1 antigen was selected as a target because of its external presentation, making it easy for aptamer binding and high copy number. It is also unique to Yp. F1 antigen is expressed from a 100 kb plasmid pFra in Yp at 37°C and is present as a multimer of approx. 300 kDa under normal physiological conditions. Yp strain D27 was grown to 37°C, F1 antigen isolated by ammonium sulfate precipitation and subsequent purification by high performance liquid chromatography. Purified F1 antigen was characterized by SDS-PAGE, Western blots using a primary antibody specific to F1 antigen, and mass spectrometry. This confirmed the existence of the monomeric form of the protein with a molecular weight of 15.5 kDa. SELEX using the purified F1 antigen was conducted by incubating 10 nM of the protein with a synthetic pool of 10¹⁵ oligonucleotides in a 1:10 ratio. Bound oligonucleotide-target complexes were separated from the unbound species by the process of electro-dialysis. PCR amplification of the bound pool, gel purification and positive strand separation using biotinylated beads was carried out. This process was continued for 4 rounds and the recovered pool was cloned and sequenced to determine whether consensus sequence species were present, which favor binding to the target. Based on the complexity of the pool, further SELEX steps will be carried out and binding assays performed to determine the kinetics of binding interactions. The aptamer thus selected can be used in *in vitro* diagnostic assays to detect F1 antigen of *Yersinia pestis*.

Characterization of Porcine Tissue Kallikreins: Towards Understanding the Biology of a Complex Family of Genes

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Presentation Subject Area: Whiteman Award Presentation

Kallikreins are members of a multigene family of serine proteases that are widespread throughout living organisms. They are found in diverse tissue specific patterns and are known to have highly diverse physiological functions. To gain insight into the structure and evolutionary origins of the kallikrein gene region in the pig, we have isolated several BAC clones containing members of the porcine tissue kallikrein gene family and constructed a BAC clone based Physical map of the porcine greater kallikrein gene region. We have also mapped the kallikrein gene region to porcine chromosome 6q1.2.

Sequence analysis of the greater kallikrein region has revealed the presence of 13 kallikrein genes in the porcine genome, among which 11 are novel porcine kallikrein genes. Furthermore, as a first step towards understanding the tissue specific expression patterns of the pig kallikrein gene family members, we have performed a global expression analysis of all porcine tissue kallikreins. We have also conducted quantitative real-time PCR based, expression analysis of porcine kallikreins to evaluate the expression of tissue kallikreins in the porcine endometrium and conceptus during the estrous cycle and early embryonic development to better understand the role of kallikreins in placental development and embryonic survival in the pig.

Development and Implementation of a Sustainable Apparel Design and Production Conceptual Framework

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Presentation Subject Area: Environmental Sciences

Many environmental problems related to apparel industry, such as toxicity in dyeing wastewater, could be minimized by apparel designers and manufacturers. In mass production system which everything must be planned and designed, designers could be the key role for considering and solving environmental problem (Papanek, Design for the real world: Human ecology and social change, New York: Pantheon Books, 1971). However, no apparel design and production model put designers' role in environmental sustainability into consideration. This project is to develop, implement and evaluate an apparel design and production conceptual framework, C2CAD, which allows apparel designers and manufacturers to consider environmental sustainability in their design and production processes. McDonough and Braungart's 'cradle to cradle' model provides designers with a new way to design products and eliminate many environmental problems during the design phase of the product life cycle. C2CAD framework integrates 'cradle to cradle' into apparel design and production models to provide sustainable production guidelines for apparel designers and manufacturers. This project implements C2CAD in knitwear design and production and produces a C2CAD knitwear as a proof-of-concept research. This project consists of four phase 1) Development C2CAD framework; 2) Implement C2CAD in knitwear design and production and produce a C2CAD knitwear; 3) Evaluate the performance, including colorfastness, abrasion resistance and dimensional stability, and cost of C2CAD knitwear; and 4) Revise C2CAD based on evaluation results and prepare an instructional unit to teach Apparel Design and Production students C2CAD framework. Using C2CAD framework, apparel designers and manufacturers select chemicals and materials based on their inherent human and environmental health and safety. Therefore, employee occupational safety and local people's living quality could be improved. With materials designed to cycle safely at the end of the products' life, the C2CAD framework also helps diminish resource consumption in the apparel industry. C2CAD framework and the implementation case study in knitwear production could be integrated into educational material and apparel design and production students could pay more attention to the environmental impacts of their future work.

Shape and Size Effects on Semiconductor Quantum Dot Energy Levels and Optical Spectra

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Presentation Subject Area: Physical Sciences & Technology

Semiconductor quantum dots or nanoparticles have found use in several nanotechnology applications, such as sensors, microlasers, and light-emitting diodes. Near-spherical quantum dots can be prepared using chemical and physical means. In this work the energy levels are calculated for HgTe, CdTe, and CdSe nanoparticles of various sizes using spherical infinite well and finite well models, with the height of the well being 5 eV for the HgTe finite well case. During preparation, slight deformations in the spherical shape of these quantum dots can occur. These are treated as perturbations to the spherical well models. For various values of deformation or ellipticity the energy level shifts for prolate and oblate quantum dots, with respect to spherical quantum dots, are calculated and compared with the literature available. The optical absorption and emission energies are also calculated for various sizes and spheroidal shape deformations of the quantum dots. Significant shifts in energy levels and transition energies due to shape deformation are found. Deformation leads to the lifting of degeneracy in the energy levels, to additional transitions in the absorption and emission spectra, and perhaps to the formation of long lived electron-hole pairs. Other effects, like Coulombic and exchange interactions, and surface states, could be taken into account as further perturbations to this model, which applies to quantum dots in the strong-confinement limit.

Using Non-Invasive Genetic Sampling to Elucidate Genetic Structure of a Naturally Recolonizing Population of Black Bears (*Ursus americanus*) in Eastern Oklahoma, USA.

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Oklahoma State University
Presentation Subject Area: Biological Sciences

An aggressive reintroduction program contributed to the successful recolonization of black bears into Arkansas during the latter half of the 1900s. Approximately 260 black bears were translocated into Arkansas in the 1950s and 1960s. Black bears from Arkansas are now dispersing west into southeastern Oklahoma where bears have been absent since the early 1900s. Genetic monitoring of this dispersal event provides a unique opportunity to examine population and genetic characteristics of naturally recolonizing populations. Not only is natural recolonization valuable as a potential tool for maintenance and enhancement of wildlife populations, but populations involved in recolonization events can provide sources of novel genetic variation. Objectives of the overall project include using DNA extracted from hair follicle samples to: 1) examine levels of genetic variation at 10 microsatellite loci; and 2) elucidate the sex ratio by examining the amelogenin locus located on the X and Y.

Computer Aided Design of Custom Chemicals

**Srinivasa Godavarthy, B.J. Neely, J. E. Fitzgerald, K.A.M Gasem, and R.L. Robinson, Jr.,
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Oklahoma State University
Presentation Subject Area: Physical Sciences & Technology**

The traditional method of sequential molecular discovery for developing new chemicals requires expensive synthesis and time consuming experimental physico-chemical property estimation. Also several hundred, and in some in the cases several thousand new molecules, have to be synthesized and tested before viable chemicals can be identified. One possible solution to these development problems is the use of virtual screening where in (a) the synthesis state is replaced by genetic algorithm based virtual synthesis, (b) experimental property evaluation requirements are minimized through the use of precise and accurate non-linear structure-based models, and (c) use of robust scoring modules which guide the virtual screening algorithms toward the most feasible subset of molecules. However, our previous chemical development experience indicates that the success of these algorithms is highly dependent on the quality of the scoring modules and physio-chemical property models, which in turn are dependent on the quality of experimental data used. To meet these requirements, and develop a viable capability for virtual design of chemicals we are currently developing novel experimental apparatus and robust non-linear structure-based models. Discussed in this presentation will be QSPR based model development for boiling point, melting point, vapor pressure, saturated phase densities, aqueous solubility, octanol water partition coefficients, Hansen solubility parameters, critical temperature, pressure and volume and infinite dilution activity coefficients. Also highlighted in this talk is the use of genetic algorithm based scoring modules. This presentation aims to highlight our model development efforts and provide some examples of real life chemical development problems which have been solved through the use of these tools.

Educational Administration Journal Impact: A Decade in Review

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Presentation Subject Area: Education**

In an attempt to provide more objective assessments of selected educational administration journals, this paper reviews citation measures (Social Sciences Citation Index impact factor, immediacy index, and half-life) over the last decade, 1990-2000. The results focus on rankings, stability and trends. Findings provide academics and contributors with a collection of journal demographics and other information which may prove helpful in targeting journals for future submissions selection and in journal assessments.

Behavioral Effects of Latchkey Children as Compared to those with Adult Supervision

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An increase in the number of working mothers, as well as single-parent families, combined with a decrease in extended families that once helped with child care has contributed to the growing ranks of latchkey children (Turvett, 1995). This study was designed to determine the number of latchkey children among college students at a Midwestern university. The participants in this study were surveyed about various behaviors they participated in as children, their parent's income, type of childhood household, and various questions about the life of latchkey child. The goal of this study was to find out whether or not latchkey children behaved differently than those children with adult supervision. The hypothesis of this research study was rejected. The results of this study did not indicate significance in the behavioral differences between latchkey children and those with adult supervision.

Quantum-Dot Cellular Automata

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Presentation Subject Area: Physical Sciences & Technology

Quantum-Dot Cellular Automata is one of the most promising nanotechnologies to be the future replacement of the current CMOS technology. A thorough and up to date summary of the QCA technology will be presented. Different QCA designs will be discussed. The main concentration of this work is the maturity of the QCA technology. Several design problems will be discussed, each with the current solution if available. The solutions will be checked if they are sufficient or not. The problems that will be discussed: The non-symmetric design fault, backward propagation fault, and the consistency between the mathematical and the physical model.

Nanogeneration of Borosilicate Glass by Excimer Laser

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Presentation Subject Area: Environmental Sciences

Here a new Nanogeneration method has been experimented. Quite contrary to the conventional micromachining process, this is building of a nanostructure on materials like glass. A KrF (248nm wavelength) excimer laser that generates laser energy in the range of 100-550mJ has been used for this purpose. Different design patterns on borosilicate glass are practically tested in air, under water and in sugar solutions. The energy is supplied in such a way that it should not be sufficient for ablation to take place. Thus this energy is varied from 375mj in air to 516mj in water. The generated surfaces were observed using optical microscope and laser interference microscope. The result obtained is a generation of surface of height varying from 15 to 30nm.

