15TH ANNUAL
K-STATE RESEARCH FORUM

FEBRUARY 11, 2010
2ND FLOOR, K-STATE STUDENT UNION

Sponsored by:
Graduate Student Council
Graduate School
Office of the President

Table of Contents

Program Schedule

POSTER PRESENTATIONS

Session	Time	Location
All Posters on Display	9:00 AM to 3:00 PM	K & S Ballrooms
CGRS Poster Authors Present	9:30 AM to 11:00 AM	K & S Ballrooms
KRF Poster Authors Present	11:00 AM to 1:00 PM	K & S Ballrooms

ORAL PRESENTATIONS

Session	Time	Location
Undergraduate	9:00 AM to 11:30 AM	Room 207
Agricultural Sciences	9:00 AM to 11:30 AM	Room 206
Social Sciences/Humanities/ Education	9:00 AM to 11:30 AM	Room 212
Biological Sciences	1:00 PM to 3:00 PM	Room 213
Engineering/Math/ Physical Sciences	1:00 PM to 3:15 PM	Room 206

AWARDS PRESENTATION

Session	Time	Location
For all sessions	4:00 PM to 5:00 PM	Room 212

Oral Session Schedules

Undergraduate
Room 207

AM

9:00 **STRUCTURAL TRANSFORMATION AND GENDER DISPARITIES: THE EFFECTS OF INDUSTRIALIZATION ON WOMEN'S EQUALITY** *Andrew Brownback*

9:15 **TESTING FOR DROSOPHILA MELANOGASTER GENES INVOLVED IN EHRLICHIA CHAFFEENSIS INFECTIONS** *Alejandro Estrada*

9:30 **ARE AGING AND HEART FAILURE SIMILAR SYNDROMES OF SYMPATHETIC DYSREGULATION?** *Anthony Garcia*

9:45 **A COMPARISON OF DUAL AND NON-DUAL ARMY COUPLES & FACTORS RELATED TO RELATIONSHIP DISTRESS IN ARMY COUPLES** *Laura Cline*

10:00 **HUMAN UMBILICAL CORD MATRIX STEM CELLS TRANSFECTED WITH AN INTERFERON-Â GENE MARKEDLY ATTENUATED THE GROWTH OF BRONCHIOLOALVEOLAR CARCINOMA XENOGRAFTS IN MICE** *Clay King*

10:15 **BREAK**

10:30 **EXPERIENCES FOR ALL AGES: CONNECTING THE ELDERLY WITH THEIR LANDSCAPE** *Lindsey Scheuneman*

10:45 **ESTIMATING POPULATION SIZE OF WHITE TAILED DEER (ODOCOILEUS VIRGINIANUS) ON THE KONZA PRAIRIE BIOLOGICAL STATION** *Adam Siders*

11:00 **"MY KID HAS MORE CHROMOSOMES THAN YOURS!": THE JOURNEY TO RESILIENCE AND HOPE IN PARENTING A CHILD WITH DOWN SYNDROME** *Taylor Veh*

11:15 **A PEEK INTO SUPRAMOLECULAR DATING** *Claudia Ganser*

Agricultural Sciences
Room 206

AM

9:00 **GREEN COFFEE BEANS TO BREWED COFFEE: EVOLUTION OF AROMA ATTRIBUTES** *Natnicha Bhumiratana*

9:15 **MAPPING QTL FOR FUSARIUM HEAD BLIGHT RESISTANCE IN WHEAT CHROMOSOME 7A** *Dimanthi Jayatilake*

9:30 **EFFICACY OF STRUCTURAL HEAT TREATMENTS AGAINST TRIBOLIUM CASTANEUM (COLEOPTERA: TENEBRIONIDAE) LIFE STAGES** *Monika Brijwani*

9:45 **DESCRIPTIVE SENSORY ANALYSIS OF CONVENTIONAL, ORGANIC, AND SUSTAINABLE PLAIN YOGURT** *Marissa Brown*

10:00 **BREAK**

10:15 **INTERACTIONS AMONG BIOLOGICAL CONTROL, CULTURAL CONTROL, AND BARLEY RESISTANCE TO THE RUSSIAN WHEAT APHID, DIURAPHIS NOXIA (KURDJUMOV) IN COLORADO, KANSAS AND NEBRASKA** *Paola Sotelo*

10:30 **DEVELOPMENT, RELATIVE RETENTION, AND PRODUCTIVITY OF RED FLOUR BEETLE ON RESISTANT STARCHES** *Meng Xue*

10:45 **DISEASE RISK MAPPING WITH METAMODELS FOR COARSE RESOLUTION PREDICTORS** *Adam Sparks*

11:00 **CHARACTERIZATION OF TRYPSIN-LIKE PROTEASES IN EUROPEAN CORN BORER (OSTRINIA NUBILALIS)** *Jianxiu Yao*

11:15 **MECHANISM AND IN VINTRO TEST METHOD OF DIGESTION OF STARCH GRANULES** *Lauren Brewer*

Social Sciences/Humanities/Education
Room 212

AM

9:00 **THE ROLE OF SOURCING AGENTS IN GLOBAL APPAREL SUPPLY CHAINS: AN EXPLORATORY STUDY** *Celeste Cook*

9:15 **THE COOPERATIVE MOVEMENT AS A SOCIAL MOMENT, CONSUMER FOOD COOPERATIVES AS POTENTIAL SOCIAL MOVEMENT ORGANIZATIONS (SMOS), AND A CO-OP AS A SMO** *Sarah Beach*

9:30 **THE DEMAND FOR ALCOHOLIC BEVERAGES IN THE U.S.: A VECTOR ERROR CORRECTION APPROACH** *Yacob Zereyesus*

9:45 **THE GER TRADITION: UNDERSTANDING URBANIZATION IN A NOMADIC SOCIETY** *Melissa Belz*

10:00 **BREAK**

10:15 **EVALUATING SYSTEMS THINKING SKILLS AMONG APPAREL AND TEXTILES UNDERGRADUATES** *Cosette M. Armstrong*

10:30 **"IT ISN'T GONE. LET YOURSELF SEE IT." MODELING COMICS' ETERNAL READER** *Josh Pearson*

10:45 **REDUCING BINGE DRINKING AMONG COLLEGE STUDENTS: COMPARING THE EFFECTIVENESS OF SOCIAL NORMS AND SELF-SCHEMA MATCHED MESSAGES** *Megan Miller*

11:00 **TRIBAL EDUCATION IN INDIA: AN EXAMINATION OF CULTURAL IMPOSITION AND INEQUALITY** *Anirban Mukherjee*

11:15 **SIR OR LADY GAWAIN? MEDIEVAL ENGLISH MASCULINITY THROUGH FEMININE PRESENCE AND CHIVALRIC CONSTRAINT** *Cheryl Rauh*

Biological Sciences
Room 213

PM

1:00 **ISCHEMIA/REPERFUSION-INDUCED INTESTINAL LIPD ALTERATIONS OCCUR PRIOR TO ANTIBODY-INDUCED PROSTAGLANDIN E2 PRODUCTION** *Emily Archer Slone*

1:15 **LONG-TERM EFFECTS OF CLIMATE CHANGE ON GRASSLAND SOIL SYSTEMS: A RECIPROCAL TRANSPLANT APPROACH** *Steven Rostkowski*

1:30 **INVESTIGATION OF THE GENETIC FLEXIBILITY OF THE NON-STRUCTURAL PROTEIN (NSP) 2 REGION IN PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROM (PRRS) VIRUS** *Ranjni Chand*

1:45 **THE ROLE OF THE ALTERNATE SIGMA FACTOR (RPON) IN THE BIOLOGY OF ENTEROCOCCUS FAECALIS** *Vijayalakshmi Iyer*

2:00 **BREAK**

2:15 **FUNCTIONAL ANALYSIS OF THE KNICKKOPF GENE FAMILY IN ORGANIZATION OF TRIBOLIUM CASTANEUM CUTICLE** *Sujata Chaudhari*

2:30 **INVESTIGATING THE ONCOGENIC POTENTIAL OF THE DUAL SPECIFICITY PHOSPHATASE 12** *Erica Cain*

2:45 **MONDINI-LIKE MALFORMATION OF THE COCHLEA IN A PENDRED SYNDROME MOUSE MODEL IS DUE TO AN ENLARGEMENT OF SCALA MEDIA AND AN INCOMPLETE OSSIFICATION** *Xiangming Li*

Engineering/Math/Physical Sciences
Room 206

PM

1:00 **EARLY DETECTION OF CANCER THROUGH MATRIX METALLOPROTEINASES (MMP'S) AND SERINE PROTEASES** *Thilani Samarakoon*

1:15 **RESIDENTIAL LOAD CURTAILMENT SCHEMES IN THE PRESENCE OF WIND GENERATION AND STORAGE** *Anita Ann Jose*

1:30 **HETEROEPITAXIAL B12AS2 ON SIC SUBSTRATES** *Yi Zhang*

1:45 **DISCRETE ELEMENT MODELING OF GRAIN COMMINGLING IN A BUCKET ELEVATOR BOOT SYSTEM** *Josephine Boac*

2:00 **BREAK**

2:15 **SILICA THIN FILM POLARITY GRADIENT** *Chenchen Cui*

2:30 **GEOCHEMISTRY OF ARSENIC HOTSPOTS AND SURROUNDING AREAS IN MURSHIDABAD, WEST BENGAL, INDIA** *Andrew Neal*

2:45 **CHEMICALLY STABLE POLYMERIC MEMBRANE REACTORS FOR SELECTIVE REMOVAL OF METHANOL FROM TRANSESTERIFICATION REACTIONS** *Fan Zhang*

3:00 **EFFECTS OF TENSILE STRESS ON EMITTER DISCHARGE OF SUBSURFACE DRIP IRRIGATION SYSTEMS** *Scott Wiens*

List of Posters

K-State Research Forum Posters
K and S Ballrooms

EFFECT OF ACIDULANT SUPPLEMENTATION ON YOGURT FERMENTATION
Tori Boomgaarden

THE ECONOMICS OF SUSTAINABLE FOOD MANUFACTURING: THE CASE OF YOGURT
Amber Tyler

INFLUENCE OF SOILS, NUTRITION, AND WATER RELATIONS UPON CHARCOAL ROT DISEASE PROCESSES IN KANSAS
David Cruz

PRODUCTION OF PLATFORM CHEMICAL FROM ETHANOL INDUSTRY BYPRODUCT: CYANOPHYCIN BIOSYNTHESIS USING METABOLICALLY ENGINEERED ESCHERICHIA COLI BL21
Yixing Zhang

A RAPID DIRECT SOLVENT EXTRACTION METHOD FOR THE EXTRACTION OF 2-DODECYLCYCLOBUTANONE FROM IRRADIATED GROUND BEEF PATTIES USING ACETONITRILE
Faraj Hijaz

MARKET POWER OF THE JAPANESE NON-GM SOYBEAN IMPORT MARKET
Koichi Yamaura

PHOSPHORUS ADSORPTION AND DESORPTION POTENTIAL OF STREAM SEDIMENTS AND FIELD SOILS
Sandra Agudelo

GAP JUNCTIONAL INTERCELLULAR COMMUNICATION OF NORMAL, DYSPLASTIC, AND NEOPLASTIC FELINE MAMMARY TISSUES
Jennifer Darby

THE ATYPICAL MITOGEN-ACTIVATED PROTEIN KINASE ERK3, A NOVEL SUBSTRATE FOR P-21-ACTIVATED KINASE ACTIVITY
Alina De La Mota-Peynado

EFFECTS OF C-5 CYTOSINE SUBSTITUENTS ON THE FORMATION OF BENZO[A]PYRENE DIOL EPOXIDE-ADDUCTS AT CG BASE PAIRS
Chen Lin

FUNCTIONAL ANALYSIS OF TWO CHITIN SYNTHASE GENES IN AFRICAN MALARIA MOSQUITO, ANOPHELES GAMBIAE
Xin Zhang

NEW INSIGHT INTO THE ELECTRONIC STRUCTURE OF THE CP47 ANTENNA PROTEIN COMPLEX OF PHOTOSYSTEM II
Khem Acharya

PYROSEQUENCING TO ANALYZE THE INFLUENCE OF FALLOW PERIOD ON SOIL MICROBIAL COMMUNITIES IN THE BOLIVIAN ALTIPLANO
Lorena Gomez

EFFICIENT AND RAPID MICROMIXING VIA ACTUATION OF DIELECTRIC ELASTOMER ACTUATORS
Eve Metto

INVESTIGATING STUDENTS' TRANSFER OF PROBLEM SOLVING ACROSS REPRESENTATIONS IN INTRODUCTORY MECHANICS
Dong-Hai Nguyen

COMPARING THE EFFECTS OF PHYSICAL AND VIRTUAL EXPERIMENTATION SEQUENCE ON STUDENTS' UNDERSTANDING OF MECHANICS
Adrian Carmichael

EVALUATION OF FAST FOOD RESTAURANT'S PERFORMANCE BASED ON BRAND VALUE: DOES BETTER BRAND RANKING MEAN BETTER PERFORMANCE?
Pei Liu

GETTING LUCKY: ATTRIBUTING AMBIGUOUS JOB PERFORMANCE TO SITUATIONAL FACTORS
William Weyhrauch

WHAT'S ON YOUR MIND?: ANALYZING SELF-REPRESENTATION AND IMPRESSION MANAGEMENT ON FACEBOOK
Natalie Pennington

THE AFRICAN AMERICAN MALE COLLEGE STUDENT EXPERIENCE: THE HISTORY AND ITS EFFECT ON RETENTION IN HIGHER EDUCATION TODAY
Mark Nelson

PREACHING TO AND BEYOND THE CHOIR: SELECTIVE EXPOSURE TO PREJUDICE REDUCTION EFFORTS
Sara Smith

SOCIAL VIGILANTISM AS A PREDICTOR OF POLITICAL PERSUASION AND AFFILIATION
Russell Webster

NEAR AND FAR: HOW DOES THINKING ABOUT INGROUP AND OUTGROUP MEMBERS' DEATHS AT HOME AND AFAR AFFECT TERROR MANAGEMENT RESPONSES?
Leschia McElhaney

SEXUAL ORIENTATION AS A POINT OF STATUS HOMOPHILY: A QUANTITATIVE STUDY
Laura Logan

WHAT ROLE CAN THE BUILT ENVIRONMENT PLAY TO FACILITATE INTERACTION BETWEEN INDIVIDUALS WHO HAVE DUAL SENSORY IMPAIRMENTS?
Zachary Wester

PROMOTING HEALTHY PHYSICAL HABITS IN BUILDINGS FOR DUAL SENSORY IMPAIRED INDIVIDUALS
Andrew Barnes

HIGHLIGHTING TACTILE AND OLFACTORY CLUES: HEALTHY ENVIRONMENTS FOR THE DEAF-BLIND STUDENTS
Sean Rigdon

EFFECTS OF THE BUILT ENVIRONMENT ON MOBILITY FOR THE DUAL-SENSORY IMPAIRED
Joshua Winter

META-ANALYSIS OF THE RELATIONSHIPS BETWEEN SOCIAL SUPPORT AND WELL-BEING IN CHILDREN AND ADOLESCENTS
Po Sen Chu

SOCIAL VIGILANTISM AND ASSERTION OF RELIGIOUS BELIEFS: PREDICTING BELIEF DEFENSE AND DISSEMINATION
Megan Strain

SENSORY EXPERIENCES IN GARDEN ENVIRONMENTS FOR ADOLESCENTS WITH DUAL SENSORY IMPAIRMENT
Laura Herron

Candidate Posters for the 7th Annual Capitol Graduate Research Summit
K and S Ballrooms

NOTE: The top ten poster presentations in the CGRS Poster Session will be selected for presentation at the 7th Annual Capitol Graduate Research Summit, which will be held on Thursday, March 25, 2010 in the Docking State Office Building in Topeka, KS.

FUNDAMENTAL STUDIES ON MOLECULAR INTERACTIONS IN STARCH/PVOH/CLAY NANOCOMPOSITES USED FOR MAKING BIODEGRADABLE PACKAGING FILMS
Samer Ali

PM10 EMISSION RATES FROM BEEF CATTLE FEEDLOTS IN KANSAS
Henry Bonifacio

DEVELOPMENT OF A 'GLUTEN- FREE' FLAVORED WAFFLE CONE USING BROWN RICE FLOUR
Angela Dodd

WATER ABSORPTION AND MIXING BEHAVIOR OF HARD AND SOFT WHEAT FLOURS WITH BRAN INCLUSIONS
Hyma Gajula

UNCOVERING MAIN PLAYERS INVOLVED IN SUCCESSFUL INVASION OF RICE CELLS BY THE BLAST FUNGUS MAGNAPORTHE ORYZAE
Martha Giraldo

MEASUREMENT OF SIZE DISTRIBUTION AND CONCENTRATION OF PARTICULATE MATTER EMITTED FROM A COMMERCIAL CATTLE FEEDLOT IN KANSAS – LASER DIFFRACTION
Howell Gonzales

EFFECT OF PACKAGING AND STORAGE TIME ON SURVIVAL OF LISTERIA MONOCYTOGENES ON SHELF-STABLE MEAT SNACKS
Nigel Harper

PACKAGE SYSTEMS AND STORAGE TIMES SERVE AS POST-LETHALITY TREATMENTS FOR LISTERIA MONOCYTOGENES ON SMOKED SAUSAGE STICKS
April Lobaton-Sulabo

IMPACT OF A PLANT EXTRACT ON THE VIABILITY OF YOGURT STARTER AND PROBIOTIC CULTURES IN NONFAT YOGURT
Minto Michael

INHIBITORY ACTIVITIES OF SPICES ON HETEROCYCLIC AMINE FORMATION IN GROUND BEEF PATTIES
Kanithaporn Puangsombat

DEVELOPING SITE-SPECIFIC MONITORING STRATEGIES FOR MANAGING CORN EARWORM (HELICOVERPA ZEA) IN SORGHUM
Alysha Soper

INFLUENCE OF PREVIOUS INFESTATION OF SOYBEAN ON THE SOYBEAN APHID, APHIS GLYCINES MATSUMURA (HEMIPTERA: APHIDIDAE)
Poornima Viswanathan

PRODUCTION OF CAROTENOID-ENRICHED ANIMAL FEED BY SECONDARY FERMENTATION OF WHOLE STILLAGE
Nanjunda Ananda

WHEAT-RYE T2BS.2BL-2RL RECOMBINANTS WITH RESISTANCE TO HESSIAN FLY (H21)
Joey Cainong

COMPARISON OF POPULATIONS OF TWO SOYBEAN APHID BIOTYPES ON DIFFERENT SOYBEAN ENTRIES
Predeesh Chandran

ENHANCING SORGHUM AS BIOFUEL FEEDSTOCK: INHERITANCE OF JUICE YIELD, STEM SUGAR AND BIOMASS PRODUCTION
Jayfred Gaham Godoy

FLAMELESS CATALYTIC INFRARED RADIATION FOR DISINFESTATION OF STORED WHEAT DOES NOT AFFECT WHEAT QUALITY
Moses Khamis

EFFECT OF EARLY- AND MID-SEASON COLD TEMPERATURE STRESS ON GROWTH, DEVELOPMENT AND YIELD COMPONENTS OF SORGHUM
Frank Maulana

EVALUATING GENETIC RESOURCES FOR DROUGHT TOLERANCE IN GRAIN SORGHUM
Raymond Mutava

TRANSPIRATION EFFICIENCY AMONG SORGHUM LINES DIFFERING IN CANOPY ARCHITECTURE
Sruthi Narayanan

PROPERTIES OF STARCH FROM NEAR ISOGENIC WHEAT SAMPLES OVEREXPRESSING PUROINDOLINES AND THE ROLE OF STARCH GRANULE SURFACE COMPONENTS IN PASTING
Daniela Nath De Oliveira

ECOLOGY AND MANAGEMENT OF LARGE PATCH DISEASE OF ZOYSIAGRASS
Kehinde Obasa

CLUMPED PLANTING GEOMETRY IN SORGHUM TO INCREASE YIELD IN WATER LIMITING CONDITIONS
Kalaiyarasi Pidaran

DETERMINATION OF GENOTYPIC AND ENVIRONMENTAL EFFECTS ON WATER ABSORPTION STABILITY OF KANSAS WINTER WHEAT VARIETIES
Gabriela Rattin

ETHANOL PRODUCTION FROM OZONATED HIGH-TANNIN GRAIN SORGHUM
Shuping Yan

OCCURRENCE AND TRANSFERABILITY OF TCRB, A COPPER RESISTANCE GENE, IN FECAL ENTEROCOCCI OF SWINE FED DIETS SUPPLEMENTED WITH COPPER
Raghavendra Amachawadi

A NOVEL ROLE OF GAP JUNCTION CONNEXIN46 PROTEIN TO PROTECT BREAST TUMORS FROM HYPOXIA
Debarshi Banerjee

PROGRESS TOWARDS THE DEVELOPMENT OF A BIOCHIP FOR EARLY DETECTION OF DEPURINATING ESTROGEN-DNA ADDUCTS
Mausam Kalita

ANALYSIS OF THE STABILITY OF RUMEN PH MEASUREMENTS OBTAINED POST MORTEM
Tiffany Lee

TESTING FREQUENCY AND RESULTS OF CASES OF FEEDLOT CATTLE SUBMITTED TO KANSAS STATE UNIVERSITY VETERINARY DIAGNOSTIC LAB FOR BOVINE RESPIRATORY DISEASE COMPLEX
Amanda May

A NOVEL COILED-COIL PROTEIN IS REQUIRED FOR PLK1 LOCALIZATION TO THE CENTRAL SPINDLE
Debjani Pal

AGENT-BASED SIMULATION EMBEDDED WITH SYSTEMIC MODEL-A PREDICTIVE TOOL FOR PROGRESSION OF H1N1 IN THE TISSUE LEVEL
Zhenzhen Shi

LARGE SCALE SYNTHESIS FOR COELENTERAZINE
Tej Shrestha

ANATOMICAL AND PHYSIOLOGICAL TRAITS AS INDICATORS OF DROUGHT TOLERANCE IN TALLGRASS PRAIRIE PLANTS
Sally Tucker

IDENTIFICATION OF UNIQUE TUMORICIDAL GENES IN RAT UMBILICAL CORD STEM CELLS
Lakshmi Deepthi Uppalapati

PASSIVE IMMUNITY TO A COMMERCIAL E. COLI-SRP® VACCINE IN BEEF CATTLE COLOSTRUM FROM COWS GRAZING NATIVE RANGE
Ben Wileman

CHARACTERISTICS OF WORK ZONE CRASHES FOR THE SMART WORK ZONE DEPLOYMENT INITIATIVE (SWZDI) REGION
Sreekanth Reddy Akepati

COMPARISON OF CHARACTERISTICS AND CONTRIBUTORY FACTORS FOR FATAL TRUCK AND NON-TRUCK CRASHES USING BAYESIAN STATISTICAL ANALYSIS
Nishitha Bezwada

DEPOSITIONAL ANALYSIS OF THE TONKAWA SANDSTONE, OKLAHOMA
Amanda Cashman

ESTIMATING EPHEMERAL GULLY EROSION USING GIS AND FIELD MEASUREMENTS
Prasad Daggupati

DEVELOPMENT OF A QUANTIFICATION METHOD TO SPECIFIC ANTI-NS3 ANTIBODIES AGAINST BOVINE VIRAL DIARRHEA VIRUS USING A BLOCKING ELISA
Stephane Guillossou

DATA ENVELOPMENT ANALYSIS OF KAMU HOSPITALS
Deep Kumar Guillipalli

NUMERICAL SIMULATION OF AIR FLOW AND PARTICLE COLLECTION BY POROUS BARRIERS AROUND AREA SOURCES
Li Guo

CENTERLINE RUMBLE STRIPS: A STUDY OF EXTERIOR NOISE
Daniel Karkle

MODEL TO INTEGRATE OVERLAND, STREAM BANK AND EPHEMERAL GULLY EROSION MODELS
Naga Raghuveer Modala

ANN-BASED PROGRAM FOR 85TH & 50TH (MEDIAN) SPEED MODELS
Srikanth Renikunta

MINIMUM DISTANCE CONDITIONAL VARIANCE FUNCTION CHECKING IN HETEROSCEDASTIC REGRESSION MODELS
Nishantha Anura Samarakoon

USING WATERSHED MANAGER TO COST-EFFECTIVELY TARGET CROPLAND BEST MANAGEMENT PRACTICES
Craig Smith

THE SIGNIFICANCE OF OUTDOOR ENVIRONMENTS FOR DUAL SENSORY IMPAIRED PERSONS
Kala Ade

FOOD SAFETY PRACTICES IN CONTINUING CARE RETIREMENT COMMUNITY FOODSERVICE OPERATIONS IN KANSAS
Ju Won Choi

HIV IN THE HEARTLAND: NEGOTIATING DISCLOSURE, STIGMA, & THE HIV COMMUNITY
Sarah Donley

KONZA PRAIRIE PRESERVE: RECONCILING SCIENCE AND THE AESTHETIC EXPERIENCE
Tyra Olstad

THE EVOLVING PERFORMANCE OF THE FEMALE BODY IN MARGARET ATWOOD'S THE YEAR OF THE FLOOD
Christy Pottroff

DEVELOPMENT OF MODULES FOR A FOOD DEFENSE WORKSHOP FOR GRADUATE STUDENTS AND WORKING PROFESSIONALS
Keith Pritts

INVENTORY AND ANALYSIS OF THE BLACK VERMILLION RIVER SYSTEM RIPARIAN CORRIDORS AND THE DEVELOPMENT OF EROSIONAL RATING CURVES FOR NORTHEAST KANSAS AND ASSOCIATED HYDROPHYSIOGRAPHIC REGIONS
Christopher Sass