Impact of Entrepreneur Characteristics on the International Growth of Born global Apparel Firms

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Presentation Subject Area: Social Sciences

Background: International process theory views internationalization as an incremental progress that develops after a period of domestic maturation and growth. However, recent studies on born global firms prove the limitation of this theory. A born global is defined as “the firm that is heavily involved in exporting at inception or shortly after establishment” (Knight & Cavusgil, 1996; Rennie, 1993). Most born global studies, however, primarily focus on high-technology industry with particular emphasis on incipient stage. In developing countries, most apparel firms have the nature of born global using labor-intensive operations. However, they often fail to maintain growth, and determinants of the growth remained largely unanswered. Among many potential factors, this study regards entrepreneur characteristics as more critical than others in explaining the international growth. The purpose of this study is to suggest the propositions that explain the impact of entrepreneur characteristics on born global firms’ growth after the inception.

Method and Results: This study chose South Korea as its focus since this country underwent the initial born global stage in the 1970s. Extensive literature reviews on academic and trade articles and in-depth interviews with field experts were conducted. Based on the literature reviews and interviews, the four propositions about entrepreneur characteristics were developed: Entrepreneur social networks, entrepreneur attitude toward innovative technology, investment, and R&D, entrepreneur international orientation, entrepreneur specific product knowledge and know-how.

Cloning and Sequencing of Conserved Gene Blocks of Drill Cytomegalovirus

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Presentation Subject Area: Biomedical Sciences

Primate cytomegaloviruses (CMVs) are the primary focus of research in our laboratory. We have isolated the drill monkey CMV (DrCMV) from a Nigeria primate. Our eventual goal is to sequence and analyze the entire genome of this large complex virus. We have cloned several large fragments of the genome in bacterial artificial chromosomes. These fragments were sub-cloned into plasmids and subjected to transposon insertion mutagenesis and sequencing. We have sequence of >80% of the clones and are designing primers to complete the project. The DNA sequences we have obtained contain several viral open reading frames, encoding essential viral genes.

Interaction Effect of E-satisfaction and E-Trust on E-loyalty: a Conceptual Framework

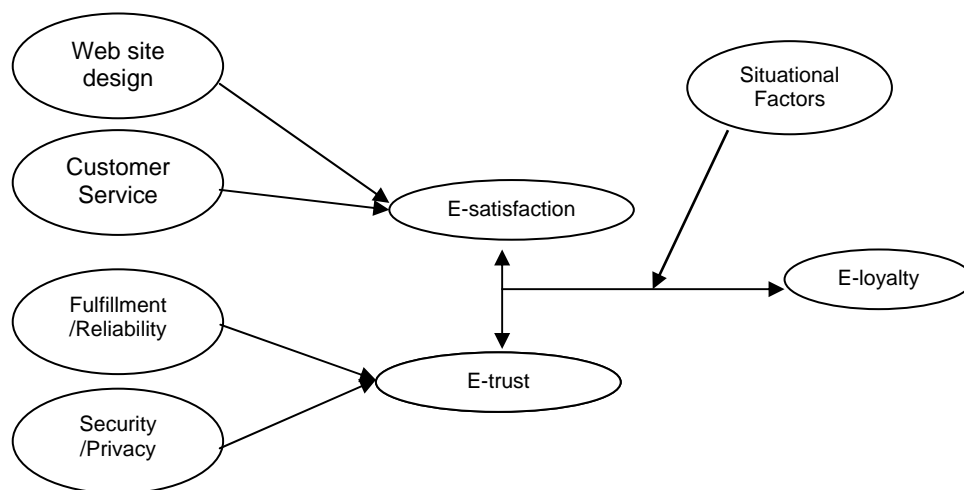
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Presentation Subject Area: Social Sciences

Loyalty has long been a core concept of successful retailing. Loyalty not only is a strong asset for the firm, but also leads the firm to constant growth and profit. In explaining the development of loyalty toward a retailer, satisfaction and trust have been a critical and widely explained concept. In online retailing context, the importance of loyalty, satisfaction and trust, and the close relationships among them still remain as a critical issue.

In understanding e-satisfaction and e-trust as antecedents of e-loyalty, previous studies found the individual influence of e-satisfaction and e-trust on e-loyalty. Further, some researchers included both e-satisfaction and e-trust to explain e-loyalty establishment in a sequential order. Harris and Goode (2004)¹ insisted that e-trust is indeed a critical component for e-loyalty only after accounting for previously established e-satisfaction. On the other hand, Singh and Sirdeshmukh (2000)² concluded that trust antecede satisfaction when explaining the development of e-loyalty. However, still not much is known about the interaction effect of e-satisfaction and e-trust upon e-loyalty.

The purpose of the study is to provide a conceptual framework based on the dynamic relationship of e-loyalty, e-satisfaction and e-trust. Specifically, the proposed model explains e-loyalty establishment through (1) the interaction effect of e-satisfaction and e-trust on e-loyalty, as well as (2) the antecedents and moderator of the relationship between e-loyalty, e-satisfaction and e-trust. This is to help retailers and researchers for understanding the substantial dimensions to consider when drawing the customers to their online store.

In the proposed framework, the interaction effect of e-satisfaction and e-trust is suggested as to be higher than the sole effect of e-satisfaction and e-trust on e-loyalty. The interaction effect here means, e-satisfaction cannot completely explain e-loyalty without e-trust, and e-trust neither can explain e-loyalty fully without e-satisfaction. Further, as antecedents of e-satisfaction and e-trust, this study posits customer evaluation of website attributes. Website attributes include website design, customer service, fulfillment/reliability and security/privacy. In addition, situational factors are maintained as moderator of the relationship between e-loyalty, e-satisfaction and e-trust. Since various situational factors can encourage or discourage online shopping, they are considered to be critical in explaining the prosperity of online retailing. As it was proved that convenience was a major consumer motivator for shopping online, this study posits situational factors especially related to customer convenience, such as time poverty geographical distance and lack of mobility.



1 Harris, L.C., & Goode, M.M.H. (2004). The four levels of loyalty and the pivotal role of trust: a study of online service dynamics. *Journal of Retailing*, 80(2), 139-158.

2 Singh, J. & Sirdeshmukh, D. (2000). Agency and trust mechanisms in consumer satisfaction and loyalty judgements. *Journal of the Academy of Marketing Science*, 28(1), 150-167.

The Fashion Consciousness and Apparel Purchasing Behavior of Mature Female Consumers

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Presentation Subject Area: Social Sciences

In the year 2000, American households in the 55-to-64 market segment had a median net worth 15 times greater than that reported for households in the under-35 age (Old is better, 2004). By the year 2020, persons 55 and older will comprise 33 percent of the U.S. population and will continue to control household assets far greater than those of younger consumers (Carrigan & Szmigin, 1999). And yet despite the growing number and obvious wealth of older consumers, they remain one of the most underappreciated consumer segments. Lack of interest toward older consumers also has been attributed to the negative stereotypes associated with aging, and businesspersons' fears that their products will become associated with senility, disability or unattractiveness (Lee, 1997; Long, 1998; Tunaley, Walsh, & Nicolson, 1999, Walsh, Mitchell, & Thurman, 2001).

In response to expressed needs for more research into actual and desired consumption by the older consumer's, this study examined the apparel and shopping preferences of mature females in America. Independent living residents in the Midwest were surveyed concerning fashion consciousness, fashion information sources, and shopping behaviors. Young and mature consumers' reactions to female apparel illustrations were compared.

The results indicated that mature subjects purchased apparel for pleasure or need, but less for conformity. Decisions were influenced more by fit and comfort, than by fashionability, despite suggestions that dressing stylishly was important. Catalog illustrations, social gatherings, and window displays were the media used to encounter new fashions. Individuals high in fashion consciousness had greater financial and social involvement with fashion, greater chronological-to-cognitive age differences, and larger clothing budgets. Young and mature consumers' responses to apparel illustrations differed significantly. Fashionability implies group admiration, but the group of reference for the apparel industry has been disproportionately youthful. As the mature market expands, attention to age-divergent definitions of fashionability (such as those based upon admiration of comfort) will determine the success of apparel businesses. Assessment of cognitive age will facilitate identification of those mature consumers most predisposed toward fashion consumption. Problems encountered during the study and recommendation for further research will be discussed.

Investigation of Ethanolamine Interaction with Mixed Bed Ion Exchange Resin

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Presentation Subject Area: Physical Sciences & Technology

An important factor in predicting the performance of ion exchange resins in Ultrapure Water (UPW) applications is the monitoring of its mass transfer coefficient (MTC). The decrease in MTC is a measure of the degree of fouling of the ion exchange resin. In the case of pressurized water reactor (PWR) nuclear power plants this decrease in the efficiency of ion exchange resin bed has been attributed to amine pH control agents, which are added to reduce corrosion. Ethanolamine (ETA) is most commonly used pH control agent currently utilized in many plants. However, some plants have reported fouling of the anion exchange resin resulting in reduced service life with ETA. We have looked into the interaction chemistry of the current fouling mechanism problems of ion exchange resins used in PWRs. This investigation has shown several significant mechanisms that lead to resin fouling. Different approaches for addressing this problem will be discussed.

Effects of a Solid-State Fermented Phytase on Growth Performance and Nutrient Digestibility of Growing Pigs Fed Barley-Soybean Meal Based Diets.

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Presentation Subject Area: Whiteman Award Presentation

Previous reports from our lab found that the addition of a solid-state fermented (SSF) phytase complex to corn-soybean meal diets improved P digestibility, but had little effect on digestibility of other nutrients. This enzyme complex contains side-enzyme activities other than phytase that could improve the digestibility of other nutrients (i.e., DM, N, energy) in lower quality feedstuffs. Thus, an experiment utilizing 24 barrows (24.3 kg) was conducted to determine the effects of adding SSF phytase complex (Allzyme SSF; Alltech, Inc.) to low available P, barley-soybean meal diets on growth performance and nutrient digestibility in a 21-d study. Pigs were blocked by BW and allotted randomly to four dietary treatments (6 pigs/trt). Diet 1 was a fortified barley-soybean meal based diet (0.77% dig. Lys; 1.2:1 Ca:total P) adequate in all nutrients, except available P. This diet contained 0.42% total P (0.11% available P), all of which was provided by barley and soybean meal. Diets 2, 3, and 4 were as Diet 1 plus SSF phytase to provide 250, 500, and 1,000 phytase units (PU)/kg, respectively. Pigs were housed individually and diets were fed at 3.0 × maintenance with ad libitum access to water. There was a 7-d period (d 14 - 21) for collection of feces and urine. The addition of SSF phytase complex improved (linear, $P < 0.05$) ADG and F:G. Digestibility of P and ash was dramatically improved (linear, $P < 0.01$) with addition of SSF phytase. The increase in P digestibility led to a 17% decrease in absolute P excretion for pigs fed 1,000 PU/kg. Digestibility of GE improved (linear, $P < 0.01$) with SSF phytase resulting in an approximate 75 kcal/kg increase in DE concentration of the diet for pigs fed 1,000 PU/kg. Also, SSF phytase improved ($P < 0.05$) DM, OM, and N digestibility. These results indicate that the addition of SSF phytase complex to low P, barley-soybean meal diets markedly improved nutrient digestibility of growing pigs.

Applications of Neural Network in Optimizing Chemical Mechanical Polishing (CMP) Process

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Presentation Subject Area: Physical Sciences & Technology

As the advanced microprocessor development by Ultra Large Scale Integrated circuit (ULSI) technology is directed towards smaller features and multilevel metallization, which are driving the need for highly planarized surface of each level to within a few nanometer. In the last two decades, the Chemical Mechanical Polishing (CMP) process has emerged as a viable mean in the semiconductor manufacturing industry to address this need. However, the inherent complexity of CMP process and the lack of physical understanding make this process difficult to be controlled and optimized. In this study, a neural network approach to model the relationships between process parameters and process performances is introduced. In this approach, the orthogonal array technique adopted from the Taguchi method is used to realize an efficiently experimental design. The ANOVA technique is implemented to obtain the contributions and interactions of all process parameters. The neural network methods are then applied to model the complex CMP process. From the ANOVA stage and neural network models, the optimal process parameter sets for largest material removal rate (MRR) and the smallest within-wafer non-uniformity (WIWNU) respectively can be predicted. In order to increase CMP throughput (i.e. higher MRR) and better quality (i.e. smaller WIWNU), a novel two-stage optimization strategy is also reported.

* This work is executed under the guidance of Dr R. Komanduri (MAE, OSU) and Dr S.T.S.Bukkapatnam (IEM, OSU), Dr. M. Hagan (ECEN, OSU) and with generous help from Prahalada K Rao (Graduate Student, IEM).

System Level Economic Analysis of Swine Diet Modifications

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Presentation Subject Area: Biological Sciences

The overall objective of this study is to determine the effect of ration formulation on costs and returns from representative feeder pig-to-finishing operations, when costs and returns are affected by daily weight gain, feed conversion, and waste management. Research on economic diet optimization for swine has shown the possibility of manipulating animal growth response by nutritional means (Fawcett et al., 1978; Glen, 1983). An integrated economic analysis of nutrient management with manure management in which the optimal decisions on collection methods, storage methods, and application methods were dependent on the amount and composition of manure is much needed for addressing the issue in the waste management of geographic concentration of hog feeding operations.

An optimization problem based on the NRC model of swine growth and nutrient requirement was developed in this study to introduce waste management cost in the profit maximization diet formulation program. Hypothesis tests or re-estimation were conducted with a series of experimental data from Carter (1999, 2000, 2003) to enhance the predictability of the simulation model across different dietary regimes. The initial results show using the concepts of diminishing returns (Fuller et al., 1993; Gahl et al. 1995), and phase feeding (Boland et al., 1999) in swine diet formulation decrease both the nutrient content in diet and manure. The comprehensive diet formulation plan was able to determine an optimal of swine feeding operation that accounted for the amount and form of nutrients excreted, fertilizer value of manure, and the required change in waste treatment facilities, in addition to animal performance.

Ruminant B-Lymphocyte Green Fluorescent Protein Aggregation Bioassay for Elk and Deer Chronic Wasting Disease

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Presentation Subject Area: Biomedical Sciences

The goal of the proposed research is to develop a cell culture model for elk chronic wasting disease (CWD) prion propagation that can be used as a bioassay for detecting CWD. CWD is a transmissible spongiform encephalopathy (TSE), caused by the mis-folding of a normal cell surface prion protein (PrP^c) through the interaction with infectious mis-folded and protease resistant prion protein (PrP^{res}). The PrP^{res} specific to CWD is PrP^{cwd}. CWD occurs in free ranging and captive elk and deer herds in several Rocky Mountain and Plains states. Although there is evidence suggesting that CWD cannot be transmitted to humans, this potential has not been thoroughly ruled out. Current infectivity bioassays involve the use of live animals, whereas the proposed cell culture model will reduce the need for animal experimentation to study the mechanism of prion infectivity and disease. To accomplish our objective, a bovine B-lymphocyte cell (B-cell) line will be bioengineering to surface express elk PrP^c fused to green fluorescent protein (GFP). Like other glycosyl-phosphoinositol (GPI) anchored proteins, surface expressed GFP-PrP^c will have a dispersed distribution on these B-cells. Interaction of these B-cells with infectious, mis-folded, protease resistant CWD prion (PrP^{cwd}) will induce conversion of the dispersed GFP-PrP^c to aggregated mis-folded GFP-PrP^{cwd} that will be detected by confocal microscopy as aggregated GFP-PrP^{cwd} on the B-cell surface.

The transfection vector construct will be accomplished by using the vector pEGFP-C1 from Clontech that encodes a red-shifted variant of wild-type GFP and is optimized for brighter fluorescence and higher expression in mammalian cells. pEGFP-C1 contains a multiple cloning site at the C-terminus of GFP for creating fusion protein and has restriction sites at the N-terminus of GFP that can be utilized for insertion of N-terminal fusions. The elk prion protein signal peptide (N-terminal 72 base pairs or 24 amino acids) will be inserted at the N-terminus of GFP and the C-terminal fragment (base pairs 73-771 or amino acids 25-257) of elk prion protein will be inserted at the C-terminus of GFP. This will create a transfection vector that will encode a fusion protein of GFP and elk PrP able to be processed in mammalian cells in a manner analogous to PrP alone. This strategy has been successfully used to create GFP-PrP fusion proteins that are normally processed by transiently transfected cell culture systems used to study the cellular processing of prion proteins. The N-terminal signal peptide will direct the fusion protein to the endoplasmic reticulum where the signal peptide is cleaved, the C-terminal GPI anchor signal peptide of prion protein is cleaved and replaced with a GPI anchor, and the protein is directed to the plasma membrane.

Technology in Interior Design Firms: Ten Years of Change

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Presentation Subject Area: Social Sciences

Technology in Interior Design Firms: Ten Years of Change The purpose of this study was to determine the expectations that employers have for interior design graduates regarding their technology competencies and to determine how the design knowledge of interior designers using different forms of technology has changed over the past ten years a result of the amplified use of technology. Data were collected by conducting 30 minute interviews with 30 participants. Fifteen participants were Directors of Interior Design

whose firms were chosen at random from Interior Design Magazine's Top 100 Giants (Davidsen, 2004). The remaining 15 participants were interior designers from the same firms who had been recommended by the directors and who had been employed with the firm for between two and six years. The interviews were coded and resulting data were analyzed using the Grounded Theory method (Strauss & Corbin, 1998) to determine the patterns of expectations of employers and the changes occurring in the field of interior design as a result of the increased technology use. The results will benefit educators in understanding the expectations for students entering into the interior design profession and will help the profession understand the implications that the increase in technology has had and will continue to have on the profession.

AB Initio Molecular Dynamics (AIMD)- A New Approach for Development of Accurate Potentials

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Presentation Subject Area: Physical Sciences & Technology

In this study a new approach is presented for the development of accurate interatomic potential-energy hypersurfaces based on *ab initio* calculations, for use in molecular dynamics (MD) and Monte Carlo (MC) simulations of a variety of chemical and mechanical processes. The method integrates *ab initio* electronic structure calculations with the interpolation capability of multilayer neural networks. A sampling technique based on modified novelty detection is also developed to provide an effective convergence test of the neural network fitting over the entire configuration space involved during the simulation.

The method was used to develop the potential energy hypersurface for five-atom silicon cluster system, where a central atom is bonded to four other silicon atoms, which represents the bulk silicon tetrahedral structure. During the first step, an empirical Tersoff potential was used to perform MD simulations of silicon, and configurations were stored during the simulations. *Ab initio* calculations were performed for these configurations to compute the energies and forces, using density functional theory (DFT) with Gaussian-98 electronic structure program. A multilayer neural network was trained in Matlab for the energies of the configurations employing early stopping and regularization to avoid overfitting. The output from the trained neural network was used to compute the force field during the simulation. The accuracy of the neural network over the entire configuration space was iteratively improved using a sampling procedure based on modified novelty detection.

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Application of Bi-Cell SPR for the Detection of Aptamer Mediated Thrombin Capture in Serum

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Presentation Subject Area: Biomedical Sciences

The objective of the study reported herein is to assess SPR (surface plasmon resonance) for detection of the coagulation protein thrombin in plasma samples as proof of concept that SPR can be used as a medical diagnostic instrument for the detection and quantification of medically relevant diagnostic markers. A SPR spectrometer consisting of a diode laser, bi-cell photodetector, and 4 μ l flow-cell sample vessel was developed. Aptamers were immobilized onto gold-coated glass coverslips mounted on a glass prism on the flow-cell. The detection is done by measuring the change in the resonance angle at which maximum light energy is transferred to the gold film as waves called surface plasmons and the reflected light is detected by the photodetector. The change in the resonance angle is proportional to the mass of target bound to the gold surface. The gold surface of our SPR spectrometer was functionalized with an aptamer specific for thrombin (5'-GGTTGGTGTGGTTGG-SH-3') via a gold-thiolate bond. SPR detected thrombin capture between 0.5 and 1 pmole of thrombin in Tris-EDTA buffer. When aptamer capture of thrombin in serum was studied the SPR detected 1 pmole of thrombin, whereas no change in resonance angle was observed for 1 pmole of Factor X, a similar serine protease coagulation factor. Immobilization of a different aptamer in place of the thrombin aptamer resulted in loss of detection for thrombin. Aptamer-capture SPR specifically and sensitively detected thrombin. Future objectives will be to improve sensitivity to femtomolar level and apply detection in a clinical setting.