MEASURING COLLEGE AND UNIVERSITY DINING SERVICES DIRECTORS' KNOWLEDGE, ATTITUDES, CHALLENGES, AND IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT
Ying Zhou

REINFORCED CONCRETE CONFINED CIRCULAR COLUMN: NEW ECCENTRICITY BASED MODEL
Ahmed Abd El Fattah

LONG-TERM SALT SCALING DURABILITY OF CONCRETE CONTAINING FLY ASH
Brandon Bortz

PYRAZOLE: A CRYSTAL ENGINEERING APPROACH FOR BETTER PESTICIDES, HERBICIDES, AND FUNGICIDES
Evan Hurley

EFFECT OF SINUSOIDAL SPECTRAL PHASE ON STEPWISE EXCITATION OF ATOMS
Hyounguk Jang

NOVEL PHOTOCATALYTIC WATER SPLITTING WITH THE N-DOPED IN2O3/TIO2 D10-D0 CONFIGURATION COMPOSITE OXIDE SEMICONDUCTORS
Yenting Kuo

SOLARCHEMICAL PRODUCTION OF AMMONIA USED FOR FERTILIZATION
Ronald Michalsky

POST BUCKLING BEHAVIOR OF HEMISPHERICAL SHELL SUBJECTED TO CONCENTRATED LOAD
Shahin Nayyeri Amiri

SYNTHESIS AND CHARACTERIZATION OF PHOTOCATALYTICALLY ACTIVE TITANIUM DIOXIDE/SILICON DIOXIDE (TIO2/SIO2) MIXED OXIDE SYSTEMS FOR ENVIRONMENTAL REMEDIATION
Thelge Manindu Peiris

LASER ASSISTED MACHINING OF SILICON NITRIDE CERAMICS
Xinwei Shen

ASSESSMENT OF SUITABILITY OF CHEMICAL SHRINKAGE AS A MEANS OF APPARENT ACTIVATION ENERGY CALCULATION
Md Siddiqui

SEMICONDUCTING ICOSAHEDRAL B12AS2 AND B12P2 CRYSTAL GROWTH
Clinton Whiteley

CHARACTERIZING THE RAPID CHLORIDE CONCRETE RESPONSE USING ARTIFICIAL NEURAL NET APPROACH
Hakan Yasarer

Oral Presentation Abstracts

Undergraduate

STRUCTURAL TRANSFORMATION AND GENDER DISPARITIES: THE EFFECTS OF INDUSTRIALIZATION ON WOMEN'S EQUALITY

Andrew Brownback
Department of Economics and Mathematics, College of Arts and Sciences

In this paper, we address the different indicators of a structural transformation, specifically, a decrease in GDP originating in agriculture, a decrease in the labor force in agriculture and an increase in the productivity of agriculture. We then analyze the relationship between different metrics of gender equality (secondary school enrollment & life expectancy) and these indicators of a structural transformation. In order to do this, we take panel data for each country from 1960 to 2001. We then use fixed-effects regression analysis to determine these relationships. Our hypotheses were that GNI per capita and agricultural technology would be positively correlated to gender equality and that the percent of the GDP originating in agriculture would be negatively correlated to agriculture. Our findings provide evidence in favor of these hypotheses. Furthermore, we test if the structural transformation away from agriculture affects the concentration of women in the agricultural labor force. The findings on this were less clear, but if we keep all outliers a quadratic equation can be derived which tells us that a maximum number of women in the agricultural labor force does exist and that it exists when agriculture accounts for around 10% of GDP. These conclusions indicate that policy makers can support the structural transformation without concern that gender disparities will be worsened; however, there could be some effects on the female agricultural labor force.

TESTING FOR DROSOPHILA MELANOGASTER GENES INVOLVED IN EHRLICHIA CHAFFEENSIS INFECTIONS

Alejandro Estrada, Alison Luce-Fedrow, Tonia Von Ohlen, Stephen K. Chapes
Department of Biology, College of Arts and Sciences

Ehrlichia chaffeensis is an obligate intracellular bacteria, which will only grow in live cells. Individuals are infected with E. chaffeensis when bitten by lone star ticks, which carry the bacteria. The disease caused by infection with E. chaffeensis is called human monocytic ehrlichiosis. Infected individuals may experience headaches, muscle aches, fever, chills, and/or nausea. If not treated with care, it may cause neurological side effects or death. Several Drosophila genes were identified in a microarray study that were up-regulated after infection of Drosophila S2 cells with E. chaffeensis. We hypothesized that adult Drosophila, which are mutant for the genes identified in the microarray study, may display altered survival compared to wild-type flies. In our current study, E. chaffeensis was injected into flies that are mutant for the genes identified in the microarray study. Survival of the flies was monitored for 120 hours post infection. By testing the various types of genetically altered D. melanogaster, we can gain an understanding on the genes which contribute to host defense of E. chaffeensis. Since the Drosophila innate immune system has many vertebrate homologs, the information we obtain from our fly studies is readily useable in animal systems and relevant to human medicine. This project has been supported by NIH grants AI55052, AI052206, RR16475, and RR17686; NASA grants NAG2-1274, the Kansas Agriculture Experiment Station, the Terry C. Johnson Center for Basic Cancer Research, and the KSU Developing Scholars Program.

ARE AGING AND HEART FAILURE SIMILAR SYNDROMES OF SYMPATHETIC DYSREGULATION?

Anthony Garcia[1], AA Garcia[2], MJ Kenney[1], ML Margiocco[3], TI Musch[1], KS Hageman[1]
[1]Department of Anatomy and Physiology, College of Veterinary Medicine; [2]Department of Clinical Sciences, College of Veterinary Medicine; [3]Department of Kinesiology, College of Arts and Sciences

The sympathetic nervous system plays a crucial role in the regulation of physiological homeostasis under basal conditions and in response to acute stress. Both heart failure (HF) and aging alter the basal regulation of sympathetic nerve discharge (SND). An estimated 4.8 million Americans have HF and the aged are at an especially high risk of developing this condition, however, the combined effect of aging and HF on SND regulation to acute stress is not known. Hyperthermia is a stressor that produces robust sympathoexcitatory responses in young rats. We tested the hypothesis that aging and HF produce dissimilar syndromes of sympathetic nervous system dysregulation, as evidenced by differences in renal and splenic SND responses to heat stress in young HF compared with aged HF rats and in aged HF compared with aged non-HF rats. Anesthetized young (3-6 months) and aged (24-25 months) F344 rats received either a myocardial infarction (MI) or a sham infarction. Heating experiments were completed in anesthetized rats after the MI or the sham procedure. Left ventricular function was evaluated by comparing dimensions of the left atrium (LA) to the aorta (Ao) (LA/Ao ratio) using echocardiographic techniques. Preliminary results indicate that LA/Ao ratio along with SND responses to acute heating may differ in young HF compared with aged HF rats and in aged HF compared with aged non-HF rats. These findings suggest that both age and HF should be considered when determining mechanisms regulating SND responses to acute stress. NIH HL91342.

A COMPARISON OF DUAL AND NON-DUAL ARMY COUPLES & FACTORS RELATED TO RELATIONSHIP DISTRESS IN ARMY COUPLES

Laura Cline, Matthew Johnson, Jared Anderson
Department of Family Studies and Human Services, College of Human Ecology

The number of dual-military couples is on the rise, increasing from 4% in 1974 to 11% today (Huffman, 2006). The goal of the present study is to critically assess the factors, including marital satisfaction, that differentiate individuals in a dual military marriage from individuals where only one spouse is a member of the military (i.e. single soldier marriages). A survey of 1,600 Fort Riley soldiers, 90 of which were dual-military, was used to calculate the results. Comparisons between dual and single soldier marriages on rank, age, number of children and relationship length were all factors to consider based on past research. The present study determined that dual-military status was significantly associated with holding a lower rank, being from a minority racial group, being younger, having a shorter relationship, and having fewer children. Interestingly, dual-military and single soldier marriages did not differ on levels of marital satisfaction. Further analysis of the total sample indicated that relational distress is linked with holding a lower rank, having the family not accompany the soldier on a move, being in a dating or engaged relationship compared to a marriage, and having a shorter relationship. With the number of dual-military couples continuing to increase, this information is helpful for both military and civilian professionals. The clarification of the critical factors outlined in this research will help professionals gain a clearer understanding of the challenges faced by dual-military marriages, as well as risk factors for relationship distress among military marriages.

HUMAN UMBILICAL CORD MATRIX STEM CELLS TRANSFECTED WITH AN INTERFERON-Â GENE MARKEDLY ATTENUATED THE GROWTH OF BRONCHIOLOALVEOLAR CARCINOMA XENOGRAFTS IN MICE

Clay King, Atsushi Kawabata, Raja Shekar Rachakatala, Chiyo Doi, Dharmendra Kumar Maurya
Department of Anatomy and Physiology, College of Veterinary Medicine

Mesenchymal stem cells derived from human umbilical cord matrix (UCMSC) have great potential for therapeutic use in multiple diseases including cancer. UCMSC can be used as carriers for targeted gene/therapeutics-delivery and local production of biologic agents. Interferon-â (IFN-â) has demonstrated potent anti-tumor effects on many tumor cell lines in vitro. However, inhibition of tumor cell growth by IFN-â required much higher concentrations than permitted in blood levels with the maximally tolerated dosage. The aim of this study was to determine the anti-cancer effect of IFN-â gene transfected UCMSC (IFN-UCMSC) on bronchioloalveolar carcinoma (BAC) in vitro and in vivo. The conditioned media derived from IFN-UCMSC significantly attenuated cell growth of H358 and SW1573 BAC cell lines in vitro compared to media derived from non-transfected UCMSC. The percentage of dead cells by the trypan blue exclusion test was significantly higher in the cells treated with the media derived from IFN-UCMSC than UCMSC alone. The co-culture of IFN-UCMSC with cancer cells inhibited cell growth significantly through stimulation of apoptosis. Finally, the systemic administrations of IFN-UCMSC (0.3 million cells/injection, 5 day interval for four times) markedly attenuated tumor multiplicity and tumor size of orthotopic H358 BAC xenografts in SCID mouse lungs. These results indicated that IFN-UCMSC attenuated growth of BAC cells through inducing programmed cell death with IFN-â production both in vitro and in vivo. This research clearly demonstrated that UCMSC are excellent cellular vehicles for cancer-targeted therapeutic genes.

EXPERIENCES FOR ALL AGES: CONNECTING THE ELDERLY WITH THEIR LANDSCAPE

Lindsey Scheuneman
Department of Landscape Architecture/Regional and Community Planning,
College of Architecture, Planning, and Design

With the growing number of aging men and women, there is a growing need for full-continuum care communities. There are many rules and regulations on how the interior architecture of these communities are designed, but there is a lack of similar rules and regulations for exterior spaces; which inevitably deters residents from wanting to leave the confines of their interiors. As a designer, I have the ability to design exterior elements that are both aesthetically pleasing and sustainable to the environment. The focus site for this research is located in Manhattan, KS. Meadowlark Hills Retirement Community is 50-acre, full-service retirement community serving 200 independent living residents, 40 assisted living residents, 130 residents in the health care households. Through extensive research —e.g., literature reviews, precedent studies, site visits, site inventory/analysis— of the elderly and aging, revolutionary design of retirement communities, and healing/therapeutic landscapes, I plan to design general and site specific amenities that are aesthetically appealing to residents and sustainable to the environment. The documentation of my design research will be in forms of a literature map, literature reviews, and summaries of material which influence my deign decisions. Written and graphic materials emphasizing the scope of my project, design guidelines, conceptual master planning, and detailed site plans will also be included. The end product will be a compilation of the written documentation, hand-rendered drawings, and computer rendered drawings to best portray my ideas and concepts.

ESTIMATING POPULATION SIZE OF WHITE TAILED DEER (ODOCOILEUS VIRGINIANUS) ON THE KONZA PRAIRIE BIOLOGICAL STATION

Adam Siders, Samantha M. Wisely, KSU Student Chapter of the Wildlife Society
Department of Biology, College of Arts and Sciences

In 2004, the Kansas State University student chapter of The Wildlife Society began a long-term study to monitor white tailed deer (Odocoileus virginianus) on the Konza Prairie Biological Station. The data acquired through distance sampling can be used to estimate densities and to monitor population fluctuations from year-to-year. We hypothesize that because there is no hunting pressure on the white tailed deer population at the station, the population has increased since 2004. We used a line transect method of distance sampling to estimate density. The line transect method involved surveying a 19 kilometer predetermined route on the station. We recorded cluster size, radial distance from the vehicle, a compass bearing, and the

UTM of the vehicle location. Program DISTANCE was used to analyze the data. DISTANCE estimated the densities as well as the probabilities of detection to determine the likelihood of seeing deer in various habitat types at particular distances from the transect. We recorded three habitat types, open, mixed, and forested and found different probabilities of detection for each. If we determine population densities have increased in the last 5 years, we believe that management of the population should be considered.

"MY KID HAS MORE CHROMOSOMES THAN YOURS!": THE JOURNEY TO RESILIENCE AND HOPE IN PARENTING A CHILD WITH DOWN SYNDROME

Taylor Veh[1], Madison Peak[2], Laura Cline[3], Courtney Tracy[4]
[1]Department of Biology, College of Arts and Sciences; [2]Department of Human Nutrition, College of Human Ecology; [3]Department of Family Studies and Human Services, College of Human Ecology; [4]Department of Elementary Education, College of Education

In a review of literature, fewer than 10 academic publications addressed the positive experiences of parenting a child with Down syndrome (DS). While there are several mainstream publications about parenting children with DS, they are not empirically-based. This research study will include online surveys and qualitative interviews with parents that will explore the journey to resilience and hope experienced by families with a child with DS. The research will identify the key resilience factors in families who have successfully navigated this difficult transition and provide important information and resources for families facing this journey in the future. Specific questions will ask participants how they coped with their child's Down syndrome diagnosis, about their relationship as a couple, and their hope and satisfaction with life. In addition, qualitative questions will ask more about their initial response to the diagnosis, their current attitude about the diagnosis, and other specific experiences they have had as a parent to a child with DS. We anticipate two primary outcomes from this project: 1) peer-reviewed journal or book chapter publications based on the quantitative and qualitative interview data, and 2) a consumer media book for families with children with DS. Particularly because the mainstream publications in this area are not empirically-based, we believe this will have a significant impact on the DS community.

A PEEK INTO SUPRAMOLECULAR DATING

Claudia Ganser[1], Prashant D. Chopade[2], John Desper[2], Christer B. Aakeröy[2]
[1]Department of Biology, College of Arts and Sciences;
[2]Department of Chemistry, College of Arts and Sciences

Through supramolecular interactions we can modify physical properties of chemicals such as herbicides and insecticides to improve their function and effectiveness. Rather than looking at interactions within molecules, supramolecular chemistry deals with interactions beyond that. What entices molecules to interact with one another, and what makes a suitable partner is not completely understood and this is the main focus of our research.We set up 105 reactions with various amino pyrazine derivatives and acids. To observe communication between molecules they are combined in a medium such as methanol. Through slow evaporation, this process can either lead to co-crystallization - interactions between different molecules – or re-crystallization – between the same molecules. While the naked eye does not tell us much about interactions between molecules, we can listen in on their conversations through vibrational spectroscopy, and determine whether our molecules interacted by forming co-crystals or salts. The amino pyrazine derivatives showed varying degrees of willingness to interact with acids. Unsubstituted amino pyrazines had the highest probability of reacting with acids (76 %). While amino pyrazines with one substituent (-Br) had a reduced probability of 47%, addition of another bromine decreased the interactions down to 15%. This trend can be explained through changes in charge on the amino pyrazine; each bromine lowers the attraction between both the pyrazine and an approaching acid. This information allows us to establish guidelines for how to fine-tune supramolecular interactions and, subsequently, for how we can modify physical properties of solids such as pharmaceuticals.

GREEN COFFEE BEANS TO BREWED COFFEE: EVOLUTION OF AROMA ATTRIBUTES

Natnicha Bhumiratana, Koushik Adhikari, Edgar Chambers IV
Department of Human Nutrition, College of Human Ecology

Aroma of coffee is one of the most important aspects that contribute to the sensory experience during drinking. Each processing step including roast levels has a major impact on the aroma profile of coffee. This study investigated the effect of roasting (different degrees), grinding, and brewing on the evolution of coffee aroma of green beans of three different origins (Ethiopian, Kona, and Bourbon). Using a highly trained descriptive panel, 15 aromatic sensory attributes were identified and quantified in whole green coffee beans, whole roasted coffee beans, ground coffee, and brewed coffee. Fifteen aroma descriptors were identified by the panel. Analysis of variance (ANOVA) and canonical variate analysis (CVA) were done separately for each coffee variety. The ANOVA showed that green beans had very low coffee-related characteristics and were high in beany, green, musty/earthy, and sour aromatic attributes, all of which were carried through to the final brews, although the intensity was much less for the musty/earthy attribute. It was observed from the CVA biplots that the aroma of the brewed coffee for all three varieties and roast levels was less intense as compared to the roasted beans and roasted ground beans. This is because of the dilution of aroma in the brews. In general, the darker roasts for all samples had higher intensities of coffee aroma. Light roast for Kona, and light to medium for Ethiopian and Bourbon may be the level of roast that brings out the character aroma notes in these beans.

MAPPING QTL FOR FUSARIUM HEAD BLIGHT RESISTANCE IN WHEAT CHROMOSOME 7A

Dimanthi Jayatilake, Guihua Bai
Department of Agronomy, College of Agriculture

Fusarium head blight (FHB), caused by Fusarium graminearum, is an important cereal disease. Among different types of resistance against FHB, resistance to disease spread within a spike (type II) is the most stable type. A previous study revealed a high level of type II resistance in Chinese Spring-Sumai3 chromosome 7A substitution lines, but mapping work did not find any quantitative trait locus (QTL) on the chromosome. To characterize QTL for type II FHB resistance in wheat chromosome 7A and identify SSR markers associated with the QTL, we developed Chinese Spring-Sumai3-7A chromosome recombinant inbred lines (CRIL) from the cross between Chinese Spring and Chinese Spring-Sumai3-7A disomic substitution lines and evaluated 191 F5 CRIL for type II FHB resistance using single spikelet inoculation. Mean proportions of symptomatic spikelets (PSS) for each CRIL were calculated to measure the resistance. Twenty eight polymorphic markers from chromosome 7A were used to screen the population and a linkage map was developed using JoinMap software. CIM feature of QTL Cartographer, with a significance threshold of LOD 1.9 ($P<0.005$) was used for QTL mapping. Frequency distribution of PSS was bimodal and ranged from 5% to 97%. QTL mapping detected a major putative QTL on chromosome 7A with a LOD score of 5, flanked by markers Xbarc174 and Xwmc17. QTL explained 12% of the phenotypic variation. Mapping population will be evaluated for two more seasons and SNP markers will be developed to improve the linkage map resolution.

EFFICACY OF STRUCTURAL HEAT TREATMENTS AGAINST TRIBOLIUM CASTANEUM (COLEOPTERA: TENEBRIONIDAE) LIFE STAGES

Monika Brijwani[1], Bhadriraju Subramanyam[1], Paul W. Flinn[2], Michael Langemeier[3]
[1]Department of Grain Science and Industry, College of Agriculture; [2]USDA-ARS, SPIRU; [3]Department of Agricultural Economics, College of Agriculture

Unsanitary conditions in flour mills are potential harborage sites for the red flour beetle, Tribolium castaneum (Herbst), a major pest in mills. Two separate experiments were conducted during 13-14 May and 25-26 August 2009 structural heat treatment of Kansas State University's Hal Ross Flour Mill. In the first experiment, the effect of high temperatures (50-60C), and two levels of sanitation (dusting and 2 cm deep flour), on eggs, young larvae, old larvae, pupae and adults confined in plastic boxes was evaluated. In the second experiment, 0.1, 0.2, 1, 3, 6, and 10 cm flour depths were simulated using 20 cm diameter and 15 cm high PVC rings to evaluate survival of T. castaneum eggs and adults during the two heat treatments. Temperatures in box and PVC ring bioassays at all sanitation levels as well as temperatures within mill floors during the 24 h heat treatment were recorded. In box bioassays, essentially none of the life stages survived the 24 h heat treatment except in a few locations. In PVC ring bioassays, both the egg and adult mortality at all flour depths was 100% only on the third floor of the mill after 24 h. The survival of insects is related to how quickly temperatures reached 50C and how long temperatures were held between 50-60C.

DESCRIPTIVE SENSORY ANALYSIS OF CONVENTIONAL, ORGANIC, AND SUSTAINABLE PLAIN YOGURT

Marissa Brown
Department of Food Science Institute/Human Nutrition,
College of Agriculture/College of Human Ecology

As yogurt's health benefits become increasingly recognized, demand for more options arises. Current yogurts, conventional and organic, differ in flavor, texture, and nutrition. Three plain yogurts were developed using more sustainable production, and this research aimed to determine their market viability. The prototypes were tested alongside 26 commercially-available yogurts using descriptive sensory analysis. A six-person highly-trained panel evaluated the samples based on 25 flavor attributes and 10 texture attributes. Each sample was evaluated three times, and all samples were tested at least 10 days prior to the end of their shelf-life. Using factor analysis, the 35 attributes were reduced to 5 factors representing the comprehensive (1) sour/sharp flavors, (2) fatty/thickness flavors and textures, (3) off-flavors, (4) degree of dissolving, and (5) salty flavor. No one yogurt type scored high with respect to factor 1. Greek-style yogurts scored highly with respect to factor 2, and store-brand yogurts tended to score

higher with respect to factor 3. Since few attributes were associated with factors 4 and 5, the scores were not considered in the analysis. Although unflavored yogurt is not generally preferred by consumers, these findings are indicative of overall market trends. Variability in flavor and texture exists even in flavored, sweetened yogurts. This research also indicates the viability of the prototypes. Since they have similar sensory characteristics as some current products and offer the value-added benefit of being more sustainable, they should be successful, in theory.

INTERACTIONS AMONG BIOLOGICAL CONTROL, CULTURAL CONTROL AND BARLEY RESISTANCE TO THE RUSSIAN WHEAT APHID, DIURAPHIS NOXIA (KURDJUMOV), IN COLORADO, KANSAS AND NEBRASKA

Paola Sotelo, C. Michael Smith
Department of Entomology, College of Agriculture

The Russian Wheat Aphid, Diuraphis noxia (Kurdjumov) (RWA) is an important pest in the Western Plains, causing hundreds of millions of dollars in U. S. wheat and barley production losses through reduced yields and pesticide treatment costs. The objective in this research is integrate a rational chemical control, the use of two new spring barley resistant varieties, take advantage of the current presence of natural enemies in the experimental fields, and use a combination of two planting dates as cultural control practice. The research is being conducted in three barley fields located in Colorado, Kansas, and Nebraska during 2007, 2008 and 2009. The experimental design in use is a split-plot design with two main plot treatments (early and normal planting dates). Within each main treatment plot, four split-plot treatments (varieties) are randomized. These treatments include Stoneham and Sydney barley, and the susceptible cultivar Otis under thiamethoxam-protected and unprotected regimes. Aphid, and incidence (tillers with RWA or visual damage/25 tillers/treatment, respectively) sampling was conducted at four dates from late May through early July in 2007. RWA total populations on the unprotected susceptible cultivar Otis were the highest in Colorado and Kansas, and RWA populations at all the three locations were greater on Otis than on the RWA resistant varieties and Otis under thiamethoxam protection. The early planted plots yielded lower RWA populations on the resistant RWA varieties and the Otis under chemical protection in comparison with the late planted plots.

DEVELOPMENT, RELATIVE RETENTION, AND PRODUCTIVITY OF RED FLOUR BEETLE ON RESISTANT STARCHES

Meng Xue[1], Bhadriraju Subramanyam[1], Yong-Cheng Shi[1], James F. Campbell[2]
[1]*Department of Grain Science and Industry, College of Agriculture;*
[2]*USDA, Manhattan, KS*

The development, relative retention, and fecundity of the red flour beetle, Tribolium castaneum (Herbst), on six different starches, flour, and flour plus yeast were investigated in the laboratory. The size of starch particles ranged from 15-58 µm when compared with flour (133 µm). Larvae reared on starches rarely developed beyond the second instar. As a result, the larval length, weight, and head capsule width were much less than those reared on flour or flour plus yeast. Larval mortality was high on all starches compared with survival on flour or flour plus yeast. On potato starch and wheat starch complete mortality occurred on day 15 and day 21, respectively. The six starches were as attractive as flour to T. castaneum adults. However, when paired, female T. castaneum, on average, laid 97 eggs over 14 d on flour compared to less than 3 on starches. The presence of aggregation pheromone did not trigger egg laying on both flour and starches. The lack of significant egg laying on starches could be related to adult feeding, because adults fed flour and placed on starches laid eggs. These results suggest that starches may have potential in managing the development and reproduction of T. castaneum—a common and severe pest in food-processing facilities.