Determination of the effects of different winter growing programs on visceral organ mass and oxygen consumption by beef steers

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Presentation Subject Area: Whiteman Award Presentation

The purpose of this study was to investigate the effects of winter growing program on visceral organ mass and O₂ consumption. A total of 46 steers were utilized for the experiment. Four steers were selected as an initial harvest group. Remaining steers were allotted to one of four treatment groups: 1) ad libitum fed high-concentrate diet (CF; ADG = 1.72 kg/d), 2) grazed on wheat pasture (WP; ADG = 1.07 kg/d), 3) fed a sorghum silage-based growing diet (SF; ADG = 1.14 kg/d), or 4) program fed a high-concentrate diet (PF; ADG = 1.19 kg/d). Steers in the WP, SF, and PF groups were managed to achieve approximately equal rates of BW gain and were adapted to a high-concentrate diet for finishing following the growing phase. At the end of the growing and finishing phases, six steers from each treatment group were randomly selected for harvest. At each harvest, weights were collected on carcass and all individual noncarcass tissues. Tissue samples were collected from the liver, rumen, and duodenum to determine in vitro O₂ consumption of tissues. At the end of the growing phase, liver, kidney, and small intestine (SI) weights (g/kg EBW) were greatest for WP steers ($P < 0.01$). Silage-fed steers had the heaviest ($P < 0.05$) reticulo-rumens. Mesenteric fat (MF) mass was greatest for PF, intermediate for SF, and lowest for WP steers ($P < 0.01$). At final harvest, liver and large intestine (LI) weights were greatest (g/kg EBW; $P < 0.01$ and $P < 0.05$, respectively) for WP steers. Weight of total gastrointestinal tract (GIT) tended ($P = 0.06$) to be greatest for WP, intermediate for SF, and lowest for CF and PF steers. There were no significant ($P > 0.10$) differences in O₂ consumption (L \cdot min⁻¹g⁻¹) of tissues due to treatment, and O₂ consumption by the liver was generally related with

tissue mass. The most dynamic changes in GIT mass occurred for steers grazing WP ($P = 0.07$), with increases in mass of liver, kidney, and SI occurring during the growing phase and increases in reticulo-rumen, LI, and MF occurring during the finishing phase. Due to the considerable energy expenditure by splanchnic tissues, we conclude that changes in organ mass during the growing phase might contribute to altering maintenance energy requirements, and therefore performance in the finishing phase.

The Story of the Estranged Couple: Tracing the relationship between Marxism and Contemporary Feminism

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Presentation Subject Area: Social Sciences

Even though many modern political movements seemed to have relegated women's concerns to the margins, from its inception, the Marxist movement has championed female equality and women's rights and propagated that women's liberation is bound up with the struggle against 'capitalism' in a class-ridden society. But the political upheavals of the 1960s challenged the classical inception of class struggle by pointing to the multiplicity of sites and mechanisms of power and domination irreducible to class and exploitation. Consequently, Feminism came about as an ideology premised on the idea that the fundamental division in human society is between the sexes, rather than the social classes. In recent years, attempts have been made to develop a theoretical perspective that might confidently be termed 'Marxist Feminist', yet the work that has been generated so far remains fragmentary. Thus, although women played important roles in the socialist movement, the marriage of Marxism and Feminism has not always been a happy one! What then might be the object of Marxist Feminism? In spite of the apparent discrepancies, it may be said that Marxist Feminism has, directly or indirectly, helped to pave the way for future Feminist theories. As radical feminism deepened and broadened its scope, feminists and theoreticians who appreciated aspects of both Marxist and Feminist perspectives have made efforts to unify the two conflict theories in such a way as to provide a better world-view than either theory could provide alone, and this project, along with the resultant hybridized theories, is often called socialist feminism. The paper also looks at Third Wave feminist theory: a depiction of the diversity of women's experiences; a critique of many of the most basic categories common to both modern feminist and social analyses, as a more recent development in the debates of class and gender. Thus, the paper traces the relationship between Marxism and Feminism, while exploring the advent of new theories, which came about as the result of discrepancies within this existing framework, that have contributed to the on-going study of more diversified gender issues affecting the world labor markets today.

Acid Solubilization-Isoelectric Precipitation (Acid-Sip) To Remove Off-Odors/Flavors Associated With Farm Raised Channel Catfish (*Ictalurus punctatus*) Fillets.

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Presentation Subject Area: Whiteman Award Presentation

Many catfish producers are burdened with the chronic management problem of producing off-odor/flavor (o-o/f) catfish. Off-odor/flavor catfish results from two compounds named 2-methylisoborneol (MIB) and geosmin that can reside in the water in which catfish are raised. The resulting o-o/f's decrease profit margins for producers because processing must be delayed until the o-o/f is absent, or the o-o/f product is processed as a less valuable by-product such as fish meal. The objective of our research was to apply an acid solubilization process as a post-harvest processing technique and evaluate its effectiveness at eliminating or reducing the off odors and flavors associated with o-o/f catfish fillets. Live Channel Catfish were placed in plastic aquariums containing water treated with geosmin or MIB and were allowed to absorb the compounds for 24 hours. The catfish were subsequently harvested and fillets were processed into raw and cooked batters using acid-sip which were compared to fillets processed using no acid-sip. Proximate analyses, texture, sensory, and color analyses were performed, as well as gas chromatography analyses to determine geosmin and MIB concentrations in test samples. Our data indicates that there were no statistically significant reductions ($p < 0.05$) in geosmin and MIB concentrations between acid-sip samples and non-acid-sip samples. However, the data does show a trend in that acid-sip samples have lower concentrations of the o-o/f compounds, with the exception of cooked geosmin samples. Based on the texture data, the gel-strength properties of the acid-sip samples are maintained and some properties are slightly improved in comparison to non acid-sip samples. Fat content was significantly reduced in all raw acid-sip samples while protein and ash contents did not differ between acid-sip and non acid-sip samples. The water holding ability of the non-acid sip samples was slightly higher than the acid sip-samples, whereas there was no significant difference ($p < 0.05$) in cook yield for both treatments. Our research indicates that the acid-sip process produces a low fat protein product with strong gel characteristics. Results also show that the process has the capability to lower o-o/f compounds, although further research is needed to refine the process and prove its efficacy.

Sustainable Uniform Design for Flight Attendant: Applying Cradle to Cradle Model

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Presentation Subject Area: Environmental Sciences

Textile and apparel industry can be regarded as a polluter industry by emitting a lot of chemicals, finishes and solid wastes that threatening environmental and human health. A recent poll conducted by Wall street journal revealed that eight out of ten consumers considered themselves environmentalists, and more than half said fundamental changes in lifestyle were necessary. However, they did not consider it in actual purchasing situations (Solomon & Rabolt, 2004). Environmental-friendly apparel products are often regarded as high priced and lack of aesthetic appealing (Butler and Francis, 2000).

The purpose of this project was to design sustainable uniform for flight attendant can benefit environmental and the human health, and satisfy users' needs. "Cradle to cradle" model, developed by McDonough and Braungart (2002), is a revolutionary way to change traditional "cradle to grave" manufacturing model. In

“cradle to cradle” model, designers should consider material flow, avoid contamination of biological and technological metabolism, define user period and design for disassembly in product development stage.

One hundred percent recycled polyester is selected as the material for flight attendant uniform to satisfy both of the user's needs and the environmental requirements. The input, output and potential environmental impacts of a product system was evaluated by the use of Life Cycle Assessment (LCA) (Sustainable Textile Standard). The life cycle of the flight attendant uniform was initiated from the recycled PET bottle as a technical nutrient, which continually circulates as valuable nutrients for industry creating technical metabolism. Polyester uniform will reduce the water, energy and chemical uses during the whole product cycle compared with conventional cotton or wool. To avoid mixing of biological and technical materials that need of disassembly, 100% of recycled polyester is used for every component of uniform suit including outer shell, lining, thread, button, zippers and others. After user period time, this suit will be recycled back to the polyester resin without the need of disassembly and will re-manufacture to a new suit. One hundred percent polyester from recycled PET bottle will be used for the every component of uniform suit having a potential to serve the needs of consumer (flight attendant) by its' properties and affordable price.

The significance of this research can be listed as follows. 1) This research can contribute to reduce the use of landfill. According to NAPCOR (the National Association for PET Container Resources), the total amount of PET bottles and jars available in the United States for recycling in 2003 was 4.292 billion pounds. 2) This project has a potential to affect current uniform industry, because it can be easily applied to other uniform areas such as police uniform, postal workers' uniform, school uniform and others. The uniform section is a big part in apparel industry in the U.S. One research reported that up to 58 million U.S. workers donned career apparel before they headed to the job (Abend, 2000).

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RFID and Smart Sensor applications in monitoring engineering systems

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Presentation Subject Area: Physical Sciences & Technology

Radio-frequency identification (RFID) is an emerging technology, which promises to advance the modern industrial practices in object identification and tracking, asset management and inventory control. This technology is being evaluated and implemented successfully in many manufacturing and distribution environments, retail stores and defense installations. The scope of RFID is rapidly shifting from tracking objects (present or absent) to monitoring the condition (where and how) of engineering systems. The integration of sensors with RF tags (Smart Sensors) enables RFID technology to gather and process sensor data in addition to identifying and tracking the object. The deeper ramification of such RFID systems for monitoring manufacturing systems remains largely unexplored and untapped. The focus of this paper will be to present the results of in-depth review of the current and emerging technologies and applications based on RFID and Smart sensors for depot support and logistics environments and for machine condition monitoring.

Sol-Gello Synthesis of Nanocrystalline Spinel and Calcium Phosphate

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Presentation Subject Area: Physical Sciences & Technology

A new sol-gello method was developed for the synthesis of spinel and calcium phosphate. Spinel can be formed directly by combining aluminum oxide and magnesium oxide, but this method is expensive and demands temperatures of 1450-1600°C. In our approach, magnesium and aluminum salts are added to gelatin, ensuring that the metal ions are trapped in a homogeneous distribution. The gelatin content controls the particle size, product reactivity, and microstructure. The amorphous solids are then converted to spinel nanocrystalline phases at relatively low temperatures. Preliminary results have shown the spinel phase appears in the low and high-gelatin content amorphous solids at a temperature as low as 420°C. Calcium phosphate, a bioceramic material, is formed when a calcium salt and phosphoric acid are added to the gelatin. The same method of ammonia hydrolysis and heating used in the spinel synthesis is implemented in the calcium phosphate preparation. Preliminary results show the calcium phosphate nanocrystalline phases form within the gelatin matrix. The synthesis of spinel and calcium phosphate with this method will be discussed.

The Directed-Assembly of CdS Interconnects between Targeted Points in a Circuit

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Presentation Subject Area: Physical Sciences & Technology

A central goal in device-assembly is the development of methodology for fabricating targeted structures from nanoscopic building blocks, in a manner that embraces self-assembly. Here we demonstrate the one-step dielectrophoretic assembly and interfacing of individual interconnects from populations of 3.8nm CdS nanoparticles between targeted points in a circuit, shedding light on the most probable mechanism by which this occurs. We further show that the nanoparticles fuse into bulk CdS during the fabrication process. This finding is significant because it establishes a preliminary basis for the targeted fabrication of structurally continuous semiconducting interconnects from nanoscopic building blocks.

A Compost-Based Subsurface Microbial Community Dominated by Sulphate Reducing Bacteria

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McNair Scholars Program

East Central University - McNair Student

Presentation Subject Area: Biological Sciences

A site at Ponchatoula, LA has been designated a superfund site by the Environmental Protection Agency. This metal contaminated site will need to be characterized in order to determine the effects on the local ground water. The objective of this research is to characterize the sulfate reducing bacteria in ground water of this superfund site. Aseptic techniques were used to isolate Sulfate Reducing Bacteria from ground water samples. Equipment was used at the Kerr Laboratory to identify and characterize the Sulfate Reducing

Bacteria. The samples were core and water samples but research was focused on the water samples. Analysis of the samples was conducted in an anaerobic environment. By the use of certain medias, it was determined that this site had a high number of sulfate reducers. There was also production of hydrogen sulfide which is an end product of physiological activity by the sulfate reducers. The presence of sulfate reducers is indicative of microbially-mediated reduction of the redox-sensitive heavy metals present. Sulfate reducers can be used as an option for the cleanup of contaminated ground water. Natural attenuation is the use of natural processes to remove contaminants such as metal. Remediation of contaminated sites is a more conventional technique.

Cross-Species Analysis of Mammalian Beta-Defensin Gene Family

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Presentation Subject Area: Whiteman Award Presentation

Beta-defensins comprise a large family of antimicrobial peptides produced by phagocytes and mucosal epithelial cells in response to infection. To study the evolutionary relationship and the innate host defense role of this important gene family, we have developed a comprehensive, genome-wide computational strategy in attempt to identify the entire repertoire of the beta-defensin genes across several evolutionarily divergent mammalian species, including the human, chimpanzee, dog, mouse, and rat. Such searches led to discovery of a total of 37, 43, and 41 distinct beta-defensins encoded in the genomes of chimpanzee, dog, and rat, respectively. Novel beta-defensins have also been identified in humans and mice. As expected, all beta-defensins share a highly homologous signal sequence at the N-terminus and a characteristic six-cysteine motif at the C-terminus. Furthermore, beta-defensins genes in different species are densely clustered on syntenic chromosomal regions with each cluster spanning <812 Kb. There are five distinct clusters in the human and chimpanzee, while four exist in non-primate species. Phylogenetic analysis revealed that, although the majority of beta-defensins genes are conserved across mammalian species, species-specific genes exist, except for the chimpanzee and human, whose genes are almost in complete analogy. We argue that the beta-defensins that are unique to each species may have specific functions important for that species. Together with our earlier analysis of chicken beta-defensins, these data suggest that all beta-defensins share a common ancestry and have undergone significant duplication and expansion during evolution. Analysis of tissue expression patterns of the entire repertoire of rat beta-defensin genes indicated that they are preferentially expressed in the male reproductive tract with predominant expression in epididymis and testis. Moreover, their expression is developmentally regulated and plateaued at 1-2 months of age, which is consistent with an earlier finding that certain defensins may be involved in sperm maturation in addition to innate defense. Identification of such a vast array of host defense molecules will undoubtedly lead to a better understanding of the molecular mechanisms of disease resistance and also provide important leads for the development of novel antimicrobial drugs.

Thermal Modeling of Laser Drilling Process for Steel and Ceramic Material.

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Presentation Subject Area: Physical Sciences & Technology

Lasers are used to drill a hole of high aspect ratio in difficult to drill materials. Laser drilling process is modeled using Jaeger's heat source method. The laser beam is considered as a circular moving plane disc heat source equation. This is a general equation that can be used for transient as well as quasi-steady state condition with different laser beam distributions, such as normal, bi-modal and uniform. Simpson 1/3rd numerical integration method is used to solve the heat source equation and programmed using Visual Basic.NET. Temperature rise at any time and at any location in the work-piece is determined using the laser beam and the thermal properties of the work material such as AISI-1036 steel and aluminum oxide ceramic. Fusion and evaporation temperatures of the work materials are used to calculate the amount of material removed by each laser pulse with the given laser beam parameters. The effect of latent heat of fusion and evaporation are considered. Absorptivity of the work-surface is included in the calculation of actual laser beam power. Using this method, the number of laser pulses required to drill a hole of required depth and diameter can be calculated. Heat affected zone (HAZ) and energy balance calculations are performed for different materials. Thermal residual stresses due to thermal gradient of the work-material after the laser drilling process are also discussed.

*I would like to thank Dr. R. Komanduri and Dr. Z. B. Hou, for their guidance and encouragement during the present study.

Winescapes and Culture Change in Northern New Mexico

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Presentation Subject Area: Social Sciences

Wine production began in New Mexico in the early 1600s after the arrival of the first Spanish settlers, nearly a century before it was introduced into California. Although wine played an important role in the region's Hispanic population's folklife for nearly four centuries, commercial growing and the emergence of larger scale viticultural landscapes are a recent phenomenon. During the past several decades, viticulture has become a significant element of the region's popular (commercial) culture. Contemporary wine production in Northern New Mexico is, however, directed primarily toward Santa Fe's affluent connoisseurs, tourists, area restaurants, and wine competitions. This study focuses upon viticulture as an index of culture and landscape change in Rio Arriba and Santa Fe counties. It highlights the marked contrasts between the traditional cultural landscapes of Hispano villages and Native American pueblos and the landscape impact of modern viticulture.

Fabrication of Nanometric Zinc Sulfide Particles from Xanthate Single-Source Precursors for Use in Light Emitting and Photovoltaic Devices

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Presentation Subject Area: Physical Sciences & Technology

Nanometric materials have garnered much attention of late, particularly semiconductor nanoparticles, due to electronic properties that change with particle size. Metal sulfides smaller than about 10 nm have potential uses in light emitting diodes, photovoltaic solar cells, or luminescent materials, while larger sulfides in the range of 10-500 nm can be used in IR windows, photonic crystals, or with the proper dopants, in luminescent materials. We present the preparation of fluorescent ZnS nanoparticles from the low temperature (60°C) thermal decomposition of zinc ethyldithiocarbonate, $Zn(S_2COCH_2CH_3)_2$. When the decomposition of the ethyldithiocarbonate (xanthate) precursor is carried out in dimethyl sulfoxide (DMSO), the result is a capping of the zinc sulfide particles with a ZnS-DMSO complex. An increase in particle size with heating time is suggested by dynamic light scattering and ultraviolet adsorption. A high degree of size tunability (ca. 2 – 60 nm.) was achieved by varying the reaction time and the precursor concentration. Infrared spectra recorded for the capped ZnS yielded peaks indicative of DMSO complexation. The decomposition of the precursor in DMSO appears to follow a first order pathway as determined by 1H and ^{13}C NMR spectroscopy. Furthermore, additional particle size analysis in the powder state is based on X-Ray diffraction and transmission electron microscopy.

Habituation of the rattle response in western diamondback rattlesnakes

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Presentation Subject Area: Biological Sciences

Habituation is defined as a decrease in response to a regularly repeating stimulus. This type of non-associative learning is ubiquitous throughout the animal kingdom and is adaptive in several ways. We performed experiments to determine if several components of rattling behavior exhibited habituation. Ten western diamondback rattlesnakes (*Crotalus atrox*) were collected and induced to rattle using an apparatus in which stimuli were presented automatically. The dependent variables included the presence of rattling, latency of rattling, and duration of rattling. Audio recordings were also made. Each snake was induced to rattle every five minutes until it failed to rattle in 10 consecutive trials or until it reached a maximum of 120 trials. If the ten trial criterion was met, a dishabituating stimulus was presented to rule out sensory adaptation and effector fatigue. The entire procedure was repeated for four consecutive days with each animal. Individual differences in habituation rate were observed. Additionally, rattling latency and duration also showed a decreasing curve over time, indicative of habituation. However, the rates of decrease differed among these behavioral components and between individuals. Spontaneous recovery was apparent in most, but not all snakes. Some individuals also showed retention of habituation of response over days.

Vulnerability Assessment of Lake Water Using Microbial Indicators

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Presentation Subject Area: Environmental Sciences

The examination of recreational lakes for the presence of bacterial and viral indicators is an essential practice for the maintenance of water quality standards. Antibiotic testing is another valuable tool for the identification and characterization of resistant bacterial populations. The selection of the locations was based upon various input and output streams. Two independent water samples were collected from each of the sampling location (N.W. Stream, N. Stream, N.E. Stream, S. Stream, N. Lake, S. Lake, and E. Lake) during every event. Each water sample was transferred into a fermentation tube and from each positive fermentation tube onto a series of differential and selective media leading to positive identification and selection of the coliforms. The results from each monitoring event remained consistent throughout the study. Antibiotic sensitivity of each site was determined by the use of antibiotic disk assays (ampicillin, trimethoprim, vancomycin, chloramphenicol, and gentamicin). The result of testing for the presence of bacteriophages confirmed the bacterial results in that low numbers were detected and the monitoring location with the highest delectable range was N. Stream.