DISEASE RISK MAPPING WITH METAMODELS FOR COARSE RESOLUTION PREDICTORS

Adam Sparks[1], K. A. Garrett[1], G. A Forbes[2], R. J. Hijmans[3]
[1]*Department of Plant Pathology, College of Agriculture;* [2]*International Potato Center, Lima, Peru;* [3]*Department of Environmental Science and Policy,*
University of California-Davis

Many predictive disease models rely upon fine-scale weather data collected in hourly, or finer, increments. This is a major constraint when working with disease prediction models for areas of the world where hourly weather data is not available or is unreliable. Weather or climate summary datasets such as Worldclim or CRU 2.0 provide a partial solution to this problem with global data at coarse temporal scales, i.e., monthly not hourly. Difficulties arise when attempting to use these forms of data in small spatial and temporal scale models. To address this issue, we created metamodels based on daily and monthly weather values which adapt an existing potato late blight model for use with these coarser forms of data. The daily and monthly weather metamodels have R-squared values of 0.62 and 0.78 respectively. These new models were used to create maps of global late blight risk for current and future climate conditions. Changes in late blight risk in areas of poverty, food insecurity, and wild potato species occurrence were evaluated.

CHARACTERIZATION OF TRYPSIN-LIKE PROTEASES IN EUROPEAN CORN BORER (OSTRINIA NUBILALIS)

Jianxiu Yao, Lawrent L. Buschman, Kun Yan Zhu
Department of Entomology, College of Agriculture

Trypsin- and chymotrypsin-like serine proteases are the main digestive enzymes in lepidopteran midguts, and are considered the major proteases involved in Bacillus thuringiensis (Bt) protoxin activation or toxin detoxification. A previous report indicated that the reduced level of transcript T23 was associated with European corn borer (Ostrinia nubilalis) (ECB) resistance to Dipel® Bt formulations. Here we describe the sequence and the partial characterization of 16 trypsin- and 16 ymotrypsin-like proteases, which were identified from ECB gut-specific cDNA libraries. These

putative trypsins and chymotrypsins have structural characteristics of serine proteases, including the catalytic triad of histidine, aspartic acid and serine, six conserved cystein residues; and other amino acids involved in substrate specificity. They also shared a high percent similarity with those of other lepidopteran species- Heliothis virescens, Manduca Sexta, and Helicoverpa armigera based on bootstrap amino acid consensus analysis. RT-PCR results indicated that all of these proteases were highly expressed in the midgut of ECB; however, there existed different expression profiles in other tissues, such as foregut, hindgut, haemolymph, fatbodies, silkglands, Malpighian tubules, and carcass. In addition to their roles in digestion, some of these proteases might also have other important physiological functions in other tissues.

MECHANISM AND IN VITRO TEST METHOD OF DIGESTION OF STARCH GRANULES

Lauren Brewer, Liming Cai, Yong-Cheng Shi
Department of Grain Science and Industry, College of Agriculture

The rate and extent of starch digestibility are widely determined by the Englyst method, which has been cited in over 500 peer reviewed articles. The method, developed in 1992, focuses on starch digested in a systematic manner to reveal the rapidly digestible starch, slowly digestible starch, and resistant starch content found in a starch sample. The addition of amyloglucosidase, a portion of the Englyst method, has been assumed not to impact the determination of the digestibility of starch. The objectives of this study were to investigate the exact role of amyloglucoamylase in determining the digestibility of starch and understand the mechanism of enzymic actions on starch granules. Four maize starches differing in amylose content: waxy maize (0% amylose), normal maize (26% amylose), and two high amylose starches (50% and 70% amylose) were examined. After several variations of the method, with and without amyloglucosidase added, it was noted that amyloglucosidase could change the outcome 30- 60% of the expected slowly digestible starch fraction. Scanning electron microscopy is used to view the structure and morphology of the undigested fractions and understand the roles of pancreatin and amyloglucosidase on digestion of starch granules.

Social Sciences/Humanities/Education

THE ROLE OF SOURCING AGENTS IN GLOBAL APPAREL SUPPLY CHAINS: AN EXPLORATORY STUDY

Celeste Cook
Department of Apparel, Textiles, and Interior Design; College of Human Ecology

In production of apparel goods, companies make many sourcing decisions, including those related to how and where goods will be manufactured. Apparel firms have increasingly outsourced the production of goods to off-shore producers, particularly in countries with lower wage rates than the United States. As the apparel supply chain has become more globalized, barriers such as geography, language, and culture have necessitated many apparel firms to turn to sourcing agents to assist in making sourcing decisions. The various processes in the supply chain including textile manufacturing, pattern making and cutting, the assembly of garment pieces, and packaging oftentimes occur in several different countries before the final garment is shipped and/or exported to be sold to consumers. This study will highlight the role of apparel sourcing agents in the rise of global supply chains and the governing role sourcing agents play today in the production of sourced apparel. Quantitative data from the Office of Textile and Apparel, a division of the United States Department of Commerce will be evaluated, and a qualitative study using both interviews and ethnography of sourcing agents in Shanghai, China will be conducted. Data will also be collected from domestic apparel industry professionals to evaluate the need and governing role of sourcing agents within the institution of global apparel supply chains.

THE COOPERATIVE MOVEMENT AS A SOCIAL MOVEMENT, CONSUMER FOOD COOPERATIVES AS POTENTIAL SOCIAL MOVEMENT ORGANIZATIONS (SMOS), AND A CO-OP AS A SMO

Sarah Beach
Department of Sociology, Anthropology, and Social Work; College of Arts and Sciences

In the United States, the recent recession has caused many people to look for ways to cope with the vast changes in the economy and in society—whether they have experienced diminished savings, decreased incomes, and/or job losses. The cooperative movement, which has been active in the United States since the mid-1800s, is one social space more people may find beneficial to engage in as an alternative to capitalistic business and consumer practices. This movement is composed of individuals working in groups and networks to bring people, materials, and products together in order to meet the needs of its participants and others without pursuing profits over social well-being. For this exploration, I draw on the social movement literature, the cooperative literature, and case study research—including literature reviews, 30 semi-structured interviews, participant observations, and documentary analysis that I completed in 2006-2007. I argue that the cooperative movement is a social movement, consumer-owned food cooperatives are, or can be, social movement organizations (SMOs), and a consumer food cooperative, the Grocery Co-op, is a SMO. The aim of this paper is to show the cooperative social movement as an example of a possible viable alternative to capitalistic dominance in business and consumer interactions.

THE DEMAND FOR ALCOHOLIC BEVERAGES IN THE U.S.: A VECTOR ERROR CORRECTION APPROACH

Yacob Zereyesus, Tian Xia
Department of Agricultural Economics, College of Agriculture

This paper performs an econometric analysis of the demand for alcoholic beverages for the U.S. using time series data from 1979-2006. The estimation is done using the error correction form of the Almost Ideal Demand System to accommodate for changes in the consumption decisions of consumers in the short run and in the long run. The study finds evidence of co integration between budget shares, prices, and real expenditure in the three alcoholic beverages (beer, wine, and distilled spirits), thus justifying the use of an error correction approach. Overall, the demand for each alcoholic beverage is own price inelastic in both the short run and in the long run. Age group variables also play an important role in explaining consumer consumption decisions.

THE GER TRADITION: UNDERSTANDING URBANIZATION IN A NOMADIC SOCIETY

Melissa Belz
Department of Geography, College of Arts and Sciences

Nearly half of Mongolia's population practices nomadic pastoralism and continues to live in traditional round felt-tents called ger, (more commonly known to us as yurts). After the collapse of Soviet control in 1990, Ulaan Baatar experienced great waves of rural and nomadic families settling on its outskirts. The resulting "ger districts" make up a significant portion of the capital's population and are accepted as an extension of the city. These areas have limited access to water and services and maintain a high degree of poverty, yet they are also home to urban professionals. This presentation first explores the factors leading up to urbanization, then using empirical research, examines these informal settlements focusing on growth and transition. It concludes by evaluating how the enduring ger tradition is reinforced in the Mongolian context. Has its paradoxical role as national icon spared it from being seen as an element of poverty?

EVALUATING SYSTEMS THINKING SKILLS AMONG APPAREL AND TEXTILES UNDERGRADUATES

Cosette M. Armstrong, Kim Y. Hiller-Connell
Department of Apparel, Textiles, and Interior Design; College of Human Ecology

The UN has challenged higher education to integrate sustainability across all disciplines by 2014 (UNESCO, 2003). Education for sustainable development (ESD), the UNESCO initiative, advocates for reorienting education (Rode & Michelsen, 2008). This reorientation has significant pedagogical implications for advancing skills, attitudes, and values supporting sustainable development (Sterling, 2004). One skill, systems thinking, is considered a fundamental learning outcome for ESD; a problem-solving skill requiring the learner to examine the parts of a system or multiple perspectives of a problem (social, environmental, & economic) and the interrelationships among the parts to better understand the whole (Forum for the Future, 2004; McKeown, 2002). It is the purpose of this study to explore systems' thinking competency among apparel and textile undergraduates through a case study analysis exercise for the purpose of informing teaching strategy in the apparel and textiles curriculum. Students are given a brief case study description of an industry scenario and are asked to identify multiple perspectives, analyze conflicts, and offer recommendations for improved business strategy. First, a rubric based on systems' thinking literature has been developed and student cases are being scored by two researchers for inter-rater reliability. Secondly, student reflections are being analyzed for emerging themes to enrich the quantitative data. Data is being collected from two sections of an apparel product development course in the fall and spring semesters, approximately 35 respondents.

"IT ISN'T GONE. LET YOURSELF SEE IT." MODELING COMICS' ETERNAL READER

Josh Pearson
Department of English, College of Arts and Sciences

Metafictional narrative strategies challenge western concepts of experience as a linear progression of measured moments. Critics have noted comics' affinity for representing metafictional and non-linear narratives. Because time is made manifest visually within the comic form, it's open to sophisticated inflection/manipulation through design choices. However, because critical observations about non-linearity are often made tangentially within the context of defining the form, no controlling or organizing metaphor for this important aspect of the comics' structural operation has emerged. Theological models offer powerful and longstanding cultural constructions for apprehending nonlinear experience. Using Moore and Gibbon's Watchman, I demonstrate the usefulness of such theological models for understanding the structural basis of Comic's affinity for depicting narratives to which non-linear experience is central. In Watchmen, metafictional elements in the narrative foreground the comics' capacity to depict non-linear experience by deploying the deific Dr. Manhattan to draw parallels between the reader's position vis a vie individual panels across a page and theological models of divine atemporality and omniscience, connecting Manhattan's in- or ultra- human subjective experience of time to the recursive reading strategies available to the comic reader. Once developed, this Eternal Reader model of non-linear experience is redeployed to explore human characters' subjectivity, connecting recursive reading to the unstable, nonlinear experience of memory. Moore's grounding of depictions of memory within an analogy to the atemporality of the comic reader's experience helps explain the prevalence and success of the graphic memoir.

REDUCING BINGE DRINKING AMONG COLLEGE STUDENTS: COMPARING THE EFFECTIVENESS OF SOCIAL NORMS AND SELF-SCHEMA MATCHED MESSAGES

Megan Miller, Laura Brannon
Department of Psychology, College of Arts and Sciences

Self-monitoring was examined as a moderator of the effectiveness of persuasive messages for reducing college student binge drinking. Low self-monitors tend to be influenced by their personal values and attitudes, while high self-monitors tend to be influenced by the behavior of those around them. Via a website simulation, college students were presented with one of three types of anti-binge drinking messages: a self-schema message, which highlighted how responsible drinking is consistent with the message recipient's personal values and attitudes; a social norms message, which explained that most college students drink less than one might think they do; or a control message, which stated in general terms that people can experience a variety of problems from binge drinking. Overall intended drinking behavior in the self-schema message condition was almost identical to that of the social norms message condition, both of which were lower than drinking intentions in the control message condition. When presented with a self-schema matched message, low self-monitors intended to drink less alcohol than did high self-monitors, but these means were not significantly different. However, high self-monitors intended to drink significantly less than did low self-monitors when presented with a social norms message. The results suggest that self-schema matched messages may be effective at reducing binge drinking for most students, and that social norms messages may be equally as effective but only for high self-monitors.

TRIBAL EDUCATION IN INDIA: AN EXAMINATION OF CULTURAL IMPOSITION AND INEQUALITY

Anirban Mukherjee, W. Richard Goe
Department of Sociology, Anthropology, and Social Work; College of Arts and Sciences

This qualitative study explores the effects of participation in the mainstream Indian educational system on tribal students in India. Previous studies have tried to analyze the problem from four theoretical perspectives: biological interpretation, the socio-economic perspective, inter-colonization theory, and the cultural reproduction perspective. This study examines the applicability of these perspectives in analyzing the participation of tribal students in the Indian education system. The findings indicate that participation in the Indian education system promotes cultural dissonance among tribal students due, in part, to the fact that the Indian education system makes little attempt to address the cultural specificities of tribal students in the design of educational policies. The cultural dissonance among tribal students results from incompatibilities with the daily routine at school, food provided, the medium of instruction, vacations and holidays granted to the students, and the types of questions used in examinations. This promotes a

poor educational performance by tribal students, which aids in the formation of a negative self-image. The study used a non-experimental, cross-sectional research design with the main tools of data collection being observation and personal interviews. The study was conducted on the Santal, Birhor, Kharia and Lodha tribes located in Bankura, Birbhum, Puruliya, and Paschim Medinipur districts of the state of West Bengal in India. Personal interviews were conducted with tribal students, graduates, parents, teachers, and principals of tribal schools.

SIR OR LADY GAWAIN? MEDIEVAL ENGLISH MASCULINITY THROUGH FEMININE PRESENCE AND CHIVALRIC CONSTRAINT

Cheryl Rauh
Department of English, College of Arts and Sciences

Medieval scholars recognize Sir Gawain as the chivalric ideal. Gawain is treated as the masculine ideal as well because chivalric code applies only to men. However, Lee Tobin McClain argues that chivalry restrains masculinity, complicating Gawain as the masculine ideal. This paper argues that chivalry restricts natural male tendencies which cause conflict in male interaction through demanding feminine behavior of chivalric men; therefore, the chivalric ideal, Sir Gawain, is the masculine ideal within the social system of chivalry though he is feminized by chivalry. Through literary analysis of *Sir Gawain and the Carl of Carlisle*, this paper compares female characters against chivalry to establish feminine traits in chivalry. Furthermore, it defines natural masculinity and examines the occurrence of male conflict when masculinity is unrestrained by chivalry through a comparison of Gawain and his companions against the carl (a free peasant) who is unrestrained by chivalric code.

Biological Sciences

ISCHEMIA/REPERFUSION-INDUCED INTESTINAL LIPID ALTERATIONS OCCUR PRIOR TO ANTIBODY-INDUCED PROSTAGLANDIN E2 PRODUCTION

Emily Archer Slone[1], Byron Sparkes[2], Mary Roth[2], Ruth Welti[2], Sherry Fleming[2]
[1]Department of Anatomy and Physiology, College of Veterinary Medicine;
[2]Department of Biology, College of Arts and Sciences

Ischemia/reperfusion (IR) induced injury results in significant tissue damage resulting in up to 30,000 human deaths per year in the United States. In a mouse model of IR, wild-type but not antibody deficient, Rag-1-/- mice, sustain significant intestinal damage similar to humans. Previous studies indicate that administration of wild-type antibodies or naturally occurring, specific anti-phospholipid related monoclonal antibodies restores damage to the Rag-1-/- mice, suggesting involvement of a lipid antigen. We hypothesized that IR initiates metabolism of cellular lipids, resulting in production of an antigen recognized by anti-phospholipid antibodies. To test the hypothesis, we used electrospray ionization triple quadrupole mass spectrometry to compare intestinal lipids after Sham or IR treatment. We found that significantly more lysophosphatidylcholine (lysoPC) and free arachidonic acid (AA) are produced by IR treatment when compared to Sham treatment. Despite similar lysoPC and free AA levels in C57Bl/6, (wild-type) and Rag-1-/- mice, IR induced downstream Cox-2 and prostaglandin E2 (PGE2) production in wild-type, but not in the antibody deficient, Rag-1-/- mice. Similar to intestinal damage, administration of wild-type antibodies to Rag-1-/- mice restored PGE2 production. Thus, IR-induced intestinal damage requires antibodies for Cox-2 stimulated PGE2 production
but not for production of lysoPC and free AA.

LONG-TERM EFFECTS OF CLIMATE CHANGE ON GRASSLAND SOIL SYSTEMS: A RECIPROCAL TRANSPLANT APPROACH

Steven Rostkowski[1], Charles Rice[2], Timothy Todd[3]
[1]Department of Biology, College of Arts and Sciences; [2]Department of Agronomy, College of Agriculture; [3]Department of Plant Pathology, College of Agriculture

Altered precipitation patterns are predicted to accompany climate change and are likely to impact grassland soil communities and nutrient cycling processes, which are dependant to a large extent on soil water content. While short-term responses of soil communities and nutrient cycling to changes in precipitation amounts and soil water availability have been documented, very few studies have examined the long-term effects of these changes. A long-term reciprocal transplant experiment, initiated in 1993, provides a unique opportunity to address the long term response of soil communities (e.g. microbes, macroinvertebrates, and microarthropods) and nutrient cycling due to altered precipitation amounts. In 1993, large (25cm x 70cm), intact soil cores and associated plants were reciprocally transplanted between a mesic tallgrass site (Konza Prairie Biological Station) and a more arid mixed-grass site (Kansas State University Agricultural Research Center at Hays) in a randomized block design. For the present analyses, both "native" and "transplanted" cores incubated at each site for 16 years were extracted in May 2009, along with additional cores from the surrounding areas for comparison. Although in the preliminary stage of analysis, soil cores appear to be affected more by incubation site rather than initial soil type. Results on root biomass, microbial biomass, nematode densities, and macroinvertebrae densities indicate higher values in soil incubated at the more mesic Konza site, relative to all other treatments. This research will provide insight into the potential effects of global climate change on tallgrass prairie soil systems.

INVESTIGATION OF THE GENETIC FLEXIBILITY OF THE NON-STRUCTURAL PROTEIN (NSP) 2 REGION IN PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME (PRRS) VIRUS

Ranjni Chand, Raymond R.R. Rowland
Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine

PCR amplification and sequencing identified mutations that changed residues at Tyr-66 and Arg-96, which are involved in fluorescence. We hypothesize that the residues involved in fluorophore formation induces a fitness cost to the virus. In this study, we will use pyrosequencing to track the appearance of specific point mutations in EGFP during serial passage in culture. Sequencing primers are designed to track the mutations related to codons associated with Tyr-66 and Arg-96. Furthermore, we will clone an EGFP cDNA that contains a Tyr-66 mutation in the infectious clone and determine if the fluorescence-negative virus replicates to a higher level than the EGFP wild type virus. Information from this study will aid in understanding how small rapid changes in a virus increase virulence.

THE ROLE OF THE ALTERNATE SIGMA FACTOR (RPON) IN THE BIOLOGY OF ENTEROCOCCUS FAECALIS

Vijayalakshmi Iyer, Lynn Hancock
Department of Biology, College of Arts and Sciences

Transcriptional regulators play a critical role in regulating important aspects of bacterial metabolism and pathogenesis. The alternate sigma factors are a distinct class of transcriptional regulators that have been studied in variety of bacterial species and have emerged as key players in modulating gene expression related to bacterial physiology. In the gram-positive opportunistic pathogen, Enterococcus faecalis, the function of RpoN has not been extensively studied. It has been shown to regulate genes related to the transport of specific sugars into the cell, and these transport mechanisms are associated with susceptibility to class II bacteriocins (novel antibiotics). To further investigate a role for RpoN in the physiology of E. faecalis, we constructed a mutant lacking rpoN gene and examined this mutant for changes in cellular physiology related to the ability of the organism to form biofilms. The mutant formed thinner biofilms in comparison to the wild type strain as seen by confocal microscopy. The mutant displayed defects in

autolysis, which was accompanied by the inability to release extracellular DNA (eDNA), a known matrix component of E.faecalis biofilm. On the basis of these observations, we hypothesize that RpoN regulates cellular processes related to modifications of the cell wall that in-turn modulate the activity of autolysins. This hypothesis is the central focus of the ongoing project, the outcome of which will enhance the understanding about how RpoN in E.faecalis regulates important physiological processes.

FUNCTIONAL ANALYSIS OF THE KNICKKOPF GENE FAMILY IN ORGANIZATION OF TRIBOLIUM CASTANEUM CUTICLE

Sujata Chaudhari[1], Arakane Yasuyuki[1], Daniel Boyle[2], Karl Kramer [1], Richard Beeman [3], Subbaratnam Muthukrishnan[1]
[1]Department of Biochemistry, College of Arts and Sciences; [2]Department of Biology, College of Arts and Sciences; [3]Grain Marketing and Production Research Center

The insect cuticle is composed mainly of chitin and proteins and is a protective barrier that shields insects against biological and mechanical stresses. Proteins associated with chitin metabolism and cuticle assembly are attractive targets for biopesticide development. Recent studies in Drosophila (Dm) have identified a gene, knickkopf (knk), whose expression is important for tracheal tube expansion and cuticle organization. In the present study, we have identified three Knk-like genes in Tribolium, TcKnk1, TcKnk2 and TcKnk3 which are orthologs of DmKnk1, DmKnk2 and DmKnk3, respectively. All of these genes were differentially expressed throughout the different developmental stages of the beetle, suggestive of crucial roles for TcKnk's in Tribolium development. All three genes are expressed in the carcass (whole body without gut) but not in gut tissue. RNAi of TcKnk1 resulted in lethal phenotypes preventing larval-larval, larval-pupal and pupal-adult molts, whereas RNAi of TcKnk2 and TcKnk3 resulted in developmental arrest only at the pupal-adult molt with ~55% and 100% mortality, respectively. Interestingly, lethal phenotype was observed only with dsRNAs specific for the C-terminal region of TcKnk3 but not its N-terminal region, suggestive of alternative sliced variants of TcKnk3. TEM analysis confirmed thatTcKnk1-specific RNAi lethality is associated with defects in cuticle organization. Collectively, our results indicate that each Knk plays a different role in the synthesis or organization of chitin in the cuticle of Tribolium.

INVESTIGATING THE ONCOGENIC POTENTIAL OF THE DUAL SPECIFICITY PHOSPHATASE 12

Erica Cain, Alexander Beeser
Department of Biology, College of Arts and Sciences

Dual specificity phosphatases (DUSPs) are the predominant negative regulators of mitogen-activated protein kinase (MAPK) signaling pathways. DUSPs are an increasingly attractive target for drug therapies because MAPK signaling pathways are implicated in a variety of diseases including cancer. DUSP12 is one of only two candidate genes for the target of an amplification found in highly invasive liposarcomas, however very little is known about DUSP12. The objective of this study is to investigate the function of DUSP12 and evaluate its oncogenic potential. We established a human cell line over-expressing DUSP12, and initial studies reveal faster wound closure and increased cell migration. Interestingly, we found that over-expression of DUSP12 does not impact MAPK signaling even in response to a variety of stimuli. Further insights into the function of DUSP12 can be found in studies of its Sacchramyces cerevisiae homolog, Yeast Vaccinia Homolog 1 (YVH1). In yeast, YVH1 regulates cell growth and sporulation. Human DUSP12 can functionally substitute YVH1 in yvh1 knock out strains, indicating an evolutionarily conserved role of DUSP12 from yeast to humans. Intriguingly, we have found that YVH1 and DUSP12 regulation of cell growth in yeast is dependant not on its catalytic phosphatase domain, but on its highly conserved C-terminal domain of unknown function. In conclusion, our data suggests that DUSP12 is an evolutionarily conserved protein that regulates cell activity not by modulating MAPK signaling, but through the evolutionarily conserved C-terminal domain whose function we are currently investigating.

MONDINI-LIKE MALFORMATION OF THE COCHLEA IN A PENDRED SYNDROME MOUSE MODEL IS DUE TO AN ENLARGEMENT OF SCALA MEDIA AND AN INCOMPLETE OSSIFICATION

Xiangming Li[1], Sara Billings[2]
[1]Department of Biochemistry, College of Arts and Sciences; [2]Department of Anatomy and Physiology, College of Veterinary Medicine

Pendred syndrome due to the mutation of SLC26A4, is characterized by an enlargement of vestibule aqueduct, mondini-like malformation of cochlea and congenital or progressive hearing loss during childhood. Assembling human disease, Slc26a4 knockout (KO) mice has a prenatally developed enlargement of scala media and a failure to hear. Here, we determine whether the mondini-like malformation occurs in the pendred syndrome mouse model. Cochlear morphology was observed in cryosections. Bone calcification was detected by alizarin red staining in cochlear cryosections and microdisected specimens. Gene expression was determined by qRT-PCR. Sex matched *SLC26a4* heterozygous (HET) mice and *Slc26a4* KO littermates were investigated at postnatal (P) ages of P2, ~P8 and P15. At P8, calcification was lacking in the modiolus and in interscalar septa but no difference in calcification of phalangeal bones was observed. At P2, cochlea expression for Mepe, Dmp1 and Ibsp is 2 fold lower in *SLC26a4* KO mice comparing with *SLC26a4* HET littermates but no difference at P15. At all ages tested, cochlear expression for Bglap1, Rankl, Alpl, Opg, Rank, Acp5, Sparc, Spp1 had no differences between *SLC26a4* HET and KO mice. We conclude that mondini-like malformation of the cochlea in a Pendred Syndrome mouse model is due to incomplete bone calcification and enlargement of scala media. This incomplete calcification is not due to abnormal representation of osteoblast or osteoclast, but is associated with delayed expression of bone matrix proteins.

EARLY DETECTION OF CANCER THROUGH MATRIX METALLOPROTEINASES (MMP'S) AND SERINE PROTEASES

Thilani Samarakoon[1], Hongwang Wang[1], Sivasai Balivada[2], Jeffrey J. Lange[1], Stefan H. Bossmann[1], Deryl L. Troyer[2]
[1]Department of Chemistry, College of Arts and Sciences; [2]Department of Anatomy and Physiology, College of Veterinary Medicine

The early detection of cancer is crucial with regard to proper treatment. Cancer cells are known to overexpress various matrix metalloproteinases (MMPs), and serine proteases. The objective of our research is to develop a Fe/Fe3O4 nanoparticle-based system, which has the potential to identify the presence of these proteases in cancer cells and tissue. Our nanoplatform for protease detection consists of dopamine-tetraethylene glycol coated Fe/Fe3O4 nanoparticles to which porphyrins (TCPP) are attached by means of specific peptide sequences. These cleavage sequences can be cleaved in the presence of the right protease, releasing the porphyrins. Upon escape from the Fe/Fe3O4 nanoparticle the porphyrins' emission intensity will increase, which can be detected using fluorescence spectroscopy. For the in-vivo experiments, the mice impregnated with melanoma cells were injected with a solution of Fe/Fe3O4-NPs. The tumor regions of the mice have been excited by means of laser light at 870nm. We have observed significant changes in the luminescence intensity from excited TCPP within the tumors compared to healthy tissue. For the in-vitro experiments urine samples from canine cancer patients were used to demonstrate the concept of the "Light Switch" for MMP2 detection. The change in fluorescence intensity of the porphyrin vs. time was studied. A distinct relationship was observed between the stage of the cancer and the fluorescence intensity increase of TCPP. This method can be applied to the detection of different stages of cancer.

RESIDENTIAL LOAD CURTAILMENT SCHEMES IN THE PRESENCE OF WIND GENERATION AND STORAGE

Anita Ann Jose, Anil Pahwa, Ruth Douglas Miller
Department of Electrical and Computer Engineering, College of Engineering

With Time of Day (TOD) pricing becoming a reality, intelligent dispatching systems that utilize Energy Storage Devices (ESD), such as batteries, to optimize the use of renewable resources and grid energy while determining the most economical dispatch schedule could play an important role for both the customer and the utility. An optimization algorithm based on linear programming for various cases has already been developed as the initial part of this research, which took into account energy storage devices (batteries) and renewable generators (small wind and solar generators). Including the option of curtailing the load in the house in response to electricity- rate changes in the optimal schedule is focus of the proposed research. This could be done by reducing the total house load either by reducing the voltage or by deferring certain loads to a later time. With TOD, many home appliances such as the washing machine and dishwasher will be available with timers or clocks so that they can be run at times when energy-cost is low. Similarly, air conditioning load can be reduced by adjusting the thermostat or by
controlling operation of the air conditioner. A comparison of the Critical Peak Pricing (CPP) and Time of Use (TOU) demand response schemes will be shown. Effects of different electricity rates on the optimal dispatch will be included in this research.

HETEROEPITAXIAL B12AS2 ON SIC SUBSTRATES

Yi Zhang[1], J.H.Edgar[1], Y. Gong[2], M. Kuball[2], Y.Zhang[3], M. Dudley[3]
[1]Department of Chemical Engineering, College of Engineering; [2]H.H. Wills Physics Laboratory, University of Bristol; [3] Department of Materials Science and Engineering, Stony Brook University

Icosahedral boron arsenide, B12As2, is a wide band gap semiconductor with extraordinary self-healing ability from radiation damage, making it useful for betavoltaic cells, devices which directly convert nuclear energy into electrical power. In this study, epitaxial thin films of B12As2 were deposited on on-axis c-plane 6H-SiC and 4H-SiC substrates by chemical vapor deposition from diborane (B2H6) and arsine (AsH3). Raman spectroscopy showed that the films were B12As2 with good crystalline quality. X-ray diffraction patterns demonstrated an c-axis oriented crystalline B12As2 films deposited at temperatures ranging from 1200 to 1400 °C. The As/B ratio present in the films, revealed by x-ray photoelectron and Auger spectroscopy, was consistently 1:6 through the depth of the layer, regardless of the input reactant ratio. Synchrotron x-ray Laue pattern showed that the B12As2 film deposited was a combination of twinned and untwinned B12As2. The average growth rate of B12As2 on SiC substrates depended on the deposition temperature, increasing from 0.6 μm/h at 1200 °C to 1.2 μm/h at 1300 °C and decreasing to 0.8 μm/h at 1400 °C. The maximum growth rate observed at 1300 °C might be due to significant decomposition of the reactants at higher temperatures. The films were p-type with the carrier concentration on the order of 1012 and 1014 cm-3 at 300K and 370K, respectively. The activation energy of the p-dopants extracted from temperature-dependent Hall-effect measurement was 565 meV.

DISCRETE ELEMENT MODELING OF GRAIN COMMINGLING IN A BUCKET ELEVATOR BOOT SYSTEM

Josephine Boac, Mark E. Casada, Ronaldo G. Maghirang
Department of Biological and Agricultural Engineering, College of Engineering

Unwanted grain commingling impedes new quality-based grain handling systems and has proven to be an expensive and time consuming issue to study experimentally. To provide a more economical method to study the problem, grain commingling in a pilot-scale bucket elevator boot was modeled using three-dimensional (3D) and quasi-two-dimensional (quasi-2D) discrete element method (DEM) simulations. Experiments on grain commingling were performed using red and natural soybeans to validate the 3D DEM model on a pilot-scale boot. Predicted results from the initial 3D model agreed well with experimental data after the first 7 s. Simulations from quasi-2D models with reduced control volumes (with the third dimension, width, reduced to 4 to 7 particles diameters, i.e., 4d, 5d, 6d, or 7d) showed the quasi-2D (6d) model best matched the 3D model. Introduction of vibration during the onset of clear soybeans as well as inclusion of realistic particle surge flow to refine the physics of the quasi-2D

(6d) model better predicted commingling than did models without those refinements. This study showed that grain commingling in a bucket elevator boot system can be simulated with 3D and quasi-2D DEM models and gave results that agreed with experimental data. Results of this study will be used to accurately predict impurity levels and improve grain handling, which can help farmers and grain handlers reduce costs during transport and export of grains and make the U.S. grain more competitive in the world market.

SILICA THIN FILM POLARITY GRADIENT

Chenchen Cui, Fangmao Ye, Dan Higgins
Department of Chemistry, College of Arts and Sciences

Surface gradients represent powerful tools for the high-throughput investigation of interfacial phenomena in the areas of physics, chemistry, materials science and biology. Several methods of creating molecular and macromolecular gradients will be introduced. Emphasis will be given to the so called ¡°infusion-withdrawal¡± dip-coating (IWDC) method. Preparation of silica film polarity gradients from tetramethoxysilane (TMOS) and methyltrimethoxysilane (MTMOS) using IWDC will be described. Such films are characterized by bulk fluorescence spectroscopy (using Nile Red as a polarity sensitive probe), by spectroscopic ellipsometry and by surface profilometry. The bulk spectroscopy provides strong and clear evidence for the presence of polarity gradients in the resulting films. To get a uniform MTMOS film, Acid-Base two-step processing is used. The nanometer-scale properties of these polarity gradients will be characterized by single molecule spectroscopic methods. High purity TMOS and MTMOS thin films are now being prepared. Difficulties resulting from sample contamination will be discussed, along with the potential solutions now being explored.

GEOCHEMISTRY OF ARSENIC HOTSPOTS AND SURROUNDING AREAS IN MURSHIDABAD, WEST BENGAL, INDIA

Andrew Neal, Saugata Datta
Department of Geology, College of Arts and Sciences

Groundwaters in many regions of southeast Asia, in particular eastern states of India and Bangladesh, are polluted by dangerously high levels of naturally occurring arsenic, placing millions of people at risk. Presently, the mechanism responsible for releasing geogenic arsenic from the sediments into drinking water is poorly understood. Groundwater and shallow aquifer sediments have been collected from areas of Murshidabad district in West Bengal, India, to study their hydrochemical and mineralogical properties to correlate between arsenic concentrations in groundwater and the solid-phase. This work focuses on delineation of the mineralogical source and release mechanism of arsenic from solid sediment phases along a particular transect with contrasting subsurface geochemical signatures. One area west of the Bhagirathi river (low As) and four areas east of the Bhagirathi (high As) have been targeted in this study. Major minerals that dominate aquifer sediments are phyllosilicates, calcite, magnetite, sphene, with occasional bands of Fe-carbonates, apart from expected quartz and feldspars. Preliminary analysis of core sediments via SEM-EDX reveals increasing Mg content with depth in high arsenic areas, coupled with XRF analysis showing higher bulk concentrations of Fe, Ti, Ca, K. Low arsenic area did not exhibit this trend. Water As(III)/As(V) (via HR-ICPMS) and total As are increasing from west (~35%) to east (70%). Currently, detailed As and Fe speciation within sediments and heavy mineral and clay separation studies are being done. Additionally, the importance of Mg-bearing clays in releasing As will be further investigated.

CHEMICALLY STABLE POLYMERIC MEMBRANE REACTORS FOR SELECTIVE REMOVAL OF METHANOL FROM TRANSESTERIFICATION REACTIONS

Fan Zhang[1], Mary E. Rezac[1], Stuart Nemser[2], Sudipto Majumdar[2]
[1]Department of Chemical Engineering, College of Engineering; [2]Compact Membrane Systems, Inc

Transesterification reactions are significant reactions in the chemical, polymer and pharmaceutical industries. Membrane reactors operating in pervaporation conditions have the potential to significantly increase the conversion achieved in conventionally equilibrium-limited transesterification reactions. These reactions generate alcohol byproducts which if selectively removed can result in enhanced conversion over that conventionally achieved. If operating effectively, the membrane reactor configuration can eliminate the need for most of the down-stream separators. Thus, cost saving and energy saving will be realized. Typically, transesterification reactions are operated at elevated temperatures in organic solvents. Unfortunately, most polymeric membranes have significant temperature and chemical limitations. In this study, an enhanced membrane reactor was developed with a nonporous chemically-stable polymer selective layer on a microporous polymeric support. This presentation will discuss the performance of a membrane commercially available from Compact Membrane Systems in this application. The model reaction of methyl benzoate with butanol to produce butyl benzoate and methanol was tested in the membrane reactor at temperature range of 75-120ºC in presence of organic solvents and aggressive acid catalyst. Our results indicate that the enhanced membrane reactor rapidly achieved conversion of approximate 77%, nearly 25% in excess of that achieved in the conventional system. The membrane had a high permselectivity of methanol over butanol. The membranes demonstrated superior chemical resistance and the purity of the methanol permeate remained high through all the runs.

EFFECTS OF TENSILE STRESS ON EMITTER DISCHARGE OF SUBSURFACE DRIP IRRIGATION SYSTEMS

Scott Wiens
Department of Biological and Agricultural Engineering, College of Engineering

Subsurface drip irrigation (SDI) drip tape was studied to determine how tensile stress (stretching) affected drip tape emitter flow rates, variability, elastic deformation, and recoil percentage. SDI uses a grid of buried drip tape to irrigate crops. SDI drip tape is installed by a tractor-operated installation tool; during installation drip tape can be stretched. Three different commercial SDI products (Robert's Ro-Drip 8-mil, Robert's Ro-Drip 15-mil, and T-Systems 15-mil) were evaluated in this research. Each SDI tape was stretched until the tape experienced 110% elongation. The drip tape was measured before, during, and after stretching to analyze how the drip tape stretched and recoiled. Emitter flow rates were also measured before and after stress at three different pressure settings (55, 69, and 83 kPa). Almost all drip tapes experienced uniform elongation. Both Robert's Ro-Drip products almost completely recoiled to original length but the T-Systems had variable recoil percentages. Flow rate changes after stretching were not consistent; the Robert's Ro-Drip 15-mil had lower emitter flow rates but the Robert's Ro-Drip 8-mil and T-Systems 15-mil had greater flow rates. Higher operating pressures decreased the emitter flow rate changes for Robert's Ro-Drip 15-mil and T-Systems 15-mil but increased the changes for Robert's Ro-Drip 8-mil. The emitter flow rate CV variability was not affected by stretching; all CV measurements were acceptable. No governing relationship between stretching and flow rate changes was observed in these three SDI products; therefore each SDI tape product must be studied individually to understand its unique stretching response.

Poster Abstracts

K-State Research Forum

EFFECT OF ACIDULANT SUPPLEMENTATION ON YOGURT FERMENTATION

Tori Boomgaarden[1], Karen A. Schmidt[2]
[1]Department of Food Science Institute, College of Agriculture; [2]Department of Animal Science and Industry, College of Agriculture

Consumers are increasingly aware of the impact the products they consume have on the world; therefore, a greater emphasis has been made for sustainable production of agricultural products. This research aimed at developing yogurt with reduced fermentation time without effecting sensory qualities negatively, thus using less energy and resources for production and creating a more sustainable manufacturing process. Yogurt was manufactured by pre-acidifying yogurt mix with citric acid, lactic acid or concentrated lemon juice at 200 ppm either before or after heat treatment to a pH of 6.2 and the conventional manufacturing process was continued. Yogurts were analyzed for microbial growth of Streptococcus thermophilus and Lactobacillus bulgaricus at the beginning and end of fermentation. Adding citric acid or lemon juice to the mix after pasteurization caused a 13% reduction in fermentation time compared with the control (5.33 hours). Lactic acid added before or after heat treatment increased fermentation time by 16%. Citric acid or lemon juice added before heat treatment resulted in no difference from control. No difference was observed for the microbial growth of yogurt cultures. Supplementing with citric acid or lemon juice after heat treatment successfully reduced fermentation time, and may result in greater efficiency for yogurt manufacturers, allowing for a more sustainable manufacturing process. A collaborative effort to determine the sensory qualities and economic impact of this production process is being completed with a transdisciplinary group. This new yogurt has potential for success in the marketplace because it appeals to consumers seeking sustainable products. Identification of Work Zone Crash Characteristics

THE ECONOMICS OF SUSTAINABLE FOOD MANUFACTURING: THE CASE OF YOGURT

Amber Tyler
Department of Agricultural Economics, College of Agriculture

The growing demand for sustainable practices has spurred action within the food manufacturing industry. However, there is no single, mutually agreed upon definition of sustainability; nor is there consensus on who should incur its costs. The implementation of sustainable practices may increase costs that could be passed to the consumer through an increase in price. The case of yogurt production was adopted to test the feasibility of implementing sustainable practices into the food manufacturing process, its economics and consumers' willingness to pay for sustainably manufactured food products. A literature review was conducted to determine the following: a working definition of sustainability and how that definition applies to food processing and manufacturing, consumer yogurt preferences, consumer willingness to pay for sustainable food products and the yogurt production process. Through interdisciplinary research, data on reduction in yogurt fermentation time was collected. This was conducted by a masters student in Food Science to determine the feasibility of more sustainable yogurt production. These data points were replicated through Monte Carlo Simulation and scaled to a pilot size. Costs were determined and compared to the cost of traditional yogurt production. It is my hypothesis that sustainable food processing will increase costs (and therefore price). The change in costs, consumer willingness to pay, and overall feasibility of a sustainable yogurt process will be reported. Evaluating the economics of sustainable food manufacturing will yield a better understanding of sustainability and the efforts necessary for proper implementation in a manner that is still profitable for food manufacturing companies.

INFLUENCE OF SOILS, NUTRITION, AND WATER RELATIONS UPON CHARCOAL ROT DISEASE PROCESSES IN KANSAS

David Cruz[1], P. V. Vara Prasad[2], DeAnn Presley[2], Kraig L. Roozeboom[2]
[1]Department of Plant Pathology, College of Agriculture; [2]Department of Agronomy, College of Agriculture

Charcoal rot (caused by Macrophomina phaseolina) is the most important soybean disease in Kansas. Several strategies have been recommended to control this disease including crop rotation, lower plant density, biological control, plant tolerance, and fungicide application. However, those techniques have not been completely effective. Information on the effect of soil texture and the interactions with irrigation and fertilization (particularly manganese) upon charcoal rot disease severity and the pathogen population is limited. To determine the effect of the aforementioned variables, a field experiment was conducted in Manhattan and Rossville. Pathogen colonization was assessed by measuring colony-forming units from ground root tissue at R2-R4 (post-flowering/pod) and R8 (maturity) stages. Soil populations (pre-planting and post-harvest) of M. phaseolina, yield parameters, and plant characteristics were obtained. Results indicate that there are complex relationships between soil physiochemical properties (pH, NPK content, exchangeable cations, organic matter) and soil texture (sand, soil, clay composition), which may mitigate disease severity and pathogen levels in host tissue. Although soil populations did not increase over the course of the season, root colonization increased variably. Soil and environmental information obtained from field studies will be used to test the disease in artificial inoculation experiments under controlled environmental conditions.

PRODUCTION OF PLATFORM CHEMICAL FROM ETHANOL INDUSTRY BYPRODUCT: CYANOPHYCIN BIOSYNTHESIS USING METABOLICALLY ENGINEERED ESCHERICHIA COLI BL21

Yixing Zhang[1], Amit Kumar[2], Praveen Vadlani[1], Sanjeev Narayanan[2]
[1]Department of Grain Science and Industry, College of Agriculture; [2]Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine

Globally, the majority of countries now use genetically modified (GM) soybeans to produce oil and meal for livestock and human consumption. Japan, however, uses only Non-GM soybeans for direct human consumption of which more than 80% are imported from the U.S., Canada, and China. This research used the inverse residual demand model to estimate a two-country partial equilibrium trade model to test the existence of market power in the Japanese Non-GM soybean import market. The two-country partial equilibrium trade model incorporated the U.S. residual Non-GM soybean supply for Japan, the Japanese residual demand for U.S. Non-GM soybeans, and the equilibrium condition, where the U.S. residual Non-GM soybean supply equals the Japanese residual Non-GM soybean demand. Monthly data from January 2003 to December 2007 were used for the analysis. Empirical results indicated that U.S. Non-GM soybean exporters have stronger market power than Japanese Non-GM soybean importers. The results also indicate that Japanese consumers are willing to pay higher prices for soybeans, tofu, natto, miso, and other all soy food products.

A RAPID DIRECT SOLVENT EXTRACTION METHOD FOR THE EXTRACTION OF 2-DODECYLCYCLOBUTANONE FROM IRRADIATED GROUND BEEF PATTIES USING ACETONITRILE

Faraj Hijaz, Priyadarshini Gadgil, Curtis L Kastner, J. Scott Smith
Department of Food Science Institute, College of Agriculture

The amount of irradiated beef in market is growing and a reliable and a rapid method is needed to detect irradiated beef and quantify the irradiation dose. The objective of this study was to develop a rapid method for the analysis of 2-dodecylcyclobutanone in irradiated beef. A 5.0 gram sample of irradiated ground beef patties was extracted with n-hexane using a Soxhlet apparatus or with acetonitrile via direct solvent extraction. The Soxhlet hexane extract was evaporated to dryness and the sample was dissolved in a mixture of ethylacetate and acetonitrile. The extract was cooled to -20C and filtered using coarse filter paper to remove the fat. The defatted extracted was purified with a 1 gram silica cartridge. Another 5.0 g aliquot of the same patty was mixed with 75 mL acetonitrile and the beef was blended for 1 min. The acetonitrile was collected and evaporated to dryness. The extract was dissolved in n-hexane and was cleaned using a silica gel cartridge. The eluants from both methods was injected into a GC-MS running in the selective ion mode. The 2-DCB concentration in the commercial samples was 0.030 ± 0.0026 ppm using the Soxhlet method and 0.030 ± 0.0025 ppm using direct solvent extraction. The recovery of 2-DCB from spiked beef samples using the direct solvent extraction method was 93.2 ± 9.6%.This study showed that the direct solvent extraction is simple, and is efficient as the Soxhlet method.

MARKET POWER OF THE JAPANESE NON-GM SOYBEAN IMPORT MARKET

Koichi Yamaura
Department of Agricultural Economics, College of Agriculture

Globally, the majority of countries now use genetically modified (GM) soybeans to produce oil and meal for livestock and human consumption. Japan, however, uses only Non-GM soybeans for direct human consumption of which more than 80% are imported from the U.S., Canada, and China. This research used the inverse residual demand model to estimate a two-country partial equilibrium trade model to test the existence of market power in the Japanese Non-GM soybean import market. The two-country partial equilibrium trade model incorporated the U.S. residual Non-GM soybean supply for Japan, the Japanese residual demand for U.S. Non-GM soybeans, and the equilibrium condition, where the U.S. residual Non-GM soybean supply equals the Japanese residual Non-GM soybean demand. Monthly data from January 2003 to December 2007 were used for the analysis. Empirical results indicated that U.S. Non-GM soybean exporters have stronger market power than Japanese Non-GM soybean importers. The results also indicate that Japanese consumers are willing to pay higher prices for soybeans, tofu, natto, miso, and other all soy food products.

PHOSPHORUS ADSORPTION AND DESORPTION POTENTIAL OF STREAM SEDIMENTS AND FIELD SOILS

Sandra Agudelo[1], N.O. Nelson[1], T.D. Keane[2], P.L. Barnes[3], G.M. Pierzynski[1]
[1]Department of Agronomy, College of Agriculture; [2]Department of Landscape Architecture/Regional and Community Planning, College of Architecture; [3] Department of Biological and Agricultural Engineering, College of Engineering

Numerous hydrologic and geochemical processes govern the distribution, transport and fate of dissolved and sediment-bound phosphorus (P) at the watershed scale. P from upland soils enters stream channels via runoff; therefore, affecting water quality. The objective of this study was to quantify the P sorption and desorption for both stream sediments and upland soils at Upper West Emma Creek watershed. Samples were collected from banks, pools, riffles and bars features. Soils were sampled from wheat, row crop, pasture, and manure-amended fields. Our analyses of sediments and soils included equilibrium P concentration at zero net P sorption (EPC0), maximum adsorption capacity (Pmax), anion exchange extractable P (AEP), and degree of P saturation (DPS). Water samples were analyzed for dissolved reactive phosphorous (DRP). EPC0 was similar between stream features, with an average of about 0.1 mg P L-1. AEP of bank sediments increased 3-fold respect to other sediments in the stream system. Additionally, Pmax of bed sediments (i.e., pools, riffles and bars) was 19 mg kg-1; 10-times less than Pmax of bank sediments and field soils. Bed sediments also exhibited low AEP (8.6 mg kg-1) and high DPS (41%), which indicates that they do not have much more assimilation capacity remaining. Stream DRP during base flow was in the same range as the EPC0 of sediments and stream DRP during storm flow was in the general range as the EPC0 of field soils. Finally, P reduction in stream water must address soil losses to be effective in this watershed.

GAP JUNCTIONAL INTERCELLULAR COMMUNICATION OF NORMAL, DYSPLASTIC, AND NEOPLASTIC FELINE MAMMARY TISSUES

Jennifer Darby, Annelise Nguyen
Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine

For more than forty years, the lack of gap junctional intercellular communication (GJIC) has been described in cancer cells. Previous studies have shown that increased GJIC of cancer cells causes sensitivity to cancer drugs and attenuates cell growth. Thus, restoration of GJIC in cancer cells provides the means for future chemotherapeutic treatment. The role of gap junctions in feline mammary cancer is not well understood. The purpose of this study was to characterize differential patterns of connexins in feline mammary tumors and subsequently determine the role of GJIC in feline mammary cancer. Fifteen feline mammary tumors in formalin fixed blocks were obtained from the Veterinary Diagnostic Laboratory. Immunohistochemistry was performed on these tumors. The results show that 15 tumors (100%) were positive after incubation with protein kinase C, survivin, connexin 46 , and connexin 43 antibodies. Two tumors (13.3%) yielded positive reactions with connexin 32 (Cx32) antibodies. The two benign tumors (13.3%) yielded positive results after incubation with connexin 26 (Cx26). Two tumors (13.3%) yielded positive results after incubation with Ki67. These results indicated that the lack of Cx26, Ki67, and Cx32 staining may be due to species-specific antibodies, insufficient concentration of antibodies, or down regulation of their expressions in feline adenocarcinomas. Normal feline mammary tissues will be collected and compared to these 15 tumors. The results of this study provide evidence for the first time that differential patterns of GJIC in feline mammary tissues can be used as a target for drug development.