GIMPM Parallel Computation Using SAMRAI

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Presentation Subject Area: Physical Sciences & Technology

The material point method (MPM) first introduced by Sulsky, Zhou and Shreyer (1995) has demonstrated its capabilities in the simulation of impact/contact/penetration and large deformation problems. To resolve alternating stress sign and instability problems associated with conventional MPM, the generalized interpolation material point method (GIMPM) was recently introduced, and implemented for one-dimensional simulations by Bardenhagen and Kober. We have extended it to 2D and 3D GIMPM and applied to simple tension ,compression and indentation problems. For simulations spanning multiple length scales at continuum level, we present a parallel GIMPM computational method using the Structured Adaptive Mesh Refinement Application Infrastructure (SAMRAI developed by Lawrence Livermore National Laboratories). SAMRAI is used for multi-processor distributed memory computations, for the platform for domain decomposition, and for multi-level refinement of the computational domain. Nested computational grid levels with successive spatial and temporal refinements are used in GIMPM simulations to improve the computational accuracy and to reduce the overall computational time. The domain of each grid level is divided into multiple cuboid patches for parallel processing. This domain decomposition embedded in SAMRAI is very flexible when applied to GIMPM. As an example to validate the parallel GIMPM computing scheme under SAMRAI parallel computing environment, numerical simulations with multiple length scales from nanometer to millimeter were conducted on a 3D nanoindentation problem. A GIMPM algorithm for the treatment of contact between a rigid conical indenter and a deformable workpiece has also been developed. GIMPM results are compared with finite element results on indentation for validation.

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Growth of Carbon Nanotubes Using Plasma Enhanced CVD

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Presentation Subject Area: Physical Sciences & Technology

Carbon nanotubes (CNTs) are thin cylinders of carbon which can be considered as a graphite sheet (hexagonal lattice of carbon) rolled into a cylindrical shape. Their diameter varies from few nanometers (single walled carbon nanotubes) to few hundreds of nanometers (multi-walled carbon nanotubes). Carbon nanotubes were first synthesized by Sumio Iijima in 1991. CNTs have remarkable physical properties, such as Young's modulus 1~1.28 TPa compared to 200 GPa for steel, thermal conductivity ~2000 W/m/K compared to 390 W/m/K for copper in addition to their excellent field emission characteristics. Applications include modern day composites, hydrogen storage, AFM probes and flat panel displays. In this investigation we have grown carbon nanotubes using microwave plasma enhanced chemical vapor deposition (MPECVD) on silicon wafers coated with transition metal catalysts, such as Fe, Co. The catalysts are deposited on to the silicon wafer substrates using a pulsed laser deposition (PLD) technique using a KrF excimer laser (248 nm). The deposition time of the PLD was varied from 30 sec to 90 sec to form catalyst films of different thickness values. Methane, hydrogen and nitrogen are used as the precursor gases for the growth of carbon nanotubes in the plasma enhanced CVD reactor. Various process parameters, such as plasma pretreatment time, growth time, flow rates of gases, temperature, microwave power, and the chamber pressure that affect the growth process of the carbon nanotubes are studied. The nanotubes are characterized using scanning electron microscope (SEM) equipped with energy dispersive spectra (EDS), transmission electron microscope (TEM), atomic force microscope (AFM), and μ -Raman Spectroscopy. The TEM images show catalyst particles at the tube ends which suggest our process follows a tip growth mechanism. Characterization also showed that the nanotubes synthesized are multi-walled with a pronounced appearance of the bamboo or arrow headed shapes. Carbon nanotubes grown were found to have diameters varying from 30 to 150nm.

Statistical Characterization of the Chemical-Mechanical Polishing Process*

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Presentation Subject Area: Physical Sciences & Technology

As the semiconductor industry embraces miniaturization ever aggressively, the onus is on critical chip manufacturing processes to meet stringent global planarization requirements. Though over time the Chemical-Mechanical Polishing (CMP) process has been effectively leveraged to meet industry requirements, scientific understanding of CMP has yet to mature akin to the level of conventional manufacturing processes. Since efforts to control the process have accorded only incremental results; an innate knowledge regarding the behavior of key process input variables (KPIV's) must be developed in order to afford breakthrough improvements.

An attempt is made to investigate the behavior of certain KPIV's in influencing key process output variables (KPOV's) utilizing the method of designed experiments with data being primarily garnered from hitherto published literature.

In specific, the design matrix used is an L25 Taguchi array which investigates the effect of five factors or KPIV's (platen speed, slurry abrasive concentration, time, down force and back pressure) on two performance variables or KPOV's (material removal rate (MRR) and within-wafer-non-uniformity (WIWNU)). This knowledge can be utilized in developing contemporary models which enhance the physical understanding of the process.

The results obtained indicate the presence of non-linearity and interaction among the KPIV's- an effect largely ignored by current researchers.

**Student Member, ASQ, APICS

*This work is executed under the guidance of Dr R. Komanduri (MAE, OSU) and Dr S.T.S. Bukkapatnam (IEM, OSU), and with generous help from WenChen Lih (PhD Student, MAE).

The Effect of Personal Innovativeness on the Acceptance and Use of Technology

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Presentation Subject Area: Education

PIIT is defined as the willingness of an individual to try out any new information technology. Surprisingly, this stable-trait has not been used in many studies of technology acceptance. In this study, PIIT will be tested as a main-effect variable to help explain behavioral intentions to use technology, and as a moderator between perceptions of technology and intentions to use. The effect of PIIT on technology acceptance and use will be tested using the Unified Theory of Acceptance and Use of Technology (UTAUT) model as the framework. It is hypothesized that the inclusion of PIIT in the research model will better explain the process of individual level acceptance and use.

Postpartum nutrition of primiparous beef cows influences insulin like growth factor-I and insulin-like growth factor binding proteins in follicular fluid and plasma

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Presentation Subject Area: Whiteman Award Presentation

Effect of postpartum nutrient intake on insulin-like growth factor binding proteins (IGFBPs) in dominant follicles (DF) and plasma was evaluated at 56 ± 9 d postpartum in anovulatory primiparous Angus x Hereford cows. Body condition score (BCS) at calving was 4.8 ± 0.2. Cows (n=28) were blocked based on BCS and randomly assigned to one of two nutritional treatments at calving; moderate (M), 2.3 kg/d of a 40% CP supplement and ad libitum hay, or high (H), ad libitum access to a 12% CP-50% concentrate diet and hay. Blood samples were collected twice a day starting at 30 d postpartum. Ovarian follicles were evaluated daily by ultrasonography commencing at 42 d postpartum. When growth of DF plateaued, follicular fluid (FF) was obtained by transvaginal ultrasound-guided follicular aspiration. Data were analyzed using the

MIXED procedure of SAS and Pearson correlation coefficients. Concentrations of IGF-I in FF ($P < 0.01$) for H (34.0 ± 10.7 ng/ml) than M (23.6 ± 8.5 ng/ml) cows, but concentrations of progesterone, androstenedione, and estradiol in FF were not influenced ($P > 0.10$) by treatment. Concentrations of IGFBP-4 and -5 in plasma were 30% greater ($P < 0.01$) in H than in L cows. Concentrations of IGFBP-4 and -5 in FF were 68% and 48%, respectively, greater ($P < 0.05$) for H than M cows. Concentrations of IGFBP-2 and -3 in plasma and FF were not influenced by treatment. Concentration of IGFBP-2 and -5 in plasma at follicular aspiration were positively correlated with follicle size ($P < 0.05$) and IGFBP-2 in FF was correlated with follicle size. BCS at calving was positively correlated with IGFBP-2, -4 and -5 in plasma at aspiration of follicles. Concentration of IGF-I in plasma at aspiration and in FF were positively correlated with IGFBP-3 and -4 in FF. Postpartum interval to luteal activity was longer ($P < 0.05$) for M cows (94.9 ± 23.7 d) than for H (79.8 ± 11.0 d). Postpartum interval to luteal activity was negatively correlated ($P < 0.01$) with BCS at aspiration. Although concentrations of IGFBPs in FF were not correlated with IGFBPs in plasma, similar increases in both systemic and intrafollicular IGFBP-4 and -5 in cows with greater nutrient intake, indicate that these two IGFBPs may be regulated by the same nutritionally driven endocrine or metabolic changes.

Temporal and spatial variability in trace element signatures of juvenile striped bass otoliths.

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Presentation Subject Area: Biological Sciences

The trace elemental composition of fish otoliths provides a permanent record of the environmental conditions an individual has experienced that reflects the physical and chemical characteristics of the ambient water. We tested the use of trace element signatures in otoliths as natural tags of the river of origin of juvenile striped bass collected from the Red and Washita River arms of Lake Texoma. We were able to detect 17 elements in otoliths of juvenile striped bass collected during 2002, 2003, and 2004. All otoliths were standardized to 40% Calcium. Phosphorus (P31) was the strongest predictor of river of origin during 2002 ($X^2 = 38.41$, $p < 0.0001$); however, phosphorus is biologically unstable. Strontium (Sr88) was the next strongest predictor ($X^2 = 29.10$, $p < 0.0001$). During 2002, our classification rate of river origin was 83%. In 2003, Lanthanum (La139; $X^2 = 10.97$, $p = 0.0009$), Copper (Cu63; $X^2 = 12.84$, $p = 0.0003$), and Strontium (Sr88; $X^2 = 10.26$, $p = 0.0014$) were all useful in predicting the river of origin. In 2003, our classification rate was 84%. In 2004, Rubidium (Rb85; $X^2 = 6.13$, $p = 0.0133$), Neodymium (Nd146; $X^2 = 7.65$, $p = 0.0057$), Phosphorus (P31; $X^2 = 5.70$, $p = 0.0170$), Vanadium (V51; $X^2 = 9.29$, $p = 0.0023$), and Strontium (Sr86; $X^2 = 6.85$, $p = 0.0089$) were all useful in predicting the river of origin. Our classification rate was 88% for 2004.