THE ATYPICAL MITOGEN-ACTIVATED PROTEIN KINASE ERK3, A NOVEL SUBSTRATE FOR P-21-ACTIVATED KINASE ACTIVITY

Alina De La Mota-Peynado[1], Alexander Beeser[1], Jonathan Chernoff[2]
[1]Department of Biology, College of Arts and Sciences; [2]Fox Chase Cancer Center

Extracellular signal-regulated kinase 3 (Erk3) is a member of the mitogen-activated protein kinase (MAPK) family of serine/threonine kinases that transduce extracellular signals into intracellular responses. The MAPK signal transduction pathways are among the most widespread and conserved mechanisms of eukaryotic cell regulation and their mechanism of action in cell cycle progression and differentiation are well established. The lesser known isoform, Erk3, differs from other MAPKs in that it does not contain a true canonical MAPK Th-X-Tyr motif, but contains a single phosphorylation site in its activation loop (Ser-Glu-Gly). Erk3 has very restricted substrate specificity, and does not phosphorylate any of the known MAPK substrates, nor is it a target of the established MAPK kinases. Little is known about the regulation, substrate specificity and physiological functions of Erk3. Recent studies suggest it may be involved in the regulation of the cell cycle and has been linked to some cancers. Our objective is to elucidate how Erk3 is regulated and the physiological implications of its regulation by identifying upstream effectors of Erk3. Using a high throughput protein array we found that Erk3 functions as a substrate for p-21 activated kinase 2, suggesting a relationship between Pak2 and Erk3. To confirm our findings, we purified full length Erk3 and performed phosphorylation studies confirming that Erk3 is an in vitro substrate for Pak2 kinase activity. In addition, we mapped the key residues phosphorylated by Pak2 using activation loop specific phospho-antibodies.

EFFECTS OF C-5 CYTOSINE SUBSTITUENTS ON THE FORMATION OF BENZO[A]PYRENE DIOL EPOXIDE-ADDUCTS AT CG BASE PAIRS

Chen Lin[1], Rebecca Guza[2], Brock Matter[2], Patrick Simpson[2], Ryszard Jankowiak[1], Natalia Tretyakova[2]
[1]Department of Chemistry, College of Arts and Sciences; [2]Department of Medicinal Chemistry and the Cancer Center, University of Minnesota, Minneapolis, MN

CG dinucleotides within exons 5-8 of the human p53 tumor suppressor gene contain endogenous 5-methylcytosine (MeC). Guanine residues within these sites are the major mutational hotspots for smoking induced lung cancer, suggesting that MeC may mediate the reactivity of neighboring guanine bases towards tobacco carcinogens. Previous studies have shown that the reactivity of guanine towards the reactive diol epoxide metabolite of the benzo[a]pyrene, i.e. BPDE, is increased by the presence of a neighboring MeC as compared to a unmethylated cytosine. The structural basis for the increased reactivity of BPDE towards guanines at MeC:G sites was investigated using a series of MeC structural analogs and stable isotope-labeling via HPLC-ESIMS/MS and low temperature laser-based spectroscopy. We found that the presence of a C-5 substituent on cytosine and related structural modifications influence the reactivity of its partner guanine towards BPDE and modifies the stereoisomeric composition of the resulting N2-BPDE-dG adducts. Our results suggest that the increase in guanine reactivity at MeC:G sites is due to the facilitated formation of a unique conformation of BPDE-DNA complex that places BPDE in a favorable orientation for trans attack by the N2 of guanine.

FUNCTIONAL ANALYSIS OF TWO CHITIN SYNTHASE GENES IN AFRICAN MALARIA MOSQUITO, ANOPHELES GAMBIAE

Xin Zhang, Kun Yan Zhu
Department of Entomology, College of Agriculture

Chitin synthase (CHS) is an important enzyme in insects and other chitin-containing organisms. Chitin synthase is encoded by two genes in insects, chitin synthase 1 and chitin synthase 2, which are exclusively expressed in cuticle epidermal and tracheal cells, and gut epithelial cells, respectively. Here we report functional analysis of two chitin synthase genes (AgCHS1 and AgCHS2) by a non-invasive and effective larval feeding-based RNAi method using chitosan/dsRNA nanoparticles in African malaria mosquito, Anopheles gambiae. Both AgCHS1 and AgCHS2 can be repressed by

feeding mosquito larvae with its own gene specific dsRNA, revealing the systemic nature of RNAi in mosquito larvae. Repression of AgCHS1 significantly reduced the chitin content and increased the susceptibility to diflubenzuron in mosquito larvae. Repression of AgCHS2 enhanced the effects of dithiothreitol and calcoflour white both on mosquito larval mortality and peritrophic membrane permeability. These results show a great potential for application of RNAi in pest management.

NEW INSIGHT INTO THE ELECTRONIC STRUCTURE OF THE CP47 ANTENNA PROTEIN COMPLEX OF PHOTOSYSTEM II

Khem Acharya, B. Neupane, M. Reppert, C. Dang, R. Jankowiak
Department of Chemistry, College of Arts and Sciences

We report that low temperature fluorescence spectrum of the CP47 antenna complex from Photosystem II has a maximum near 695 nm and not, as previously reported, at 690-692 nm. The (0,0)-band near 695 nm is in agreement with the emission observed in the intact PSII cores and thylakoid membranes. It is shown that the fluorescence maximum shifts blue with increasing fluence, in agreement with non-resonant hole burned (HB) spectra. The above findings provide important constraints and parameters for excitonic calculations, which offer new insight into the excitonic structure and composition of low-energy absorption trap(s). Using a number of experimental constraints and Monte Carlo simulations of several optical spectra we show that two lowest-energy states are contributed to by different pigment composition than previously reported. That is, our calculations suggest that the lowest-energy state is not localized exclusively on Chl 526, as previously suggested [Raszewski and Renger, J. Am. Chem. Soc. 2008, 130, 4431], although this pigment partially contributes. It appears instead that Chl 523 provides a large contribution to the lowest-energy state. Since the fits of non-resonant holes are more restrictive (in terms of possible site energies) than those of absorption and emission spectra, we suggest that fits of linear optical spectra along with HB spectra provide more realistic Chl site energies.

PYROSEQUENCING TO ANALYZE THE INFLUENCE OF FALLOW PERIOD ON SOIL MICROBIAL COMMUNITIES IN THE BOLIVIAN ALTIPLANO

Lorena Gomez[1], Ari Jumpponen[2], Michael Herman[2], Karen A. Garrett[1]
[1]Department of Plant Pathology, College of Agriculture; [2]Department of Biology, College of Arts and Sciences

The Bolivian highlands (approximately 4000 masl) are experiencing changes in agricultural practices due in part to climate change and economic pressures. Traditional fallow periods are being shortened in an effort to increase short-term yield, but this may be at the expense of soil quality. A long-term Sustainable Agriculture and Natural Resources Management project has been implemented to address the effects of these pressures on two highland regions. As a component of this project, we are studying soil microbial metagenomics using pyrosequencing methods, which allows us to place hundreds of thousands of individual microbes in taxonomic categories. Our goal is to evaluate the effect of fallow period on soil microbial communities, including fungal communities, to inform land management practices. Our preliminary results suggest that the two regions differ in their microbial resource base and that the effects of fallow period may be more complex than originally thought.

EFFICIENT AND RAPID MICROMIXING VIA ACTUATION OF DIELECTRIC ELASTOMER ACTUATORS

Eve Metto, Alexander Price, Christopher Culbertson
Department of Chemistry, College of Arts and Sciences

Poly(dimethylsiloxane) (PDMS) has been extensively used in microfluidics because of its desirable properties which include low cost, robustness and flexibility. PDMS, however, can also be used to create dielectric elastomeric actuators (DEAs). DEAs take advantage of the fact that some polymers like PDMS change shape when exposed to an electrostatic field. This shape change is accomplished by sandwiching PDMS between two electrodes where at least one of the electrodes is flexible. We have developed a novel micromixer that employs a pair of dielectric actuators integrated with a PDMS microfluidic device to improve mixing efficiency. The T-type microfluidic mixer consists of a thin layer of PDMS sandwiched between a glass substrate patterned with chrome electrodes and a PDMS layer containing the fluid channels. The patterned electrodes are positioned on the arms of the T-type mixer. The channel, filled with electrolyte, acts as the flexible electrode. When voltage is applied across the thin PDMS layer under the patterned electrode, it changes shape and as a result changes the volume of the buffer in the channel. By applying voltage to the patterned electrodes at 180 degrees out of phase, fluids from the two arms of the T-type mixer are alternately injected into the mixing channel. In this way, the contact area between the two interfaces is increased and diffusion distance decreased. Mixing is, therefore, faster and completed over a shorter distance downstream. The mixing efficiency determined by analysis of fluorescence images of the mixing channel.

INVESTIGATING STUDENTS' TRANSFER OF PROBLEM SOLVING ACROSS REPRESENTATIONS IN INTRODUCTORY MECHANICS

Dong-Hai Nguyen
Department of Physics, College of Arts and Sciences

Problem-solving skills form the basic toolbox of scientists and engineers. Learning to solve problems in a variety of contexts and representational forms is at the heart of training future scientists and engineers. In this study, we investigated the difficulties that students encountered when solving physics problems in the domain of introductory mechanics, which shared deep structural similarities but differed in context and representation. We conducted individual teaching/learning interviews with 20 students in a first-semester calculus-based physics course in which classical mechanics was the stress. Each student was interviewed four times during the semester. The students were asked to 'think aloud' while working out the solutions to the problems. Appropriate hints were provided by the interviewer when students were unable to proceed. The findings of this study inform physics

instructors on the difficulties students might have when solving problems in different representations and the hints that might be helpful in helping students overcome those difficulties. We discuss some common trends in students' performance and common difficulties students encountered when solving with physics problems in multiple representations.

COMPARING THE EFFECTS OF PHYSICAL AND VIRTUAL EXPERIMENTATION SEQUENCE ON STUDENTS' UNDERSTANDING OF MECHANICS

Adrian Carmichael, Jacquelyn Chini, Sanjay Rebello
Department of Physics, College of Arts and Sciences

We investigate the effects of sequence of virtual and physical activities on student conceptual understanding of mechanics in an inquiry-based curriculum. We used pre-, mid- and post-test data. We saw evidence of blocking and the primacy effect based on sequence and concepts tested. Students completing the physical activity first showed mid- to post-test gains whereas those completing the virtual activity first did not. This result is consistent with high salience in the first activity blocking learning in the second activity. Students completing the physical experiment first did better on force and distance mid-test questions, consistent with advantages of kinesthetic learning. These questions show equal blocking because these concepts are equally salient in both groups. Instead, a primacy effect was seen.

EVALUATION OF FAST FOOD RESTAURANT'S PERFORMANCE BASED ON BRAND VALUE: DOES BETTER BRAND RANKING MEAN BETTER PERFORMANCE?

Pei Liu, Junehee Kwon
Department of Hospitality Management and Dietetics, College of Human Ecology

During the past several decades, the world has been changing from a production-based economy to a people-centered economy, and it has given customers more power in business (Gobe, 2001). Because of this shift, brands became more important intangible assets than products. Since the recession became a global issue, the value of intangible assets became more important than before. The purpose of this study was to evaluate if there were a positive relationship between brand value and the performance of fast food restaurant chains. This study hypothesized that a company with a higher brand value will perform better financially in its long-term financial stability, activity and profitability. Firms characteristics such as the number of company-owned and franchised units and revenue (i.e. total and per store) would be associated with brand value. Brand value would be associated with the financial performance of fast food restaurants, which was measured by its long-term financial stability, activity and profitability. From the results of multiple regression analyses, brand value was influenced only by the annual total revenue of the company. Based on the finding of this study, restaurant operators should realize that the total revenue plays an important role in the brand value and ranking. Moreover, visibility-based on increased number of franchisees and good management practice should earn consumer trust and loyalty even for small brands. Last, the investors should display caution when deciding their investment decisions based on brand value or ranking only.

GETTING LUCKY: ATTRIBUTING AMBIGUOUS JOB PERFORMANCE TO SITUATIONAL FACTORS

William Weyhrauch, Satoris S. Culbertson
Department of Psychology, College of Arts and Sciences

This study sought to examine employee performance ratings made in situations of ambiguous performance. Specifically, we examined the extent to which locus of control (LOC), or the tendency to attribute life events to internal or external causes, and self-monitoring (SM), or the tendency to adjust one's behavior to situational norms, influence attributions of work outcomes to the employee or the situation. Further, we investigated the impact of positive v. negative work outcomes on raters' attributions. Undergraduates completed LOC and SM measures and read one of four ambiguous descriptions of employee behaviors in an online survey. The descriptions depicted either a salesman or customer service representative interacting with a customer and resulted in either a positive or negative outcome for the employee. We hypothesized that individuals higher in SM would tend to attribute outcomes to the situation rather than the employee (H1), individuals with greater external LOC would tend to attribute outcomes to the situation rather than to the employee (H2), and that raters would tend to attribute positive outcomes to the employee and negative outcomes to the situation (H3). H1 and H2 were not supported. However, participants in the positive outcome conditions tended to attribute work outcomes to the employee, not the situation, and vice-versa for those in the negative outcome conditions, confirming H3. These results indicated rating leniency in that, despite identical performance behaviors, raters gave credit to employees when there was a positive outcome and blamed the situation when there was a negative outcome.

WHAT'S ON YOUR MIND?: ANALYZING SELF-REPRESENTATION AND IMPRESSION MANAGEMENT ON FACEBOOK

Natalie Pennington
Department of Communication Studies, Theatre, and Dance,
College of Arts and Sciences

Erving Goffman first coined the term "impression management" in 1959 when discussing how individuals engage in behavior that showed both passive and active forms of performance of identity. Goffman suggests that it's through communication that we form impressions of people and express who we are. With the emergence of computer-mediated communication and social network sites, the nature of interaction has changed, and as a result, the traditional forms of impression management used to construct identity have also shifted. This research investigates the connection between use of a particular social network site, Facebook, and the impact that use has had on individual impression management and self-

representation techniques. In-depth qualitative interviews (n=20) were conducted to answer these questions. The most common emphasis from participants was on being attractive. Many users felt that there was a social pressure to be seen as attractive on Facebook, and would alter images/text to coordinate with what the social acceptable and/or attractive option would be.

THE AFRICAN AMERICAN MALE COLLEGE STUDENT EXPERIENCE: THE HISTORY AND ITS EFFECT ON RETENTION IN HIGHER EDUCATION TODAY

Mark Nelson
Department of Special Education, Counseling, and Student Affairs, College of Education

The purpose of the research paper is to focus on the how the legislation passed in Congress and United States Supreme Court cases affected the college experiences of African American males starting at the period of the Morrill Act of 1890 to the beginning of the Civil Rights movement. I will focus on what African American college students did inside the classroom and outside of the classroom, their experiences on campus and the impact of major events during the timeline. I would hope my research would assist in the resolving the retention rates among African American males at predominately white institutions.

PREACHING TO AND BEYOND THE CHOIR: SELECTIVE EXPOSURE TO PREJUDICE REDUCTION EFFORTS

Sara Smith, Jessica McManus, Danielle Zanotti, Donald Saucier
Department of Psychology, College of Arts and Sciences

Prejudice reduction techniques typically attempt to make prejudiced thoughts and feelings less so, and often employ voluntarily attended lectures and workshops. However, according to selective exposure theory (Sears & Freedman, 1967), individuals prefer information consistent with their pre-existing beliefs, such that prejudiced individuals may avoid information that contradicts their prejudice. This study explored whether the race of a lecturer would have an effect on whether prejudiced individuals would attend a lecture promoting nonprejudice. White participants (N = 77) completed the modern racism scale (MRS), read an announcement for a visiting lecturer who would be discussing prejudice research, and completed items assessing their intention to attend the lecture, how important they felt the lecture was, the quality of the research, and their overall feelings about the lecture. Results revealed that MRS scores were negatively related to intent to attend the lecture, importance of the lecture, quality of the research, and overall feelings about the lecture. Whether the lecturer was an ingroup or outgroup member had no effect on the participants overall reactions to and ratings of the lecture. Further, no interactions were found between the lecturer's race and participants MRS scores. These results are consistent with selective exposure theory and suggest that individuals who have higher levels of prejudice may be unlikely to attend a lecture on prejudice, regardless of the lecturer's race. This implies that efforts to preach beyond the choir may be thwarted by those most in need of intervention.

SOCIAL VIGILANTISM AS A PREDICTOR OF POLITICAL PERSUASION AND AFFILIATION

Russell Webster, Donald A. Saucier
Department of Psychology, College of Arts and Sciences

Some individuals perceive the expression of another's beliefs or opinions as a social provocation—an opportunity to disseminate their own superior beliefs for the betterment of society. This constellation of traits composes the individual difference variable we term social vigilantism (SV; Saucier & Webster, in press). In the weeks following Barack Obama's election, we asked college students how they would spend their time talking with the President-Elect if given the opportunity. The topics of conversation either related to political persuasion strategies (e.g., impress one's own political beliefs, persuade the President to adopt certain political stances) or affiliation goals (e.g., congratulating the President on his victory, asking about what it is like to be the first Black President). We hypothesized that SV would predict trying to enact political persuasion strategies, but not as likely to predict affiliation, in talking with President Obama. As predicted, regardless of political orientation, individuals higher in SV were more likely to attempt to enact political persuasion strategies (e.g., impress their own political beliefs), but not more likely to attempt to affiliate with President Obama (e.g., ask what it is like to be the first Black President). Results indicate that regardless of ideological orientation, SV is a relevant predictor of political persuasion, but not affiliation. SV is a distinct and useful individual difference variable that will help understand the nature of attitude resistance and persuasion and likely provide greater insight into the combative nature of politics.

NEAR AND FAR: HOW DOES THINKING ABOUT INGROUP AND OUTGROUP MEMBERS' DEATHS AT HOME AND AFAR AFFECT TERROR MANAGEMENT RESPONSES?

Leschia McElhaney, Russell J. Webster, Margot Pickering, Mason Burns,
James R. Daugherty
Department of Psychology, College of Arts and Sciences

Terror management theory (TMT) research shows that after thinking about death, people are more likely to malign worldview transgressors. However, there has been no systematic study of how thinking about other people's deaths (besides intimate others) affects such TMT responses. Thus, in the current study, 154 (88 women, 64 men) undergrads from KSU were randomly assigned to read one of four fictitious newspaper articles documenting the death of a student in a car crash. In these articles, both the psychological (KSU vs. KU student) and physical (the death occurred in Manhattan, KS, or Cleveland, OH) proximity of the death was manipulated. A final, non-death control condition was included, in which participants wrote essays about dental pain. They then evaluated pro-US and anti-US essays. Results showed the greatest terror management (i.e., greatest discrepancy between their pro-US and anti-US evaluations) after reading the newspaper article about a KSU student dying in Cleveland, OH. It

appears that when someone we more closely identify with dies farther from home, we are more inclined to engage in terror management responses. Future research should examine how thinking about other people's deaths in different contexts (e.g., natural disaster vs. drinking-and-driving) affects terror management. Having a greater understanding of how people react to death-related incidents in popular media will increase our understanding of when and to what degree human beings manage the terror of death in everyday life.

SEXUAL ORIENTATION AS A POINT OF STATUS HOMOPHILY: A QUANTITATIVE STUDY

Laura Logan
Department of Sociology, Anthropology, and Social Work, College of Arts and Sciences

The literature on friendship and social networks finds that individuals form social ties with people who are like them, a concept called "homophily." Much research demonstrates that social ties are homophilous with regard to race and class, for example. However, few studies have explicitly examined sexual orientation as a point of homophily. This research helps fill that gap by looking at homophily in lesbian social ties. Drawing on data from a survey of 544 lesbian respondents, this study makes visible some of the factors that influence social ties for lesbians. The findings suggest that researchers should consider sexual orientation as an important factor in shaping social ties, regardless of the sexual identities of their study participants.

WHAT ROLE CAN THE BUILT ENVIRONMENT PLAY TO FACILITATE INTERACTION BETWEEN INDIVIDUALS WHO HAVE DUAL SENSORY IMPAIRMENTS?

Zachary Wester
Department of Architecture, College of Architecture

For individuals with dual sensory impairments, the development of communication and social skills is typically delayed. The relationship that this individual has with the built environment can be just as important in the development of social interaction as that with an instructor. It is important to understand, first, that deaf-blind individuals relate to the built environment much differently than someone without these impairments (Correa-Torres 202). Personal boundaries and physical human contact are particularly important for individuals with dual sensory impairment to be socially involved. Sensitive consideration to this unique group's needs allows a designer to acknowledge that it becomes rather evident the built environment can have a considerable impact the development of communication and social skills in individuals with dual sensory impairments.Far too many spaces designed for individuals, of any capacity, heavily restrict the control of their environment and limit their influence in the built environment. The concept of space itself for a developing child with dual sensory impairment is rather unique and an issue that those without these impairments will never understand. To a young child with dual sensory impairments, space, in any amount, can be an intimidating and fearful concept. A young student will not be willing to freely explore their environment if they are overcome with anxiety (Mindel 78). An architectural scheme that strives to eliminate fears and uncertainties of young people with dual sensory impairments will liberate apprehension and foster free communication.

PROMOTING HEALTHY PHYSICAL HABITS IN BUILDINGS FOR DUAL SENSORY IMPAIRED INDIVIDUALS

Andrew Barnes
Department of Architecture, College of Architecture

Regular physical activity aids in human development, improves quality of life, increases attention, improves psychological health and leads to the development of basic living skills (Avyazoglu, 2006). Regular physical activity and a stimulating, accommodating environment improve physical health as well as emotional and social health (NY State Technical Assistance Project). Physical activity is particularly important for dual sensory impaired individuals because daily life places a greater physical demand on them than it does on sighted, able-bodied individuals (Buell, 1983). Dual-sensory impaired persons are disadvantaged in learning normal physical habits because they must push their bodies harder than able-bodied persons to develop the strength necessary to perform even basic physical activities. Physical activity as relating to deaf-blind individuals may simply be the ability to cope with, exist in, and interact confidently with people and the surrounding environment (natural or built). Thus, interior and exterior spaces of facilities for deaf-blind individuals must encourage active and mobile lifestyles. For example, Nellist argues that access to the outdoors from every room should be encouraged (1970). Mobility; the ability to successfully navigate the environment to get from one place to another, is an important aspect of an active life. The focus of this investigation is to answer the question: how can a residential facility encourage mobility and active behavior for dual sensory impaired children? The purpose of the investigation is to develop new knowledge for the design of state-of-the-art residential facilities for severely dual-sensory impaired children.

HIGHLIGHTING TACTILE AND OLFACTORY CLUES: HEALTHY ENVIRONMENTS FOR THE DEAF-BLIND STUDENTS

Sean Rigdon
Department of Architecture, College of Architecture

For the deaf-blind population, the tactile and olfactory senses are the only means to give an idea of the world. Weber tells us that the extremities, along with the lips, are the most sensitive parts of the body when it comes to touch (36). The use of tactile clues, such as textures and floor surface variations, can guide a deaf-blind person through the environment. Materials can help establish a cognitive map. Variations in temperature can also enhance ones cognitive map. Perhaps the most neglected of the tactile sensations is vibration, most notably from music. Darrow explains that texture and rhythm are perhaps the musical elements most influential in transmitting emotion to persons with a hearing loss (2).'Olfactory stimulation must

also be considered. Odors are the longest lasting memory of a place that we can carry (Beauchamp 153-4). The nose reminds the eyes. For this reason, scent should also be a critical part of the environment for a deaf-blind person. It can remind them of their specific room or of a person which they are familiar. These scents can have different effects on people, ranging from refreshment to concentration, and can be introduced in entrances, hallways or bathrooms (Baigelman and Wydra 21). The result of this semester will be a sensitive generalization on how to incorporate tactile and olfactory clues into the built environment supporting the deaf-blind students.

EFFECTS OF THE BUILT ENVIRONMENT ON MOBILITY FOR THE DUAL-SENSORY IMPAIRED.

Joshua Winter
Department of Architecture, College of Architecture

The built environment affects the ways in which we interact with and move throughout our surroundings. Most people are dependent on vision to move through the built environment. However people with severe visual impairments move through the built environment using senses other than sight. The most important variable that effects the ease of mobility for visually impaired people is the quality of the environment in which the individual functions (Aiello, Steinfeld, 1979). Improving environmental design to enhance usability is key (Aiello, Steinfeld, 1979). Characteristics within the built environment influence how easily these individuals move around. The simplicity and clarity, consistency, volumetric proportions, tactility, lighting, color and contrast, and acoustics are the characteristics that have been gathered as a conclusive group of guidelines to be considered in the design of the built environment. It would be advantageous to include design features which assist in the movement of people with severe visual impairments, (Baynes, Francklin, 1971) and by designing the environment with these characteristic guidelines in mind, visually impaired people will be able to interact and move throughout the built environment with greater ease.

META-ANALYSIS OF THE RELATIONSHIPS BETWEEN SOCIAL SUPPORT AND WELL-BEING IN CHILDREN AND ADOLESCENTS

Po Sen Chu, Donald A. Saucier, Eric Hafner
Department of Psychology, College of Arts and Sciences

Research has started to explore the associations between social support and well-being among children and adolescents, but the overall relationship is still unclear. This study explored: 1) the overall association between social support and well-being, 2) the association differences among categories of well-being, 3) the association differences among different types of social support measures, 4) the association differences among different support sources, and 5) whether the association between social support and well-being changed with participants' age. Two hundred forty-six studies were collected and analyzed, and the results indicated a positive but small association between social support and well-being. Additionally, moderator analyses indicated that social support was more strongly associated with self-concept, perceived support was more strongly associated with well-being, support from teachers and school personnel was more strongly associated with well-being, and the association between social support and well-being increased with age. The implications and possible applications of the relationship between social support and well-being among children and adolescents are discussed.

SOCIAL VIGILANTISM AND ASSERTION OF RELIGIOUS BELIEFS: PREDICTING BELIEF DEFENSE AND DISSEMINATION

Megan Strain, Donald Saucier
Department of Psychology, College of Arts and Sciences

Religion has produced social conflict throughout history (e.g., the Crusades, Middle Eastern conflict, September 11th attacks), often stemming from individuals' attempted dissemination of their beliefs onto others. Social vigilantism (SV) is an individual difference in the tendency to impress one's "superior" beliefs onto others that also predicts resistance to persuasion (Saucier & Webster, 2009). Consequently, SV may provide insight, beyond measures of religiosity, about how and why individuals uphold and attempt to spread their religious beliefs. Thus, we investigated the relationship between SV and individuals' use of resistance strategies (e.g., counterarguing) when their religious beliefs were questioned. Participants completed measures of intrinsic, extrinsic, and quest religiosity, Christian orthodoxy, and religious fundamentalism, as well as the SV scale. To assess resistance to persuasion, participants were asked to imagine a situation in which their beliefs about God were challenged. They then indicated how likely they would be to respond by using various resistance strategies in the imagined situation. As expected, hierarchical regressions showed that SV was positively and uniquely associated with the use of three resistance strategies: negative affect, counterarguing, and impression of views. These results indicate that, when presented with an opposing religious viewpoint, individuals' tendencies to defend and disseminate their own views can be predicted, above and beyond their own beliefs about religion, by an individual difference in their tendency to impress their beliefs onto others.

SENSORY EXPERIENCES IN GARDEN ENVIRONMENTS FOR ADOLESCENTS WITH DUAL SENSORY IMPAIRMENT

Laura Herron
Department of Architecture, College of Architecture

Sight has become the primary sense with which we experience our world, to the detriment of stimulation of the four other senses (Pallasmaa, 2005). Limited sensory stimuli in our daily lives deprive us of the complete experiential awareness available to us. By engaging all five senses, all persons, but particularly individuals with vision and hearing impairments can increase their knowledge of self and place. Adolescents with impaired sight and hearing senses are apt to place stronger emphasis on those senses with which they do receive information. Holbrook (1996) refers to "Inter-sensory

Coordination" as the sharing of information from one sense to another which ultimately helps understanding and mapping of place. Garden environments can be especially stimulating through the tactility of textural pavements or soils, taste of fresh herbs, fruits, and vegetables, and the fragrance of flowers and herbs. Even the smell of air after a rain is stimulating. Encouraging adolescents with dual sensory impairment to care for and take part in the cyclical life of nature can improve mental stimulation, psycho-social well-being as well as physical and nutritional health. Active engagement in and exposure to the outdoors exponentially increases understanding, common sense, physical aptitude, and acceptance for life processes and adversity (Louv, 2008). Specifically designed settings that support dual sensory impaired young adults are still extremely limited. This investigation focuses on exploring conservatory and exterior garden spaces that encourage interaction with nature. A variety of design proposals will be presented.

FUNDAMENTAL STUDIES ON MOLECULAR INTERACTIONS IN STARCH/PVOH/CLAY NANOCOMPOSITES USED FOR MAKING BIODEGRADABLE PACKAGING FILMS

Samer Ali, Xiaozhi Tang, Sajid Alavi, Jon Faubion
Department of Grain Science and Industry, College of Agriculture

The use of petroleum-based plastic packaging materials is of great environmental concern and also a drain on limited non-renewable resources. This study focuses on replacing petroleum-based films with starch-based biodegradable films, which are comparable in cost and performance. Nanocomposites of poly (vinyl alcohol) (PVOH), starch and clay were produced using solution method. Films were produced from these nanocomposites by casting. X-ray diffraction (XRD) and transmission electron microscopy (TEM) studies were carried out to characterize the nanocomposites. Differential scanning calorimetry (DSC) studies were carried out to understand the thermal properties of the nanocomposites. XRD and TEM results confirmed that nanocomposites have good intercalation or exfoliation which improved mechanical and barrier properties of films. Tensile strength (TS) and elongation at break (E%) of films ranged from 17.1 to 23.5 MPa and 63.4 to 130.5%, respectively, while water vapor permeability(WVP) ranged from 1.51 to 1.91 g.mm/kPa.h.m2. Further work needs to be done to bring these films at par with commercial plastic films which show better TS (8-32 MPa), E% (500-900) and WVP(.001 g.mm/kPa.h.m2). The cost for polyethylene is $0.70/lb while the raw material cost for this starch based films is $0.85/lb. This is very encouraging while we move forward to replace the petroleum based plastics which show a continuous increase in costs.

PM10 EMISSION RATES FROM BEEF CATTLE FEEDLOTS IN KANSAS

Henry Bonifacio, Ronaldo G. Maghirang, Edna B. Razote
Department of Biological and Agricultural Engineering, College of Engineering

Large cattle feedlots in Kansas are often considered to be large sources of particulate matter smaller than 10 µm equivalent aerodynamic diameter (PM_{10}). However, limited data are available on PM emission rates from cattle feedlots. This study was conducted from January 2007 to December 2008 at two commercial cattle feedlots in Kansas: (1) KS1, a sprinkled feedlot with a capacity of 30,000 cattle and with pen cleaning frequency of 1 to 2 times per year; and (2) KS2, a non-sprinkled feedlot with a capacity of 25,000 cattle and with pen cleaning frequency of 5 to 6 times per year. Inverse-dispersion technique with the AMS/EPA Regulatory Model (AERMOD) was used to calculate PM_{10} emission rates, based on measurements of PM_{10} concentrations and meteorological data at the feedlots. Overall mean emission rates were 1.29 g/m^2-day (range: 0.05 - 4.97 g/m^2-day) for KS1 and 0.64 g/m^2-day (range: 0.03 - 2.77 g/m^2-day) for KS2. The corresponding overall mean emission factors were 24 and 29 lb/1000 hd-day for KS1 and KS2, respectively. As expected, for each feedlot, the mean PM_{10} emission rate was higher during hot weather than during cold weather conditions.

DEVELOPMENT OF A 'GLUTEN-FREE' FLAVORED WAFFLE CONE USING BROWN RICE FLOUR

Angela Dodd, Melissa J. Daniel
Department of Food Science Institute, College of Agriculture

Over 3 million Americans suffer from Celiac Disease, which prevents them from consuming gluten, the protein found in wheat, barley and rye. This has created a growing niche market for “gluten-free” foods. Therefore, the purpose of our research was to develop a flavored gluten-free waffle ice cream cone using brown rice flour. Formulations were tested for a liquid ingredient based batter that included liquid eggs, butter, and flavorings; and finalized for a dry mix that included: powdered eggs, flavorings, and solid fat. Four flavors (chocolate, strawberry, cinnamon, and vanilla) were developed, however consumer studies and physical analyses were only done on cinnamon and vanilla flavors. A consumer study was conducted with 37 consumers, ages 18-70 using a 9 point hedonic scale (1 = dislike extremely, 9 = like extremely). Overall acceptability was 7.19 ±1.05 which indicates high consumer acceptability and product marketability. Product specifications included: water activity (< 0.450), texture force (3727 g force ± 12%), fracturability (1.56 g force ±19%), and cone color (L* 54 ± 5, a* 4.5± 0.5, and b* 30.0 ± 5). Cones were placed in biodegradable styrofoam made from gluten-free starch for protection against breaking. Packages were wrapped in a polypropylene bag and flushed with Nitrogen. With the top comfort food in 2009 as ice cream and with gluten free foods on the rise, flavored gluten-free waffle cones have market potential in the coming years.

WATER ABSORPTION AND MIXING BEHAVIOR OF HARD AND SOFT WHEAT FLOURS WITH BRAN INCLUSIONS

Hyma Gajula, Hulya Dogan, Jon Faubion
Department of Grain Science and Industry, College of Agriculture

Wheat bran is one of most important dietary fiber sources in the bread making industry. The objective of this study was to investigate the effects of bran source, bran size and inclusion level (0-10%) on water absorption and rheological properties of dough systems of different strength and their bread quality and texture. Cleaned hard red spring (HRS) and soft white (SW) wheat samples were milled on a Buhler mill. Water sorption behaviors of bran samples were characterized and no significant difference was observed. Water absorption rates, mixing tolerance index, mixing peak time of the dough systems were studied. HRS and SW bran inclusions have higher absorption rates from 65.3-68.8% as compared to 59.6-61.1% for SW flour. The peak time and peak value was higher in HRS flour as compared to SW flour with and without HRS and SW bran inclusions. The crumb structure and texture of the bread loaves were characterized. The loaf volume of HRS flour bread decreased as percent bran addition increased and no significant difference was observed in source of bran. HRS and SW bran inclusions in HRS flour have better texture quality as compared to SW

flour. From above results, HRS flour performed better compared to SW flour both during dough mixing and baking, which was expected. Bran affected the performance of HRS flour negatively. However, inclusion of SW and HRS bran into SW flour dough systems slightly improved their mixing properties as indicated by increased mixing tolerance indices

UNCOVERING MAIN PLAYERS INVOLVED IN SUCCESSFUL INVASION OF RICE CELLS BY THE BLAST FUNGUS MAGNAPORTHE ORYZAE

Martha Giraldo, Gloria Mosquera, Chang Hyun Khang, Barbara Valent
Department of Plant Pathology, College of Agriculture

Durable resistance has not been achieved for the rice blast fungus Magnaporthe oryzae, a major threat to world food security. For successful infection, biotrophic fungi that invade living plant cells must secrete proteins, called effectors, to block plant defenses. The blast fungus grows inside live rice cells as specialized invasive hyphae (IH) that are enclosed by an extrainvasive hyphal membrane (EIHM). Therefore, effectors must cross the EIHM to reach the rice cytoplasm. Identifying blast effectors and understanding how they function inside rice cells are critical to attain durable disease control. To address this challenge, we selected four candidate blast effectors based on microarray analysis. We independently characterized them during invasion in planta by live cell imaging, using transgenic fungi that secrete chimeric proteins of each candidate fused to fluorescent reporters. This study revealed that these proteins are specifically secreted during biotrophic invasion, thus named Biotrophy-Associated Secreted (BAS) proteins. BAS1, like known blast effectors, accumulated at the biotrophic-interfacial complex (BIC). Moreover, BAS1 was translocated into the cytoplasm of invaded cells and moved ahead into neighboring uninvaded cells. BAS2 and BAS3 accumulated at BICs and localized at the rice cell wall where the IH crossed into the next cells. This result suggested a role of these two BAS proteins in mediating fungal cell-to-cell movement. BAS4 localized inside EIHM compartment uniformly outlining IH. This BAS4 is an important tool to determine EIHM integrity during biotrophic interaction. Characterization of BAS proteins will lead to novel strategies for durable disease control.

MEASUREMENT OF SIZE DISTRIBUTION AND CONCENTRATION OF PARTICULATE MATTER EMITTED FROM A COMMERCIAL CATTLE FEEDLOT IN KANSAS – LASER DIFFRACTION

Howell Gonzales[1], Ronaldo Maghirang[1], Jeff Wilson[2], Li Guo[1], Edna Razote[1]
[1]Department of Biological and Agricultural Engineering, College of Engineering; [2]USDA

This study was conducted to evaluate the applicability of laser diffraction method, coupled with total suspended particulate (TSP) sampling, in measuring the particle size distribution (PSD) and the concentrations of PM10 (particulate matter with equivalent aerodynamic diameter of 10 µm or less) and PM2.5 (particulate matter with equivalent aerodynamic diameter of 2.5 µm or less) at a commercial cattle feedlot in Kansas. The feedlot has a capacity of 30,000 head and is equipped with a sprinkler system for dust control. A low-volume TSP sampler was used to collect samples and also measure the TSP concentration at the downwind edge of the feedlot. The dust samples that were collected on Teflon filters for the low-volume TSP sampler were analyzed with a laser diffraction analyzer. Collocated with the TSP samplers were PM10 samplers (i.e., federal reference method (FRM) high-volume, federal equivalent method (FEM) Tapered Element Oscillating Microbalance (TEOM), and low-volume samplers) for direct measurement of PM10 concentration, low-volume PM2.5 sampler for measurement of PM2.5 concentration, and micro-orifice uniform deposit impactor (MOUDI) for PSD measurement. The laser diffraction method and MOUDI did not differ significantly in mean geometric mean diameter. From the laser diffraction data and TSP data, the corresponding PM10 and PM2.5 concentrations were also determined and compared with measured values from the FRM high-volume PM10, FEM PM10, low-volume PM10, and low-volume PM2.5 samplers. Results showed significant differences among the samplers/methods.

EFFECT OF PACKAGING AND STORAGE TIME ON SURVIVAL OF LISTERIA MONOCYTOGENES ON SHELF-STABLE MEAT SNACKS

Nigel Harper[1], Kamaldeep K. Uppal[1], Kelly J. Getty[1], Elizabeth A.E. Boyle[1],
Bruce Barry[2]
[1]Department of Food Science Institute, College of Agriculture;
[2]Oberto Sausage Company

USDA/FSIS requires that processors of ready-to-eat (RTE) meat and poultry products implement post processing intervention strategies for controlling Listeria monocytogenes (LM). The objective of our study was to determine the effect of packaging methods and storage time on reducing LM in shelf-stable meat snacks. Kippered beef steaks and turkey tenders were obtained from a commercial supplier. Steaks and tenders were dipped in a five-strain cocktail of LM for 1 min. Inoculated samples were then packaged with four treatments: 1) vacuum, 2) nitrogen-flushed with oxygen scavenger, 3) heat sealed with oxygen scavenger, and 4) heat sealed without oxygen scavenger. Samples were stored at 23°C and evaluated for LM levels at 0, 24, 48, and 72 h. A 1 log cfu/cm2 reduction of LM was observed after 24 h for all packaging treatments and products except for kippered beef that were heat sealed with oxygen scavenger, in which only a 0.6 log was observed. After 72 h of storage, reductions for all packaging treatments for both products ranged from 1.5 to 2.4 log. Products such as kippered beef steaks and turkey tenders are RTE products that could be potentially contaminated with LM after thermal processing. Processors of these products could use a combination of vacuum or nitrogen-flushing packaging methods and a holding time of 24 h prior to shipping to reduce potential LM numbers by at least 1 log.

PACKAGE SYSTEMS AND STORAGE TIMES SERVE AS POST-LETHALITY TREATMENTS FOR LISTERIA MONOCYTOGENES ON SMOKED SAUSAGE STICKS

April Lobaton-Sulabo[1], Elizabeth A.E. Boyle[2], Kelly J.K. Getty[1], Tyler Axman[1], Kamaldeep K. Uppal[1], Bruce Barry[3]

[1]Department of Food Science Institute, College of Agriculture; [2]Department of Animal Science and Industry, College of Agriculture; [3]Oberto Sausage Company

To validate how packaging and storage reduces Listeria monocytogenes (Lm) on shelf stable smoked sausage sticks, four packaging systems, including heat sealed (HS), heat sealed with oxygen scavenger (HSOS), nitrogen flushed with oxygen scavenger (NFOS), and vacuum (VAC), and four ambient temperature storage times were evaluated. Commercially available pork and beef smoked sausage sticks (14 cm x 1 cm) were inoculated with a five-strain Lm cocktail, packaged, and stored at 25.5C. Lm populations were enumerated at time 0 to determine initial attachment, and at 24, 48, and 72 h, and 30 d after packaging. There was no interaction of packaging system and storage time on Lm reduction. Packaging in NFOS, HSOS, VAC, and HS resulted in mean Lm log reductions of 1.79, 2.47, 2.74, and 3.01 log CFU/cm2, respectively, regardless of storage time. A mean Lm log reduction of 2.02, 2.28, 2.47, and 3.25 log CFU/cm2 was achieved after 24, 48, and 72 h, and 30 d of storage, respectively, regardless of package system. These results indicate that smoked sausage sticks packaged in HS, HSOS, or VAC, or using a minimum of 24 h storage would achieve >2.0 log CFU/cm2 of Lm. This could be used as a post-lethality treatment based on USDA FSIS compliance guidelines for RTE meat and poultry products. Processors could also use NFOS as an antimicrobial process since a >1.0 log CFU/cm2 of Lm was achieved.

IMPACT OF A PLANT EXTRACT ON THE VIABILITY OF YOGURT STARTER AND PROBIOTIC CULTURES IN NONFAT YOGURT

Minto Michael[1], Karen A. Schmidt[2], Randall K. Phebus[2]

[1]Department of Food Science Institute, College of Agriculture; [2]Department of Animal Sciences and Industry, College of Agriculture

Yogurt and probiotic cultures should be present at recommended concentration of 6 to 8 log cfu g-1 at the time of consumption to confer health benefits to the host. Typically, culture viability decreases during refrigerated storage of a yogurt product. Cegemett® Fresh (a plant extract) is an antioxidant mixture prepared from olive, garlic, onion, citrus and uses sodium acetate (~50%) as a carrier. The combined effect of reduced oxygen and less acid environment exerted by the plant extract in yogurt may enhance the viability of yogurt starter (Streptococcus thermophilus and Lactobacillus bulgaricus) and probiotic (Bifidobacterium animalis ssp. animalis and Lactobacillus acidophilus) cultures in nonfat yogurt. Nine yogurt samples were formulated with 0.5% plant extract, 0.25% sodium acetate or no supplement, and inoculated with yogurt starter and one of three cultures: B. animalis, L. acidophilus or both probiotics. Microbial and chemical analyses were done weekly for 50 days. Buffering capacity of supplemented yogurts was greater compared with non-supplemented yogurts. For all yogurts redox potential and titratable acidity increased during storage, as pH decreased. L. bulgaricus and L. acidophilus counts in all supplemented yogurts were > 6 log cfu mL-1 for additional 7 to 14 days compared with the non-supplemented yogurt. S. thermophilus and B. animalis viability was not affected by supplementation nor fermentation culture. Plant extract supplementation can improve the longevity of L. bulgaricus and L. acidophilus in a probiotic yogurt by 14 days while not affecting the counts of other two bacteria.

INHIBITORY ACTIVITIES OF SPICES ON HETEROCYCLIC AMINE FORMATION IN GROUND BEEF PATTIES

Kanithaporn Puangsombat

Department of Food Science Institute, College of Agriculture

Heterocyclic amines (HCAs) are carcinogenic compounds that are formed during cooking of muscle foods. It has been reported that the level of HCAs in meat products can be reduced by addition of compounds with an antioxidant potential. Therefore, the search for natural sources of antioxidant has been greatly intensified in recent years. The objective of this study was to investigate the influence of spices on the inhibition of HCA formation in cooked beef patties. Materials evaluated included rosemary, galangal, fingerroot, coriander seeds, cumin, and turmeric in dried powder form. The spices were added directly to ground beef at a level of 0.2%. Patties were fried at 400 Â°F (204 Â°C) for 5 min per side. All of the patties contained IQx, MeIQx, and PhIP while IQ and MeIQ were not detectable in any samples. The result showed that the total HCA levels were significantly reduced when adding rosemary (43.5%), turmeric (39.3%), and fingerroot (33.6%). The addition of cumin, coriander seeds and galangal had no effect on reduction of HCA levels in cooked beef patties. The inhibiting effect of spices on HCA formation significantly corresponded to their total phenolic contents (r2 = 0.80) and antioxidant activity based on a DPPH scavenging assay (r2 = 0.84). The results suggest that some spices such as rosemary, turmeric, and fingerroot have good potential as a source for natural antioxidants to prevent free radical mediated HCA formation in cooked beef patties, and could be easily used to provide safer meat products.

DEVELOPING SITE-SPECIFIC MONITORING STRATEGIES FOR MANAGING CORN EARWORM (HELICOVERPA ZEA) IN SORGHUM

Alysha Soper

Department of Entomology, College of Agriculture

Corn earworm (Helicoverpa zea: Noctuidae) is an annual, late-season sorghum pest in Kansas. Predicting abundant or damaging populations is difficult due to landscape complexity at regional (adult migration events) and local scales (host-plant shifts to crops like corn or soybean). The sampling threshold for insecticide application is 2-3 corn earworm larvae per sorghum head, or the equivalent of up to 25% yield loss. Decisions regarding treatment will directly affect total grain production, profits, and may unintentionally affect non-target organisms. Therefore, it is imperative that user-friendly and cost-effective sampling methods exist to minimize the chance of making incorrect management decisions. Current management

recommendations and monitoring practices include weekly, whole-field samples from the flowering stage to maturity using traditional sampling patterns. The objectives of this research are to 1) define reduced sampling area (field borders vs. whole-field) that can accurately estimate larval infestations based on geospatial distributions, and 2) test the efficacy of pheromone traps in identifying temporal sampling strategies based on adult migration and host phenology. Preliminary field data show that surrounding crop type (corn or soybean) along with regional variation in pheromone trap catches impact spatial and temporal colonization patterns at the field-level. Future research will continue to focus on larval spatial distributions along with adult flight activity in order to develop refined sampling recommendations and to understand the implications for site-specific management of corn earworm in sorghum.

INFLUENCE OF PREVIOUS INFESTATION OF SOYBEAN ON THE SOYBEAN APHID, APHIS GLYCINES MATSUMURA (HEMIPTERA: APHIDIDAE)

Poornima Viswanathan[1], John C. Reese[1], William T. Schapaugh[2], Dechun Wang[3], Tiffany Heng-Moss[4]
[1]Department of Entomology, College of Agriculture; [2]Department of Agronomy, College of Agriculture; [3]Department of Crop and Oil Sciences, Michigan State University, East Lansing MI; [4]Department of Entomology, University of Nebraska, Lincoln, NE

The soybean aphid, Aphis glycines Matsumura, first detected in the US in 2000 (Ostlie, 2002; Alleman et al. 2002) is a major pest of soybean that has already evolved a new biotype (Kim et al. 2008). This study aims to achieve an understanding of induced response in soybean genotypes as a result of previous infestation and identify any change in the resistance or susceptibility of the host plant in terms of aphid survival and reproduction. Preliminary experiments with the genotypes K1639, K1621 and KS4202 suggested an induction in antibiotic resistance when preconditioned for 2 days with 10 aphids. However, when preconditioned with 10 aphids (Illinois biotype) over a range of time viz., 2, 4, 9 and 12 days respectively, significant induction of resistance was not observed in the genotypes. Currently, experiments are underway to study the influence of induced response on the Ohio biotype of the soybean aphid in genotypes developed in MSU, and other PIs which have been found resistant to the new biotype. The Electrical Penetration Graph (EPG) technique will give further insight on the effect of induced response, if any, on the feeding behavior of the soybean aphid.

PRODUCTION OF CAROTENOID-ENRICHED ANIMAL FEED BY SECONDARY FERMENTATION OF WHOLE STILLAGE

Nanjunda Ananda, Praveen Vadlani
Department of Grain Science and Industry, College of Agriculture

Whole stillage is a co-product of grain-based biofuel and is dried to produce Dried Distiller's grain with Solubles (DDGS). Current US production of DDGS is about 10 million metric tons and is projected to increase further. DDGS is used as animal feed with scope for value addition. In general, about 30-120ppm of total carotenoids is added to animal feed to enhance meat color and quality, vitamin-A levels in milk and meat, and reproductive efficiency of animals. Since animal feed is generally poor in carotenoids, this study aimed to produce carotenoid-enriched DDGS by submerged fermentation of red yeasts. Mono and mixed culture of Phaffia rhodozyma and Sporobolomyces roseus were used to produce astaxanthin and carotene. Both mono and mixed culture fermentation yielded carotenoid-enriched DDGS. Total carotenoid yield from mixed culture (170µg/g) was greater than mono culture (120µg/g) fermentation. P. rhodozyma monoculture (31µg/g) produced twice the astaxanthin yield than mixed culture (14µg/g), while carotene yield in mixed culture (153µg/g) was similar to that of S. roseus (192µg/g) and significantly greater than that of P. rhodozyma (90µg/g) fermentation. Since the carotenoid yields are in the range that is commonly employed in animal feed, the carotenoid-enriched DDGS can be used directly as animal feed and/ or feed blends. This secondary fermentation presents an innovative strategy to utilize whole stillage and enhance market growth potential of DDGS.

WHEAT-RYE T2BS.2BL-2RL RECOMBINANTS WITH RESISTANCE TO HESSIAN FLY (H21)

Joey Cainog[1], Lee Zavatsky[2], Ming-Shun Chen[3], Jerry Johnson[4], Bernd Friebe[1], Bikram Gill[1], Adam Lukaszewski[2]
[1]Department of Plant Pathology, College of Agriculture; [2]University of California; [3]Department of Entomology, College of Agriculture; [4]University of Georgia

The Hessian fly, Maetiola destructor (Say), is a destructive insect pest of bread wheat Triticum aestivum L. worldwide. Although 32 genes conferring resistance to Hessian fly have been identified, only a few of them are still effective. One of such highly effective genes is H21, which was transferred to wheat from Chaupon rye via a compensating T2BS.2R#2L Robertsonian whole-arm wheat-rye translocation. This translocation also has a locus for field resistance to powdery mildew. To broaden the use of T2BS.2R#2L in wheat improvement, we attempted to transfer both resistance loci, via homologous recombination, to a T2BS.2BL-2R#2L chromosome. The H21 locus was closely linked to the telomere; the powdery mildew locus was distal but closely linked to the translocation breakpoint in T2BS.2BL-2R#2L. Recovered short segment rye translocation chromosomes confer resistance to Hessian fly; no crossover event in the desirable configuration was recovered to produce a short-segment wheat-rye translocation with both H21 and the powdery mildew resistance gene present. The T2BS.2BL-2R#2L recombinant chromosome has been transferred to adapted winter and spring wheat cultivars.