Extra Dimensions in Colliders

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Presentation Subject Area: Physical Sciences & Technology

Existence of extra dimensions of very tiny size predicts the observation of new kind of particles called Kaluza-Klein excitations. This research involves the production and decay signals of these particles at high energy colliders.

Development of a Novel Bovine E. coli O157 Colonization Model and Its Employment in Investigating the Host-Pathogen Relationship

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Presentation Subject Area: Biomedical Sciences

Background: The Gram negative bacterium E. coli O157 is an intestinal pathogen of man that causes diarrhea and occasionally fatal systemic complications. In the U.S., it is estimated to cause over 73,000 illnesses with 60 deaths annually. Cattle are the principal reservoir of the pathogen, and their feces can contaminate bovine-origin food products, especially ground beef, a common vehicle of infection. Because a thorough understanding of the relationship between E. coli O157 and the bovine intestine is a prerequisite for the rational development of food safety strategies, we developed a novel model of adult cattle colonization and utilized the model to investigate in vivo nutritional requirements of the pathogen. Methods and Results: First, in the development of the model, we endeavored to colonize adult cattle, which are more difficult to colonize than calves. However, because nearly all bovine-origin food is adult-derived, we deemed it the more appropriate model. Five young adult cattle (~600#) were colonized with 10^{10} cfu of streptomycin-resistant E. coli O157 via a surgically-placed duodenal cannula, and feces and rectal mucin were regularly sampled. A paired study of the effect of daily streptomycin upon colonization success was conducted by comparing treated cows (n=3) and untreated controls (n=2). Reversal of these groups in a second phase completed the pairing. Daily streptomycin therapy favored the colonization of the input strain during initiation and early maintenance phases and resulted in consistent and reproducible colonization through 15 days and beyond. Second, utilizing this model and the same animals, we hypothesized that rectal mucin-derived sugars were important for E. coli O157's tropism for the rectum. To investigate this, isogenic E. coli O157 mutants were constructed to disrupt catabolic pathways for ribose (rbsK), fucose (fucAO), and N-acetyl-galactosamine (agaWEFA); next, co-colonizing the wild-type E. coli O157 with one of the above mutants allowed us to observe any colonization defects. A defect in colonization initiation and maintenance was observed with the fucose mutant. No colonization defect was observed with the N-acetyl-galactosamine mutant. A defect in long-term maintenance was observed with the ribose mutant. Conclusions: Novel features of our model include the route of inoculation (cannula) and the continuous administration of streptomycin to facilitate colonization. The model resulted in highly reproducible colonization with satisfactory to superior persistence and magnitude. The animals were re-usable in this model. The model is amenable to competitive co-colonizations. Fucose appears to be an important factor in the definition of E. coli O157's tropism for the rectal environment.

Within-A-Reach Variability of Two Eastern Oklahoma Streams: Baron Fork Creek and the Glover River

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Presentation Subject Area: Environmental Sciences

It is well documented that stream channel morphology changes in the downstream direction. However, less well documented is the amount of variability that exists within stream reaches in the upstream to downstream direction. The purpose of this study was to examine whether within-a-reach variability decreases from upstream to downstream. This was completed by surveying five reaches of Baron Fork Creek, Ozark Highlands, and four reaches of the Glover River, Ouachita Mountains, to compare the within-a-reach variability from upstream to downstream. The Baron Fork was surveyed at one 3rd order reach and two 4th and 5th order reaches. The Glover River was surveyed at 2nd, 3rd, 4th, and 5th order reaches. Variables used in the analyses include channel unit slope, channel unit surface area, channel unit length, bankfull width, median particle-size, and width/depth ratio. The results of this study report that a certain amount of variability occurs within all the reaches and that continued surveys upstream and downstream are necessary to complement the information gathered from this study

The Moderating Effect of Environmental Uncertainty on New Product Development Alliance's Success

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Presentation Subject Area: Social Sciences

This paper integrates literature from new product development and strategic alliance. New products provide increased sales, profits, and competitive advantage for most organizations. However, nearly half of the new products introduced in the market each year, fail. Organizations form new product development (NPD) alliances to share the risk, and to develop a better product. In this study, two propositions are developed by integrating the new product development and strategic alliance literature. This study explores the relationship between cooperative competency (trust, communication, cooperation) and NPD success, and explores the effect of environmental uncertainty on this relationship. More specifically, it proposes that in high environmental uncertainty condition, greater cooperative competency is required to achieve successful new product development. The empirical study will be conducted for three different industries to provide greater generalizability of the phenomenon.

Dose response of a direct-fed microbial on milk yield, milk components, body weight, and days to first ovulation in primi- and multiparous Holstein cows

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Presentation Subject Area: Whiteman Award Presentation

The desire to increase production and reproductive efficiency in the dairy industry along with growing societal concern over the use of antibiotics and growth promoters have producers interested in products that can successfully manipulate rumen microbe populations and fermentation products. The most commonly accepted theory of changes in ruminal propionate altering metabolism in lactating dairy cows is increased ruminal propionate production results in a greater supply of this glucogenic precursor, increasing glucose production. Propionibacteria are natural inhabitants of the rumen and have been shown to comprise 1.4% of the total microbe population in cattle on a high concentrate diet. We hypothesize that manipulating ruminal fermentation by supplementing diets with propionibacteria (P169) will increase energy efficiency and result in positive effects on milk yield, milk composition, and metabolic modulators of reproductive function. From two weeks prior to parturition to 175 d postpartum, 38 primi- and multiparous Holstein cows were assigned to one of three treatment groups. Control (n = 13) received regular Total Mixed Ration (TMR). Low-dose (n = 14) received control TMR plus 6×10^{10} cfu/head Propionibacteria Strain P169 (P169). High-dose (n = 11) received control TMR plus 6×10^{11} cfu/head P169. Cows were housed in a free-stall barn divided into three separate free-stall and feeding areas. Cows were provided TMR ad libitum. Supplemental P169 was fed daily (p.m.) as a top-dress on 4.5 kg of TMR. Cows were milked daily at 0400 and 1600. Weekly milk samples were collected at successive a.m./p.m. milkings and analyzed for percentage of milk fat, protein, lactose, solids-not-fats (SNF), milk urea nitrogen (MUN) and somatic cell count (SCC). Rumen fluid was collected via intubation at 30 d prepartum and at d 60, 120, and 175 postpartum. Daily milk production expressed as 4% fat-corrected milk (FCM) was affected by treatment ($P < 0.003$) and week x parity ($P < 0.05$). High-dose and Low-dose P169 treated cows exhibited a 7.1 % and 8.5 % increase above controls in daily 4% FCM, respectively. Treatment x parity and week significantly influenced percentage of milk fat, lactose and protein, while solids-not-fats (SNF) was influenced by treatment x parity and treatment x week. Ruminal propionate levels were significantly influenced by treatment ($P < 0.05$). High-dose P169 cows had an 18.5% and 17.0% greater molar percentage of ruminal propionate than Low-dose P169 and Control cows, respectively. The acetate/propionate ratio was altered by treatment ($P < 0.06$). High-dose P169 cows had 15.4% and 13.3% lower acetate/ propionate ratios than Low-dose P169 and Control cows, respectively. Change in body weight postpartum was influenced by week x parity ($P < 0.02$) and treatment x parity ($P < 0.004$) such that High-dose P169 and Low-dose P169 multiparous cows exhibited a greater recovery of week 1 body weight than Control multiparous cows. There was no treatment, parity, or interaction on days to first postpartum ovulation or on estrous behavior at 45 and 90 d after parturition. We conclude that P169 may hold potential as an effective direct-fed microbial to increase milk production in dairy cows.

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On Display: The Experiences of Ethnic Women at the 1893 Chicago World's Fair

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Presentation Subject Area: Social Sciences

In 1893, the eyes of the world turned to Chicago, Illinois, where American citizens sought to turn a patch of land into a great international exhibition. Drawing pilgrims from around the world, the great Columbian Exposition served as a showcase of the nations with its primary focus on American accomplishments. In an attempt to enlighten the masses, the Columbian Exposition's Department of Ethnology established a series of ethnological villages filled with people from Europe, Asia, the Middle East, Africa, and the Americas. The officials placed the ethnological villages along the Midway Plaisance, a strip made up of various amusements. In these supposedly educational exhibits, officials put human beings on display, even confining them behind stockade fences. Scholars of the Columbian Exposition consistently argue that the ethnological displays on the Midway degraded and exploited ethnic people. However, scholars have given little attention to the specific experiences of the women who lived in these ethnological displays. In considering the personal experiences of these women at the Columbian Exposition, many questions arise. How did fair officials and patrons exploit and degrade these women? How did the women react to being on display? Did they exploit themselves as well? Photographs, newspaper and magazine articles, and eyewitness accounts reveal a startling world of commercial exploitation and forbidden eroticism. Fair officials and visitors exploited and degraded ethnic women for entertainment and profit; likewise, ethnic women exploited themselves for personal gain.

Carbon and Nitrogen Effects on Net and Gross N Mineralization/Immobilization

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Presentation Subject Area: Environmental Sciences

The addition of nitrogen to ecosystems through intentional fertilization or unintentional atmospheric deposition from fossil fuel burning can lead to unhealthy levels of nitrogen in rivers and groundwater as well as alter plant community structure. To better predict the effectiveness of ecosystem restoration methods, a more thorough understanding of the intricate relationship between carbon and nitrogen processing is needed. The purpose of this study was to evaluate the effects of carbon and nitrogen addition on gross and net nitrogen mineralization/immobilization. A factorial design with two levels of ammonium chloride crossed with three levels of carbon as glucose were applied to soils from Tishomingo National Wildlife Refuge, Oklahoma under laboratory conditions. Gross mineralization and nitrification rates were determined using 15N pool dilution. Net N mineralization rates as well as total carbon, total nitrogen, NH_4^+ , NO_3^- , and soluble organic carbon were determined using in-house established methods on 0, 3, 7, 21, and 42 days following treatment. Results of this study showed that carbon additions caused an increase in gross mineralization and gross NH_4^+ consumption rates, and a decrease in net mineralization rates. This indicates that C addition causes stimulation of microbial activity inducing rapid immobilization of NH_4^+ .