COMPARISON OF POPULATIONS OF TWO SOYBEAN APHID BIOTYPES ON DIFFERENT SOYBEAN ENTRIES

Predeesh Chandran, John C. Reese, Leslie R. Campbell
Department of Entomology, College of Agriculture

Soybean, Glycine max (L.) Merr is one of the most important cultivated crops in the world .The soybean aphid, Aphis glycines Matsumura, is a major pest of soybean and was first detected in Wisconsin in 2000. It has spread into most, if not all, soybean producing areas of the United States and Canada since its first report. Host plant resistance to insects is an important alternative to other controls and is more sustainable than any other control methods against this insect. Recent studies identified two soybean aphid biotypes during 2005 in just five years after its invasion. This study includes the entries from Kansas, Michigan and Nebraska soybean germplasms. Also it is the first attempt to study the different Kansas soybean entries response to Ohio biotype. The plants were screened by infested at V1 stage with 6 aphids per plant and populations counted after 7 days. The results showed that the earlier resistant entries to Illinois biotype (K1639, K1642, K1613 K1621, Dowling and Jackson) were susceptible to the new Ohio biotype with large populations developing on these entries. But two of the Michigan entries (EO 6902 and EO 7906-2) showed resistance to both Ohio and Illinois biotypes. Further characterization of resistance made clear that they showed antibiosis type of resistance with the two above biotypes. Thus, it is concluded that we found two entries resistant to both Ohio and Illinois biotypes and the Ohio biotype overcame the several different sources of resistance in previous found resistant entries.

ENHANCING SORGHUM AS BIOFUEL FEEDSTOCK: INHERITANCE OF JUICE YIELD, STEM SUGAR AND BIOMASS PRODUCTION

Jayfred Gaham Godoy, Frank Maulana, Tesfaye Tesso
Department of Agronomy, College of Agriculture

Due to its potential for high biomass production, adaptation to marginal conditions and its sugar rich stalks, sorghum has been recognized as one of the prospective sources as bio-fuel feedstock. Realizing this potential requires development of crop genotypes and hybrids suited for this purpose. This in turn involves characterization and deployment of traits associated with improved biofuel production. The objectives of this study were to evaluate the value of high biomass and/or sweet sorghum germplasm sources as biofuel feedstock and understand the genetics of biomass and sugar accumulation. Eighteen F1 hybrids were developed by crossing six high biomass and/or sweet pollinators and three grain sorghum seed parent lines following the Design II mating scheme. The hybrids and their parents were evaluated at two locations using a randomized complete block design with three replications. Data were collected on biomass, juice content and brix score. Analysis revealed significant variation among pollinator parents for all traits studied. General combining ability (GCA) among males was highly significant for all traits with the top pollinators having 77, 42 and 32% higher juice, brix score, and biomass, respectively, compared to the overall mean of the hybrids. Specific combining ability effect was significant only for juice content and that was much lower than the variation revealed by GCA among males. Two of the males (PI257602 and PI185672) had the top scores for all of the traits studied and are good breeding materials for use to develop biofuel sorghum hybrids of commercial value.

FLAMELESS CATALYTIC INFRARED RADIATION FOR DISINFESTATION OF STORED WHEAT DOES NOT AFFECT WHEAT QUALITY

Moses Khamis, Subramanyam Bhadriraju, Hulya Dogan, Jeffery Gwirtz
Department of Grain Science and Industry, College of Agriculture

Insect pests associated with stored wheat are primarily managed by grain protectants and the fumigant phosphine. Organic producers and grain managers have limited options for managing insects in their stored wheat. A bench top model of flameless catalytic infrared emitter (www.catalyticdrying.com), a "green" technology, was effective in disinfesting life stages of three species of stored-wheat insects. Wheat quality was assessed by varying the amount of wheat exposed to infrared radiation (113.5 and 227.0 g), distance from the emitter (8.0 and 12.7 cm), and exposure time (45 and 60 sec). Temperatures attained by wheat during infrared exposure were monitored continuously using a non-contact infrared thermometer connected to a laptop via a RS232 cable. The quality tests included test weight, kernel hardness, moisture content, milling yield, proximate analysis, rheological properties of flour, and baking quality. Exposure to infrared radiation resulted in a 0.6 to 1.7% drop in moisture of wheat relative to untreated wheat (11.5%) resulting in a slight increase in kernel hardness. Certain physical, chemical and rheological properties were statistically different among treatments, but the values observed did not exceed the ranges recommended for good quality wheat and flour and therefore these minor differences were not of any practical relevance. These results suggest that infrared radiation can be used to disinfest wheat of stored-product insects without affecting wheat quality.

EFFECT OF EARLY AND MID -SEASON COLD TEMPERATURE STRESS ON GROWTH, DEVELOPMENT AND YIELD COMPONENTS OF SORGHUM

Frank Maulana, Tesfaye Tesso
Department of Agronomy, College of Agriculture

Cold temperature during the early and mid growing season is a common abiotic constraint to grain sorghum production in Kansas. This study was to investigate the effect of a cold temperature episode on growth, development and yield components of sorghum. Three sorghum genotypes, Shan Qui Red, SRN 39 and Pioneer 84G62 were exposed to two temperature regimes at seedling and flowering stages. The plants were grown in a greenhouse using 5.4L pots filled with Metro-Mix® 360 growing medium, Sun Gro and laid in split-split plot with randomized complete block design, three replications. Growth stages were assigned to whole plot unit and genotypes and temperature regimes to the sub-plot and sub-sub-plot units, respectively. The temperature treatments were imposed by keeping the plants in a growth chamber calibrated to 15/13ºC (day/night) for the cold

treatment and at 25/23ºC (day/night) for the normal temperature. Treatment application lasted twelve days for both growth stages. Seedling growth, days to flowering, flowering duration, days to maturity, panicle weight, panicle yield, 100 seed weight, and number of seeds/panicle were measured. Significant differences were observed between the temperature regimes for all parameters except 100 seed weight. Early season cold temperature significantly reduced seedling growth, and delayed flowering and maturity, while mid-season stress prolonged flowering duration, delayed maturity and reduced yield components including panicle yield, seeds/panicle and panicle weight in all genotypes.

EVALUATING GENETIC RESOURCES FOR DROUGHT TOLERANCE IN GRAIN SORGHUM

Raymand Mutava[1], P.V. Vara Prasad[1], Kenneth D. Kofoid[2], Mitchell R. Tuinstra[3],
Jianming Yu[1]
[1]Department of Agronomy, College of Agriculture; [2]KSU Agricultural Research Station; [3]Department of Agronomy, University of Purdue

Grain sorghum (Sorghum bicolor L. Moench), the fourth most important cereal crop, is grown throughout the semiarid regions of the world. Even though sorghum is a drought tolerant crop, there is always a possibility that it will most likely undergo a period of drought stress during its growth cycle. The genus Sorghum is very diverse and all cultivated sorghums belong to sorghum bicolor ssp. bicolor which is divided, based on morphology, into five races (bicolor, caudatum, guinea, durra, and kafir), and ten intermediate races (based on inter-racial crosses). Although the US National Plant Germplasm System (NPGS) maintains a large collection of accessions, the genetic base used in sorghum breeding programs is still small. An association panel of 300 sorghum genotypes, which is believed to be representative of sorghum globally, has been developed for genetic studies in sorghum. The purpose of this study was to characterize the association panel for physiological traits associated with pre- and post-flowering drought tolerance. The objectives were to (i) quantify the performance of the association panel under field conditions in Kansas, (ii) characterize the sorghum association panel for phenological, physiological and yield traits that might be associated with pre- and post-flowering drought tolerance, and (iii) identify drought tolerant lines with high yield potential.

TRANSPIRATION EFFICIENCY AMONG SORGHUM LINES DIFFERING IN CANOPY ARCHITECTURE

Sruthi Narayanan, Rob Aiken, P.V. Vara Prasad, Jianming Yu,
Zhanguo Xin
Department of Agronomy, College of Agriculture

Increasing crop transpiration efficiency (TE), the ratio of biomass produced per unit water transpired, can enhance crop productivity and yield potential. This study evaluates factors affecting TE among eight sorghum (Sorghum bicolor) lines, including crop canopy architecture which is the distribution, area, shape and orientation of leaves, stems and reproductive structures. Destructive harvests at boot, post-anthesis and late grain fill stages quantified above-ground biomass of the selected sorghum lines. Crop water use was calculated from changes in stored soil water, precipitation and irrigation. Canopy architecture was characterized by leaf area index, leaf dimensions and trajectory, light transmission, as well as canopy spectral reflectance. TE was calculated by the ratio of above-ground biomass accumulation to water use for specified sampling intervals. Sorghum lines showed significant differences in apparent TE and in canopy architecture, when grown under greenhouse conditions. Data collected from a field experiment is under analysis. By developing sorghum hybrids having high TE (plant productivity in terms of water use), more yield can be expected from available precipitation and if differences in TE among sorghum lines are influenced by canopy architecture, then we can earn best yield benefits from TE by modifying or selecting for crop canopy architecture, as identified in these studies.

PROPERTIES OF STARCH FROM NEAR ISOGENIC WHEAT SAMPLES OVEREXPRESSING PUROINDOLINES AND THE ROLE OF STARCH GRANULE SURFACE COMPONENTS IN PASTING

Daniela Nath de Oliveira[1], Sean Finnie[2], Mike Giroux[3]
[1]Department of Grain Science and Industry, College of Agriculture; [2]Catholic University of Leuven; [3]Montana State University

Near isogenic samples overexpressing puroindolines have been used to assess the effect of wheat hardness on final product characteristics. The objective of this study is to determine differences among starch from near isogenic samples and to investigate the role that starch surface components play in pasting. Prime starch from soft (HGAB18) and hard (Hi-line) near-isogenic wheat lines was isolated using batter and dough methods. Starch isolated using a batter method maintains both pin proteins and polar lipids on its surface. Isolation by a dough method, deplete these components. Starch properties were characterized and surface proteins and lipids were quantified. A Brabender MicroViscoAmylograph was used to create pasting profiles and gelatinization endotherms were assessed by Differential Scanning Calorimetry (DSC). Starch isolated from HGAB18 and Hi-line exhibited differing pasting profiles and DSC endotherms. Surface components did not affect gelatinization endotherms but did affect rate and extent of setback curves. These results indicate that factors, in addition to starch surface components, may be affecting physical and thermal characteristics of near isogenic samples overexpressing puroindolines. Characterizing the relationships between starch granule surface components and pasting profiles provides insight into how endosperm texture affects flour and dough characteristics.

ECOLOGY AND MANAGEMENT OF LARGE PATCH DISEASE OF ZOYSIAGRASS

Kehinde Obasa[1], Jack Fry[2], Dale Bremer[2], Rodney St. John[2]
[1]Department of Plant Pathology, College of Agriculture; [2]Department of Horticulture, Forestry, and Recreation Resources; College of Agriculture

Zoysiagrass (Zoysia japonica) is a warm-season (C4) turfgrass that is appropriate for many uses especially in the transition and southern zones of the United States. It requires significantly less water, fertilizer and chemical inputs compared to other turfgrass species. However, large patch, caused by Rhizoctonia solani AG 2-2LP, the most common and severe disease of zoysiagrass, and poor cold tolerance, are two important factors limiting the widespread cultivation of zoysiagrass. The objectives of this study are to (1) Determine the effects of aerification, verticutting, and sand topdressing

on large patch and investigate the biology of the interaction of cultural practices and disease; (2) Determine the effects of nitrogen source and time of application on disease development; (3) Study the environmental conditions associated with disease development in the field; (4) Compare large patch susceptibility of 15 new freeze-tolerant zoysiagrass genotypes; (5) Study the effects of different preventative fungicide application timings and correlate with weather conditions to develop better guidelines for fungicide deployment; (6) Characterize the large patch isolates from zoysiagrass in Kansas. Preliminary results from ongoing studies show that patch sizes were reduced somewhat in plots that were aerified, verticut and sand topdressed compared with non-cultivated plots. Significant differences in the control of large patch were observed from single and double applications of three different fungicides at weekly and bi-weekly intervals.

CLUMPED PLANTING GEOMETRY IN SORGHUM TO INCREASE YIELD IN WATER LIMITING CONDITIONS

Kalaiyarasi Pidaran[1], Robert Aiken[2], Mary Beth Kirkham[1], Kraig L Roozeboo[1],
Brian Olson[2], Alan Schlegel[3], John Holman[3]
[1]Department of Agronomy, College of Agriculture; [2]Northwest Research and Extension Center; [3]Southwest Research and Extension Center

Prior studies indicate clumped planting can increase grain sorghum yield up to 45% under water deficit conditions; possibly by reducing tiller number, increasing radiation use efficiency and preserving soil water for grain fill. The objective of this study was to evaluate effects of planting geometry on sorghum grain yield formation. The field study was conducted in split plot design at three locations with two sorghum lines, four populations and three planting geometries. Crop responses included leaf area index, light transmittance, radiation use efficiency, biomass harvest and components of grain. Grain fill rates were determined, at standard populations; to evaluate the translocation of assimilates. Data analysis is underway, and will be presented in the final poster.

DETERMINATION OF GENOTYPIC AND ENVIRONMENTAL EFFECTS ON WATER ABSORPTION STABILITY OF KANSAS WINTER WHEAT VARIETIES

Gabriela Rattin, Jon Faubion , Rebecca Miller
Department of Grain Science and Industry, College of Agriculture

Hard red winter wheat varieties are widely used for bread-making. Optimum water absorption determination using the mixograph® is a widely used empirical technique in flour quality analysis. Water absorption is critical in bread making process, it is estimated based on flour protein content and adjusted according to mixogram interpretation. It has been observed that water absorption stability varies among different wheats. Although studies have shown genotype and environment factors affecting mixograph® parameters such as optimum water absorption, mixing time and dough strength; factors affecting water absorption stability are unknown. The focus of the present work is to investigate and determine factors and components involved with water absorption stability. Five varieties of hard red winter wheat grown in six locations within kansas state in crop year 2009 were used, a total of 30 samples. Physicochemical quality tests were done on wheat and flour after milling. A series of mixographs® was run for each sample to determine optimum water absorption ranges from dry to wet extremes. Stable and non-stable samples were selected based on mixograms and statistic analysis. Solvent retention capacity profile will be performed on selected samples to observe what components are related to stable and not stable water absorption behavior. A wheat variety having a stable water absorption range would be of great interest for wheat breeding and preferable in bakeries as within these varieties a change in water addition would not affect the end product.

ETHANOL PRODUCTION FROM OZONATED HIGH-TANNIN GRAIN SORGHUM

Shuping Yan[1], Xiaorong Wu[2], John Faubion[1], Donghai Wang[2]
[1]Department of Grain Science and Industry, College of Agriculture; [2]Department of Biological and Agricultural Engineering, College of Engineering

High-tannin grain sorghum is reputed more drought-resistant, bird-resistant, and higher yield than low-tannin grain sorghum. However, tannin has been considered as an inhibitor for sorghum usage even for bio-ethanol production. Ozone is a strong oxidant and disinfectant with a capability to inactivate tannin and may increase ethanol yield. The objective of present research was to study the fermentation performance of ozonated high-tannin grain sorghum in ethanol production. High-tannin grain sorghum flour was treated with different dosage of ozone. The preliminary results show that the ethanol yields of ozonated high-tannin grain sorghums were much higher (2-5% higher) than that of untreated high-tannin sorghum. The fermentation efficiency of ozonated high-tannin grain sorghum was about 20% higher than that of untreated high-tannin sorghum at the half way of conventional fermentation time (72 hr). Rapid visco analyzer data show that ozonated high-tannin sorghum flour had higher peak and breakdown viscosities than that of the untreated high-tannin sorghum. This result indicated starch in ozonated flour had a higher swelling power and can be breakdown easily. The changes in pasting properties favored enzymes in fermentation process. Therefore, ozonation could be a novel method to improve ethanol yield and efficiency from high-tannin grain sorghum. Keywords: Sorghum, Tannin, Ethanol, Ozonation, Fermentation

OCCURRENCE AND TRANSFERABILITY OF TCRB, A COPPER RESISTANCE GENE, IN FECAL ENTEROCOCCI OF SWINE FED DIETS SUPPLEMENTED WITH COPPER

Raghavendra Amachawadi[1], N. W. Shelton[2], S. S. Dritz[1], M. D. Tokach[2], J. L. Nelssen[2], S. K. Narayanan[1], L. Zurek[1], and T. G. Nagaraja[1]
1Department of Diagnostic Medicine/Pathiobiology,
College of Veterinary Medicine; [2]Department of Animal Sciences and Industry, College of Agriculture

Copper, as copper sulfate, is used as a growth promoter in swine production system. The growth promotional effects are similar to that of antibiotics. Acquired resistance to copper, mediated by a plasmid-borne transferable copper resistance (tcrB) gene in Enterococcus faecium, has been reported in Denmark. The plasmid also carries genes for macrolide (ermB) and glycopeptide (vanA) antibiotics resistance. The occurrence of tcrB-positive enterococci has not been reported in the US. We conducted studies in piglets to determine the occurrence of tcrB gene in fecal enterococci, assess the association between copper supplementation and tcrB gene, and determine intra- and interspecies transferability of the gene in enterococci. Fecal enterococci were isolated from pigs fed normal (16.5 ppm) or elevated levels of copper (125 ppm) to determine the occurrence of tcrB gene. Identification and speciation of Enterococcus was by API-20 Strep, multiplex PCR, and superoxide dismutase gene sequence analysis. The prevalence of tcrB-positive enterococci were 2.2% (5/225) in the control and 28.1% (38/135) in piglets fed elevated copper. The tcrB-positive isolates were either E. faecium or E. faecalis. The mean MIC of copper for tcrB-negative and tcrB-positive enterococci were 6.2 and 22.2 mM, respectively.

A NOVEL ROLE OF GAP JUNCTION CONNEXIN46 PROTEIN TO PROTECT BREAST TUMORS FROM HYPOXIA

Debarshi Banerjee[1], Gunjan Gakhar[2], Dan Madgwick[1], Amy Hurt[1], Thu Annelise Nguyen[2], Dolores Takemoto[1]
[1]Department of Biochemistry, College of Arts and Sciences; [2]Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine

Hypoxia (lack of oxygen) is a critical component of solid tumor survival and progression. Hypoxia promotes tumorigenesis by inducing angiogenesis and inhibiting apoptotic genes. Normal tissues do not survive under hypoxia. However there is one tissue which is naturally hypoxic, vertebrate lens. The human lens survives under hypoxia through the use of several unique proteins, including a novel gap junction protein, connexin46 (Cx46). Here we show that breast cancer cells, MCF-7, and breast tumor tissues also express this protein. By comparing lens cells with breast tumor cells we show that Cx46 provides protection from hypoxia, not only in lens but also in breast cancer tumors. Our results demonstrate that Cx46 is upregulated in breast cancer tumors, and, that downregulation of Cx46 causes hypoxic-induced MCF-7 cell death. Finally we demonstrate, for the first time, that knock down of Cx46, with directed inhibitory RNA (siRNA), prevents tumor growth in nude mice, in vivo. This finding will provide an exciting new direction for drug development for breast cancer treatment and suggests that both normal hypoxic tissue (lens) and adaptive hypoxic tissue (breast tumor) utilize the same protein, Cx46, as a protective strategy from hypoxia.

PROGRESS TOWARDS THE DEVELOPMENT OF A BIOCHIP FOR EARLY DETECTION OF DEPURINATING ESTROGEN-DNA ADDUCTS

Mausam Kalita[1], Sreeram Cingarapu[1], Muhammad Saeed[2], Stefan Bossmann[1], Kenneth J. Klabunde[1], Ryszard Jankowiak[1]
[1]Department of Chemistry, College of Arts and Sciences; [2]University of Nebraska Medical Center

A variety of experimental evidence led to the hypothesis that catechol estrogen-3,4-quinones react with DNA to initiate breast and prostate cancer. It is our paradigm that depurinating estrogen-DNA adducts, formed by reaction of catechol estrogen-3,4-quinones with DNA and found in urine of women with breast cancer and women at high risk of breast cancer, could serve as potential biomarkers. It is feasible that by inhibiting the formation of estrogen-DNA adducts, one could prevent the initiation of breast cancer. Therefore new methodologies for the detection of these adducts need to be developed. Standard adducts and adducts featuring a linker for the purpose of labeling with highly fluorescent water soluble quantum dots (QDs) have been synthesized. QD labeling protocols have been developed for these adducts. We report on the progress towards development of monoclonal antibody based biosensors with indirect detection based on the developed reporter molecules, i.e., QD labeled estrogen-DNA adducts.

ANALYSIS OF THE STABILITY OF RUMEN PH MEASUREMENTS OBTAINED POST MORTEM

Tiffany Lee, Daniel Thomson, Benjamin Wileman
Department of Clinical Sciences, College of Veterinary Medicine

A total of 17 Holstein steers were enrolled in this study conducted at Kansas State University College of Veterinary Medicine. Cattle were blocked by previous treatment and randomly assigned to two groups, one group receiving a diet of whole shell corn on a limit-fed basis, and the other group receiving the same diet, ad libitum. Rumen fluid was collected, pH measurements were taken at 0, 1, 2, 3, 6, 12, and 24 hours postmortem, and ten rumen samples were randomly selected for volatile fatty acid (VFA) analysis. Results show that diet had a significant effect on the postmortem rumen pH ($P = 0028$), as well as time after death ($P = 0.002$). There was also a trend for the pH of rumen samples to rise for the first 6 hours postmortem and then to gradually fall over the next 18 hours. Feeding method and time did not have an effect on the total VFA concentrations of the rumen samples ($P > 0.05$). These results indicate that ruminal pH does not remain stable over a 24-hour period after death, but can in some situations be a helpful diagnostic tool when used in conjunction with a full necropsy.

TESTING FREQUENCY AND RESULTS OF CASES OF FEEDLOT CATTLE SUBMITTED TO KANSAS STATE UNIVERSITY VETERINARY DIAGNOSTIC LAB FOR BOVINE RESPIRATORY DISEASE COMPLEX

Amanda May, Daniel U. Thomson, Benjamin W. Wileman
Department of Diagnostic Medicine/Pathobiology,
College of Veterinary Medicine

BRD results from increased susceptibility of cattle to respiratory tract infection by one or more bacterial and viral pathogens including M. haemolytica, H. somni, P. multocida, Pseudomonas spp., A. pyogenes, Mycoplasma bovis, bovine coronavirus, BRSV, BVDV, IBR and PI-3. The purpose of this study was to determine the frequency in type of diagnostic tests requested by practitioners and test results for BRD submissions. Cases were identified via a KSVDL database guided keyword search for all cases with a diagnosis of pneumonia or bronchopneumonia. Relevant cases were those cases with a necropsy and/or histopathology diagnosis of bronchopneumonia, pneumonia or pleuropneumonia. This study analyzed 285 cases. Sixty seven of the cases submitted had no bacteriology performed. Of the cases in which bacteriology was requested, 44 cases did not isolate any bacterial species (20%). In the cases resulting in culture of bacteria, 88 contained M. haemolytica (40%), 67 contained H. somni (31%), 67 contained P. multocida (31%), 6 contained Pseudomonas spp. (2.7%), and 22 contained A. pyogenes (10%). M. bovis testing was not requested for 203 of the submitted BRD cases (71%). Sixty three of the cases submitted for M. bovis testing were positive (77%). One hundred nine cases were untested for viral species (38%). Four samples were positive for bovine coronavirus (2.3%), 13 were positive for BRSV (7.4%) and 31 were positive for BVDV (17.6%). No positive results of IBR and PI-3 were found.

A NOVEL COILED-COIL PROTEIN IS REQUIRED FOR PLK1 LOCALIZATION TO THE CENTRAL SPINDLE

Debjani Pal, Di Wu, Akiko Haruta, Qize Wei
Department of Biochemistry, College of Arts and Sciences

Polo-like kinase 1 (Plk1) localizes to the central spindle and plays a central role in regulating furrow formation and ingression. However, it is still not completely understood how Plk1 is concentrated to the central spindle. Here we report that a novel coiled-coil protein CCDC69 is required for the localization of Plk1 to the central spindle. Northern blot and immunoblot analysis show that CCDC69 is ubiquitously expressed in multiple human tissues and numerous human cancer cell lines. Immunofluorescence analysis shows that endogenous CCDC69 localizes to the nucleus during interphase and is concentrated to the central spindle during anaphase. GST pull-down assays show that CCDC69 can physically bind to Plk1. Consistently, immunofluorescence analysis shows that CCDC69 and Plk1 colocalize to the central spindle and midbody during cytokinesis. Depletion of CCDC69 disrupts the localization of Plk1 at the central spindle as well as interferes with the localization RhoA to the cleavage furrow. Our results suggest that CCDC69 may play a role in directing Plk1 to the central spindle.