Mechanical Properties of Single Wall Carbon Nanotubes Using Molecular Dynamic (MD) Simulations

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Presentation Subject Area: Physical Sciences & Technology

Carbon nanotubes are hollow tubes formed by rolling a graphene sheet in a particular fashion. Based on the fashion of rolling the graphene sheet the nanotubes are broadly classified into three different configurations, namely, zig-zag, armchair and chiral. The mechanical strength of a carbon nanotube is in the order of tera pascals and their application ranges from nanometric gears for MEMS to strengthening of polystyrene based composite films. Among various mechanical properties elastic modulus plays a very important role and numerous experimental and analytical studies have been conducted in measuring them. One of the approaches to measure them is to use molecular dynamic simulations where the Newtonian equations of motion are solved using numerical techniques. Experimentalists primarily use tension experiments to find the elastic constant by measuring the strain for a given stress and sometimes, vibration frequencies are also used as an alternative to measure the elastic constants. In this work, attempt has been made to simulate the experimental tension experiment and the elastic constant has been found and compared with the experimental results. The tube behaves nonlinearly at higher strains and the variation of bond angles and bond distances have been studied. The effect of type and the length of the tube on elastic modulus have been studied in detail.

Method Development for Detecting Low Concentrations of Iron Oxide Minerals in Sediments

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Presentation Subject Area: Physical Sciences & Technology

Iron oxide minerals in sediments play an important role in mitigating the transport of contaminants in aquatic environments. Iron oxides strongly absorb inorganic contaminants and can limit the contaminants solubility in the water and effect the degree of potential exposure to organisms and humans. During the metabolic processes, iron oxides are also used resulting in microbial degradation of organic contaminants. An important step towards understanding the processes that mitigate risk due to contaminant exposure is determining the type and quantity of iron oxide present in the sediments. Successfully detecting iron oxides is limited due to there low concentrations in sediments, typically <1% by weight. Diffuse reflectance spectroscopy (DRS) in the ultraviolet-visible-near infrared(UV-Vis-NIR) spectral range may provide a solution for the detection of iron oxides at these low concentrations, since these minerals usually give off a red, yellow, or brown look due to the sediment.

Extraction of the Nitro Organic Herbicide 2,4-Dinitro-o-Cresol from water using Magnetic Nanoparticles

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Large quantities of herbicides and pesticides are introduced into aquifers by agricultural run-off and can profoundly impact wildlife and drinking water quality. The adsorption of dinitrophenol herbicides from water was performed in the past using several materials including activated carbon and clay minerals such as kaolinite, illite, and montmorillonite. The main goal of this project is to use novel magnetic-nano materials in the adsorption of 2,4-dinitro-o-cresol (DNOC). The magnetic nanoparticles used were prepared using iron(III) hydroxide caprylate and the iron(III)-Ni(II) hydroxide caprylate precursors. Suspending the precursors in tetralin and boiling the mixture at 210°C under helium atmosphere for 12 hours yielded γ -Fe₂O₃ and nickel ferrite nanoparticles capped with caprylate groups. The resulting nanoparticles have proven effective in the rapid and easy extraction of DNOC from water. Thus, they can be used in the separation of other dinitrophenols and nitro organic compounds by the same technique.

Nanoindentation and nanoscratching of Aluminum coated Silicon wafer

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Presentation Subject Area: Physical Sciences & Technology

In this investigation the nanohardness of aluminum coated silicon wafer, was determined using a Digital Instruments AFM and an MTS Nanoindenter apparatus. Nanoscratching experiments were performed on the coating using both these instruments. Also, the morphology and microstructure of the indents and scratches made on the material by both instruments were analyzed using the AFM. It is well known that magnitudes of the mechanical properties of materials at macroscale are different to those at the micro- or nano-level. This is because the materials of interest have fewer and fewer defects as the scale is reduced from continuum (macro) to micro to nano, with the result the properties rapidly reach their theoretical values. Nano hardness was determined by indenting the sample with a 60° tetrahedral indenter up to a depth of about 60nm using the atomic force microscope. A procedure was developed to obtain load versus displacement curves from the raw data obtained from the AFM. A 120° berkovich indenter was used in the MTS nanoindenter to determine the hardness at depths of up to 200nm. Nano scratching experiments were performed on the aluminum coating using the AFM indenter, in two different directions to see the effect of the indenter orientation. A 90° tetrahedral indenter and 10.3 μ m spherical indenter were used in the MTS Nanoindenter to scratch the aluminum coating at different loads. The scratches were then imaged using an Atomic Force Microscope.

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Allelic Variants Of Ovine Prion Protein Gene (PRNP) In Oklahoma Sheep

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Presentation Subject Area: Whiteman Award Presentation

Allelic Variants Of Ovine Prion Protein Gene (PRNP) In Oklahoma Sheep A. T. V. Pillai, S. C. Fernando, X. Guo, G. Q. Fitch, U. Desilva. We analyzed sequences of 1144 sheep belonging to 21 breeds and known crosses for polymorphisms in the ovine PRNP gene. Genotype and allele frequencies of polymorphisms in PRNP known to confer resistance to scrapie, a fatal neurodegenerative disease of sheep, are reported. Known polymorphisms at codons 136 (A/V), 154 (H/R) and 171 (Q/R/H/K) were identified. The frequency of the 171R allele known to confer resistance to type C scrapie was 53.8% and the frequency of the 136A allele known to influence the resistance to type A scrapie was 96.01%. In addition, we report the identification of five new polymorphisms at codons 143 (H/R), 167 (R/S), 180 (H/Y), 195 (T/S) and 196 (T/S). We also report the identification of a novel allele (S/R) at codon 138.

Effect of Lipolysis on the Rate of Cholesterol Efflux to ApoA-I and HDL in Adipocytes: Changes in plasma membrane properties.

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Presentation Subject Area: Biological Sciences

Adipose tissue constitutes a major location for cholesterol storage and, as such, it may play a role in the regulation of circulating cholesterol levels and cholesterol homeostasis in general. The mechanisms of cholesterol efflux from adipose tissue are not known. However, the nature and/or activity of the mechanism of cholesterol removal from adipose tissue are likely to be linked to the state of triglyceride metabolism of the tissue. In this report we show that β -adrenergic activation of lipolysis in 3T3L1 adipocytes enhances cholesterol efflux to both lipid-free apoA-I and reconstituted discoidal high density lipoprotein (rHDL). Activation of the lipolysis promoted a 30% increase in the extent of cholesterol efflux to lipid poor apoA-I. This increase in cholesterol efflux did not correlate with an increase in the ABCA-1 content of the plasma membrane. Contrarily, activation of the lipolysis promotes no change or a slight decrease in ABCA-1 content suggesting an ABCA-1 independent enhancement of cholesterol efflux to lipid poor apoA-I. As expected, the extent of cellular cholesterol efflux to rHDL was greater than that observed with lipid-poor apoA-I. Activation of the lipolysis also promoted an increase (17%) of cholesterol efflux to rHDL. The study of the expression of SR-BI indicated no effect of the lipolytic state of the tissue in the receptor content suggesting that the increase in efflux to rHDL was SR-BI independent. A potential role of the cholesterol content of the plasma membranes on the rate of cholesterol efflux was also investigated. The study indicated that β -adrenergic activation of lipolysis promotes a decrease in the cholesterol content of the membranes. This decrease is observed even in the absence of cholesterol acceptors. Supporting the changes in cholesterol content, the anisotropy of fluorescence of diphenyl-hexatriene was significantly reduced in membranes isolated from lipolitically activated adipocytes. Plasma membranes isolated from isoproterenol treated adipocytes also showed an increase in the generalized polarization of Laurdan. These physical changes indicate that β -adrenergic activation of the lipolysis promotes a decrease in the packing of the acyl chains and a concomitant increase in the packing of the polar head groups of the phospholipids. Altogether this study suggest that cAMP dependent increase in the lipolytic rate of adipocytes enhances cholesterol efflux by a mechanism that is not directly related to plasma membranes properties, such as ABCA-1, SR-BI and cholesterol content, that are known to affect the rate of cholesterol efflux.

Social Alienation and the American Dream

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“The American Dream” is defined by American Heritage Dictionary as “An American ideal of a ... successful life to which all may aspire.”

In this post-industrial era (since 1973), with social alienation on the rise, the promise of attaining “The American Dream” is becoming increasingly difficult. This study hypothesizes that social alienation will be highest among postindustrial workers who have abandoned “The American Dream” when compared to either postindustrial workers who still believe in “The American Dream” or workers from previous economic eras. Using quantitative data and applying statistical significance testing to the General Social Survey (GSS) cumulative data file, compiled during the years 1972-2000, accompanied by findings from an extended literature review, this study examines significant differences between post-industrial groups in terms of people’s inter-connectedness, or lack of connectedness. The findings are a step towards illuminating, and thus understanding, why social alienation is on the rise.

Detection of greenbug infestation on wheat using ground-based radiometry

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Greenbug (*Schizaphis graminum* Rondani) is an important pest of cereal crops. Early detection of greenbug infestation becomes a critical part of integrated pest management (IPM) for wheat and sorghum production. Remote sensing techniques can identify pest infestations in agricultural fields, and ground-based radiometry can provide a vital tool to study such stress in crop plants. The purpose of this greenhouse study is to develop a method that can be used to detect greenbug-induced stress on wheat using remote sensing techniques. Reflectance data and derived vegetation indices from the 16 bands of the radiometer for all experiments were analyzed using SAS PROC MIXED for statistical significance. Results show that it is possible to detect greenbug-induced stress on wheat using hand-held radiometers, such as CropScan. Band 694nm and the vegetation indices derived from the band 800 nm and 694 nm were identified most sensitive to greenbug infestation. Broad Landsat TM bands and their derived vegetation indices also show potential for detecting wheat stress caused by greenbug infestation. Impact of plant stage on the detection was examined and the comparison between greenbug infestation and Russian wheat aphid infestation was conducted. It was found that vegetation indices derived from the band 800 and 694 nm such as RVI_800_694 could be used to differentiate greenbug infestation and water stress and Normalized Total Pigment to Chlorophyll Index (NPCl) could be used to distinguish greenbug infestation and the infestation caused by Russian wheat aphid. However, more canopy-level-studies are needed to identify sensitive bands and vegetation indices that are able to distinguish greenbug-induced stress and other stresses such as nitrogen stress on wheat under field conditions.