AGENT-BASED SIMULATION EMBEDDED WITH SYSTEMIC MODEL-A PREDICTIVE TOOL FOR PROGRESSION OF H1N1S IN THE TISSUE LEVEL

Zhenzhen Shi, David Ben-Arieh, John Wu
Department of Industrial and Manufacturing Systems Engineering, College of Engineering

Introduction: Recently, the global outbreak of epidemical H1N1s raised an urgent concern about the effect of this infectious viral flu on society, economics and general public safety. With the increasing number of people suffering from H1N1s, it is of importance to explore the factors essential to the replication and transmission of H1N1s. The clinical philosophy of the influenza virus is being developed but it is difficult to apply in a practical way to help physicians to predict the evolution of H1N1s since most of analysis on influenza virus was based at the cellular level. Even though a series of mathematical model for influenza virus replication has been formulated, it is not so easy to provide visualized estimates for the trend of H1N1s progression. Methods: In this research, an agent-based simulation embedded with systemic model is proposed to predict the progression of H1N1s in the tissue level. Users could specify the initial conditions of patients and system parameters to detect the possible behaviors of H1N1s' progression. The strength of the agent-based simulation is to allow the users to visualize and verify the simulated process of H1N1s incubation in the cells and transmission between cells. Results: Our preliminary results have shown this infectious viral flu has highly correlation with the initial health condition of patients. Thus, it is expected to be capable of helping physicians to predict the patient's H1N1s progression pattern by using an initial profile tailored to patients and guide them to make decision about the treatment.

LARGE SCALE SYNTHESIS FOR COELENTERAZINE

Tej Shrestha, Stefan H Bossmann
Department of Chemistry, College of Arts and Sciences

Early detection of tumors and especially their metastases is crucial for cancer treatment. Traditionally, tumor detection is achieved by various methods, including magnetic resonance imaging and computerized tomography. The recent advances in life-science and bioengineering permit the transfection, cellular expression, and real-time imaging of light-emitting proteins, such as Renilla luciferase (Ruc), bacterial luciferase (Lux), firefly luciferase (Luc), green fluorescent protein (GFP), or Ruc-GFP fusion protein. All of these marker proteins, which generate their fluorescence (bioluminescence) by chemical processes, have been successfully employed for tumor detection. Since no excitation light is required, there is no background fluorescence and, consequently, a much improved signal to noise ratio. Coelenterazine is the substrate for renilla luciferase. Renilla luciferase requires only its substrate coelenterazine and oxygen, but no ATP. However, commercial coelenterazine is very expensive and rather

impure. Therefore, we have developed an inexpensive new method for the large scale synthesis of coelenterazine. We have used a modified Negishi coupling to make pyrazine intermediates from aminopyrazine as an inexpensive starting material. This method permits the use of up to 1g coelenterazine per kg body weight and day, which turns the renilla transfected stem cells into powerful light sources. Coelenterazine is not toxic to mammals at those concentrations.

ANATOMICAL AND PHYSIOLOGICAL TRAITS AS INDICATORS OF DROUGHT TOLERANCE IN TALLGRASS PRAIRIE PLANTS

Sally Tucker, Jesse B. Nippert, Joseph M. Craine
Department of Biology, College of Arts and Sciences

Konza Prairie contains over 550 vascular plant species, of which, few have been closely studied. Predicted impacts of climate change on the tallgrass prairie region increase the importance of understanding how native tallgrass prairie species are likely to respond to future changes in water availability and increased air temperatures. Understanding which traits are the best predictors of relative abundance along a continuum of water availability will aid in the prediction of plant community structure under altered temperature-precipitation regimes. In this research, both anatomical and physiological measurements were taken on nearly 120 species of herbaceous tallgrass prairie plants grown from seed in a growth chamber. Gas exchange measurements including photosynthetic rate and stomatal conductance were taken under optimal light, temperature, and humidity conditions. All plants were exposed to a dry-down period and were monitored until conductance fell to zero. At this point, water potential (Ψcrit) was measured and the plants were harvested to measure root length, diameter, and volume, leaf area, leaf tissue density, root tissue density, and root: shoot ratio. Traits were compared using pair-wise bivariate analyses and principal component analyses (PCA). Clear differences were detected in the PCA between grass and forb functional groups. The rotated factor pattern suggested a dichotomy between dry-adapted plants with thin, dense leaves and roots, highly negative Ψcrit, and large size and hydrophiles which have the opposite profile. Using long-term abundance datasets from Konza will help determine which of these traits confer success in the tallgrass prairie ecosystem.

IDENTIFICATION OF UNIQUE TUMORICIDAL GENES IN RAT UMBILICAL CORD STEM CELLS

Lakshmi Deepthi Uppalapati[1], Naomi Ohta[1], Yongqing Zhang[2], Marla Pyle[1], Deryl Troyer[1], Masaaki Tamura[1]
[1]Department of Anatomy and Physiology, College of Veterinary Medicine; [2]Gene Expression and Genomics Unit

Stem cell based therapy has a significant potential to treat various diseases, including cancer. Our previous study demonstrated that un-engineered rat umbilical cord matrix stem cells (UCMSC) significantly attenuate Fisher 344 rat-derived mammary adenocarcinoma (MATBIII) cell proliferation both in vivo and in vitro. To investigate the underlying mechanisms, we used cDNA microarray analysis to study the potential involvement of a specific gene(s) in the intrinsic ability of rat UCMSC to control growth of MATBIII cells. Rat UCMSC were co-cultured with MATBIII in transwell culture dishes for 48hrs; total RNA was extracted from the rat UCMSC. The microarray comparison of gene expression between untreated rat UCMSC and rat UCMSC co-cultured with MATBIII cells was carried out. A total of seven up-regulated and two down-regulated candidate genes were identified based upon the following screening criteria: 1) candidate gene expression should show at least a 1.5 fold change in rat UCMSC co-cultured with MATBIII cells; 2) candidate genes encode secretory proteins;and 3) candidate genes encode cell growth-related proteins. Following confirmation of gene expression by real time-PCR, Sulfatase1, Glucose phosphate isomerase and Adipocyte differentiation-related protein were selected for further analysis. To evaluate the tumor suppressor function of these three genes, we are currently investigating the effect of specific neutralizing antibodies and siRNA against these gene products on DNA synthesis in co-cultured MAT B III cells. These studies will identify potentially important gene products involved in rat UCMSC-dependent tumoricidal function.

PASSIVE IMMUNITY TO A COMMERCIAL E. COLI-SRP® VACCINE IN BEEF CATTLE COLOSTRUM FROM COWS GRAZING NATIVE RANGE

Ben Wileman[1], D.U. Thomson[2], KC Olson[3], L.A. Pacheco[3]
[1]Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine; [2]Department of Clinical Sciences, College of Veterinary Medicine; [3]Department of Animal Sciences and Industry, College of Agriculture

E. coli O157:H7 is a contaminant of beef and associated with food-borne illnesses in humans. Initial colonization of this organism can occur shortly after birth in cattle. The objective of this study was to determine if E. coli O157:H7SRP® specific antibodies from vaccinated cows can be passively transferred to beef calves in native range conditions. Cows (n = 20) were randomly assigned to treatments: SRP vaccine or placebo control. Vaccines were administered 60 & 30 days prior to projected calving date. Samples were collected at the time of calving from cows (fecal, blood and colostrum) and calves (pre-suckle blood sample). Blood samples were obtained from calves at 6, 12, & 24 hours and at 7, 14 & 21 days post-partum. Serum total protein (STP) and E. coli O157:H7 SRP® antibody levels were measured. Dam vaccine history had no effect on the calf STP level ($P > 0.05$). However, length of time post-partum had a significant effect on the calf STP levels ($P < 0.001$). A vaccine treatment by time post-partum interaction was observed for the calf serum E. coli O157:H7 SRP® antibody levels ($P < 0.01$). The results from this study show successful E. coli O157:H7 SRP® antibody passive transfer in beef calves under natural conditions & indicates that early immunization against E. coli O157:H7 could play a role in preventing animals from shedding the organism at harvest. Further research is needed to study possible cross protection of this vaccine in other cattle diseases.

CHARACTERISTICS OF WORK ZONE CRASHES FOR THE SMART WORK ZONE DEPLOYMENT INITIATIVE (SWZDI) REGION

Sreekanth Reddy Akepati
Department of Civil Engineering, College of Engineering

Work zone safety has become a major concern among many highway agencies. As construction of most of the major highway networks in the United States has already been completed, the majority of current highway work includes maintenance and rehabilitation of those highways, during which work zones are generated. In these work zone areas disruptions to regular traffic flow are inevitable. These may be due to interruption to regular traffic flows caused due to closed lanes, poor traffic management within work zones, general misunderstanding the problems associated within work zones, and improper usage of traffic control devices. This study investigated contributory causes and characteristics of work zone crashes of the states currently included in the Smart Work Zone Deployment Initiative (SWZDI) region. They are Iowa, Kansas, Missouri, Nebraska, and Wisconsin. The primary driver contributing factors of the work zone crashes were inattentive driving, following too close for the conditions, failed to yield right of way, driving too fast for the conditions, and exceeding the posted speed limit within work zones. Characteristics related to work zone crashes for the combined states were identified. The characteristics related to work zone crashes for the combined states such as environmental conditions, vehicles, crashes, driver, and roadway were analyzed. In order to find the relation between crash severity and other variables a test of independency was performed between them using chi-square test methodology. At the end of the analysis, risk factors with respect to work zones were presented.

COMPARISON OF CHARACTERISTICS AND CONTRIBUTORY FACTORS FOR FATAL TRUCK AND NON-TRUCK CRASHES USING BAYESIAN STATISTICAL ANALYSIS

Nishitha Bezwada, Sunanda Dissanayake
Department of Civil Engineering, College of Engineering

One-ninth of all traffic fatalities in the United States have involved large trucks in the past five years, although large trucks contributed to only 3% of registered vehicles and 7% of vehicle miles travelled. This contrasting proportion indicates that truck crashes in general tend to be more severe than other crashes, though they constitute a smaller sector of vehicles on the road. To study this issue, fatal crash data procured from the Fatality Analysis Reporting System (FARS) was used to analyze characteristics and factors contributing to truck-involved crashes. Driver, vehicle, and crash-related contributory factors were identified, and as an extension, the likelihood of occurrence of these factors in truck-involved crashes with respect to non-truck crashes was evaluated using the Bayesian Statistical approach. Likelihood ratios for factors like stopped or unattended vehicles, or improper following have greater probability of occurrence in truck crashes than in non-truck crashes. Other factors such as cellular usage, failure to yield right of way, inattentiveness and failure to obey traffic rules also have a greater probability in truck crashes. Inadequate warning signs and poor shoulder conditions were also found to have greater predominance in contributing to truck crashes than non-truck crashes.

DEPOSITIONAL ANALYSIS OF THE TONKAWA SANDSTONE, OKLAHOMA

Amanda Cashman
Department of Geology, College of Arts and Sciences

Hydrocarbon production throughout the continental United States has declined in past decades. New interpretations along with advanced recovery techniques can increase production in older fields. Re-examining these underdeveloped resources is a simple and cost effective tool that can be readily used to increase hydrocarbon production throughout the mid-continent. Pennsylvanian sandstones throughout Oklahoma and Kansas are known for their excellent reservoir qualities. The focus of this study is the upper Pennsylvanian Tonkawa Formation, a sandstone dominated unit. The Tonkawa has been loosely correlated to both the Stalnaker and Tonganoxie sandstones in Kansas. Previous publications do not present a unified understanding of the depositional environments that are seen across state borders. The interpretations vary from fluvio-deltaic to marine environments. A cohesive interpretation is necessary to understand paleo-processes and efficiently explore for hydrocarbons. The study presents a regional analysis covering an eleven county area in northwest Oklahoma. Analysis of core and well log data is used to determine the depositional environment of the Tonkawa sandstone. Sedimentary structures, mineral assemblages, and lithologies of selected cores are described and correlated with well log data. With this data, structural isopach maps are constructed using Petra software. Earlier interpretations have relied primarily on well log data, focusing on core data rather than geophysical logs, allows for a more detailed and accurate interpretation. Analysis of transitional sedimentary sequences, such as the Tonkawa, can be applied to sandstones deposited in similar environments throughout the mid-continent.

ESTIMATING EPHEMERAL GULLY EROSION USING GIS AND FIELD MEASUREMENTS

Prasad Daggupati, Kyle R. Douglas-Mankin, Aleksey Sheshukov, Philip L. Barnes
Department of Biological and Agricultural Engineering, College of Engineering

Ephemeral gully erosion has been recognized as a major source of sediment in agricultural watersheds across the state of Kansas. Over the past few decades, soil erosion caused by sheet and rill erosion has been studied extensively, and the Universal Soil Loss Equation (USLE) and related field and watershed-scale models have been used to quantify contributions of sheet and rill erosion. There has been limited research to identify and estimate ephemeral gully erosion at a larger spatial scale. The objective of this study was to identify the potential locations of ephemeral gullies, monitor and measure the ephemeral gullies, assess and quantify the soil losses from the ephemeral gullies. The study areas were several fields with ephemeral gullies in a research farm watershed ("North Farm"), Cheney Lake watershed and Black Kettle Creek watershed in the State of Kansas. An ArcGIS based model was developed utilizing Compound Topographic Index (CTI) technique to identify potential locations of ephemeral gullies and was tested in the study areas. Weather in each study area was monitored and field data collections were conducted after locating ephemeral

gullies. Field measurements of length, top width, bottom width, depth and other characteristics were measured at every 5 m for each gully in the study areas. The results showed that the DEM data with spatial resolutions of at least 5 m were needed to resolve ephemeral gully locations. Results of ephemeral gully measurements, soil losses due to ephemeral gully erosion will be presented in the poster.

DEVELOPMENT OF A QUANTIFICATION METHOD TO SPECIFIC ANTI-NS3 ANTIBODIES AGAINST BOVINE VIRAL DIARRHEA VIRUS USING A BLOCKING ELISA

Stephane Guillossou[1], Daniel Thomson[2], Cindy Thomson[3]
[1]Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine; [2]Department of Clinical Sciences, College of Veterinary Medicine; [3]Synbiotics

A cost-effective approach to control bovine viral diarrhea virus (BVDV) is to differentiate between vaccinated and infected animals (DIVA). Vaccination interferes when measuring total or neutralizing antibodies. The objective of the study was to develop a quantitative method utilizing a commercial qualitative blocking ELISA (Synbiotics®) to measure specific antibodies against the BVDV NS3 protein. Results of the test were expressed as a ratio of the sample optical density corrected by negative and positive controls. A dilution range was established by serial dilution of a reference positive sample. Eight different linear models after variable transformations for the ELISA results and the reference serum titer were compared. The best fit linear model was obtained between the Log transformation of the titer and the logit of the ELISA result. This model had a coefficient of determination (R^2) of 0.983, a slope of -0.737 and an intersection of 1.661. For a full quantitative method for high serum titer, interpolation using different wells was proposed. Three wells, at dilutions of 1:100, 1:1,000 and 1:10,000 were used. The titer obtained with the best linear model was multiplied by a correcting factor (0.1, 1 and 10 respectively). Titers obtained were expressed in ELISA units (EU). Unlike existing quantification tests, this method quantifies specific anti-NS3 antibodies. Utilizing a standardized method with three wells in a commercial blocking ELISA presents a novel approach to establishing a reliable DIVA strategy for practical BVD detection in cattle.

DATA ENVELOPMENT ANALYSIS OF KAMU HOSPITALS

Deep Kumar Gullipalli, David Ben-Arieh, John Wu
Department of Industrial and Manufacturing Systems Engineering, College of Engineering

This project explores the application of Data Envelopment Analysis (DEA) to the assessment of efficiency of 41 member clinics of Kansas Association for the Medically Underserved (KAMU). DEA is widely recognized as the tool of choice for assessing the relative efficiency of multiple production units using a set of inputs and output variables. This research provides guidelines to the identification of the input and output variables, replacing the missing data, and examines various models of DEA for quality and consistency of the results. This work presents a new methodology called “Average Ratio Method” for the replacement of missing data, which is considered to be a limitation of the original model. The analysis is based on four input variables: Medical Staff Expenses, Facility Expenses, Administration Full Time Employee, Nurses Full Time Employee; and five output variables: Uninsured Visits, Total Medical Visits, Medicaid Charges, Self Pay Collected, and State PC Collected. The outcome of this research identifies a group of super-efficient clinics who are very productive in using their resources, i.e., these clinics could produce better outcomes using the same amount of inputs when compared to others clinics. The study also provides recommendations to the inefficient clinics by providing specific metrics for improvement. Thus, each clinic is provided with a calculated projected output that it needs to reach, or a prescribed decrease in input required in order to become super-efficient. The study does not intend to explain the differences between the clinics which can very well be justifiable.

NUMERICAL SIMULATION OF AIR FLOW AND PARTICLE COLLECTION BY POROUS BARRIERS AROUND AREA SOURCES

Li Guo[1], Ronaldo Maghirang[1], Xiaofan Yang[2]
[1]Department of Biological and Agricultural Engineering, College of Engineering; [2]Department of Mechanical and Nuclear Engineering, College of Engineering

Trees and other porous fences have been widely cited for reducing the emission of particulate and gaseous pollutants. They can potentially be used for reducing particulate concentrations downwind of open cattle feedlots; however, limited data are available on their effectiveness in collecting particulate matter. This study was conducted to model air flow and particle collection through porous fence and trees using computational fluid dynamics (CFD). The applicability of CFD in modeling airflow around and through porous barriers was first evaluated by simulating air flow around a porous fence (1.2mÃ—0.08mÃ—0.01m) in a 2D domain, using both the standard and realizable turbulence model. Predicted results on air velocity agreed well with published data. Current work involves application of the CFD model to simulate airflow and particle collection by trees downwind of a cattle feedlot, taking into account the external characteristics and internal structures of the trees. Predicted results will be compared with published experimental data. Keywords. Computational fluid dynamics, Particulate matter, Collection efficiency, Cattle feedyard.

CENTERLINE RUMBLE STRIPS: A STUDY OF EXTERIOR NOISE

Daniel Karkle[1], Rohit Makarla[1], Margaret Rys[1], Eugene Russell[2]
[1]Department of Industrial and Manufacturing Systems Engineering, College of Engineering; [2]Department of Civil Engineering, College of Engineering

Centerline rumble strips (CLRS) are indented or raised patterns installed at the center of undivided rural two-lane highways to alert drivers who are encroaching or leaving the intended travel lane, by producing vibration and noise when crossed by the vehicles' tires. It is estimated that CLRS can reduce head-on collisions in about 25%. However, there are some disadvantages in their utilization, such as the exterior noise created by the strips. The objectives of this study were: a) to verify the effects of speed, vehicle type, pavement type and distance on the exterior noise, and b) to determine the minimum distance from buildings at which CLRS could be installed without causing disturbance. Two types of vehicles were driven over two different patterns of CLRS (rectangular and football-shaped) and over smooth asphalt pavement, at two different speeds. The noise level was collected at three distances (50, 100, and 150 feet), in 10 different open space locations. Results indicated that vehicle, speed, pavement, and distance affect noise levels. In addition, both football and rectangular CLRS produced significantly higher levels of noise as compared to the smooth asphalt pavement. There was no significant difference between levels of noise generated by rectangular and football shaped CLRS. The predicted distance for comfortable levels of noise was 200 feet. In summary, CLRS do increase noise levels, and the agencies of transportation should prevent this negative effect by installing this treatment only in locations as near as 200 ft from residences.

MODEL TO INTEGRATE OVERLAND, STREAM BANK AND EPHEMERAL GULLY EROSION MODELS

Naga Raghuveer Modala[1], Kyle R. Douglas-Mankin[1], Philip L.Barnes[1], Tim Keane[2]
[1]Department of Biological and Agricultural Engineering; [2]Department of Landscape Architecture/Regional and Community Planning, College of Architecture

Sediment is considered as one of the important pollutant of concerns in the U.S. In order to develop watershed management plans that address sediment pollution, it is essential to identify all sources of sediment in a watershed. The overall goal of this research is to quantify the total sediment from a watershed by integrating the outputs of three types of watershed models: an overland, an ephemeral gully, and a stream bank erosion models, together with field data on stream-bed aggradation/degradation, that each operate at different spatial and temporal scales. This method will be demonstrated in Black Vermillion River watershed using AnnAGNPS (overland flow model), REGEM (ephemeral gully model) and a field-based model of stream bank erosion. The study area includes three sub watersheds: Irish Creek, the Main Stem, and North Fork of the Black Vermillion, each monitored for continuous stream flow, base flow and event-based suspended sediment sub watershed export, annual stream bank erosion, and annual stream bed transport for 2 years. NASS land use, SSURGO soils data,30-m DEMs, and local weather data were used to generate input data needed by the models. Stream monitoring data were used to calibrate the models. This poster will present results from independently calibrated and validated combinations of AnnAGNPS, REGEM, stream-bank, and stream-bed transport models. Our hypothesis is that use of separate models to simulate sediment load contributions for each sediment source will improve model agreement with measured watershed sediment yield data.

ANN-BASED PROGRAM FOR 85TH & 50TH (MEDIAN) SPEED MODELS

Srikanth Renikunta
Department of Civil Engineering, College of Engineering

In Kansas, the total length of the gravel roads is about 78,000 miles. Most of the gravel roads, in Kansas, regulated with the posted speed limit of 55 mph which is generally posted for paved roadways. Speed regulations for paved roadways may not be suitable for gravel and sandy surface roadways. Regression- and Artificial Neural Network (ANN)-based models to predict 85th-percentile and 50th (median) speeds on gravel and sandy roads were developed based on 41 field speed data sets. Those models indicated that the traffic speed strongly rely on road width, percentage of heavy vehicles, surface classification (G1, G2 or S) and posted speed limit. By utilizing the ANN approach, the prediction accuracy via ANN models was much improved over those obtained using Regression-based method.

MINIMUM DISTANCE CONDITIONAL VARIANCE FUNCTION CHECKING IN HETEROSCEDASTIC REGRESSION MODELS

Nishantha Anura Samarakoon
Department of Statistics, College of Arts and Sciences

Given the rapid development of model building in recent years, the regression model has received considerable attention and played a significant role in statistics. In regression analysis, the usual assumption is that variances of the dependent variable are constant across the data. A more realistic assumption is that of heteroscedasticity, that is, the variance of the dependent variable varies across the data. The practical importance of detecting heteroscedasticity in regression analysis is widely recognized in many applications because efficient inference for the regression function requires that unequal variances should be taken into account. In a heteroscedastic regression model, the variance is often taken as a parametric function of the covariate or the regression mean. In this study, we propose a class of minimum distance tests for fitting a parametric variance function in heteroscedastic regression models. These tests are based on certain minimized L2-distance between a nonparametric variance function estimator and the parametric variance function estimator.

Numerical simulation studies are conducted to evaluate the finite sample performance of the test. Regression analysis is widely used in the field of biology, epidemiology, engineering, physical sciences, medicine, finance, and more. The methods proposed in this paper will generate more accurate regression equations in terms of parameter estimates, confidence intervals, prediction intervals and test statistics and result in more stable models leading to have better statistical predictions concerning uncertainties in observational data.

USING WATERSHED MANAGER TO COST-EFFECTIVELY TARGET CROPLAND BEST MANAGEMENT PRACTICES

Craig Smith, Jeff Williams, Josh Roe, John Leatherman
Department of Agricultural Economics, College of Agriculture

With sedimentation threatening the current and future utility of many of our state's reservoirs, it is particularly critical, especially in tight budgetary times, that conservation investments be targeted to projects that yield the most environmental improvements per dollar spent. This can be a challenging task considering the multitude of political, economic, and environmental variables involved in the local decision-making process. To aid in the development of cost-effective watershed scale management plans, agricultural economists at Kansas State University developed a user-friendly tool, Watershed Manager. Watershed Manager is a spreadsheet program that can support local technical-assistance outreach to enhance the development of cost-effective watershed-scale management plans. Using this program, watershed stakeholder groups and technical assistance providers can estimate, optimize, and compare the economic and environmental effects of alternative watershed management plans. Watershed Manager is a flexible program that accommodates watershed-specific data. This poster will offer a description of how Watershed Manager was used to analyze the cost-effectiveness of various watershed management plans in a Kansas watershed. Utilizing Watershed Manager, each plan was evaluated in terms of the amount of sediment, phosphorus, and nitrogen load reduction from cropland fields in the watershed. The results were presented to the local stakeholders for their input. This iterative process occurred over several months and concluded with the approval of a preferred BMP implementation plan.

THE SIGNIFICANCE OF OUTDOOR ENVIRONMENTS FOR DUAL SENSORY IMPAIRED PERSONS

Kala Ade
Department of Architecture, College of Architecture

Experiencing nature, whether it is through gardening or a nature walk, elicits a calming or centering experience (Marcus & Barnes, 1999; Ulrich, 1986). Such therapeutically beneficial human responses to nature are observed in the very young to the very old and by those with sensory impairments (Rodiek & Schwarz, 2003). Ulrich showed that nature could have beneficial effects on the physical, emotional and spiritual well-being of people and the importance of views of nature in the healing process (Ulrich, 1984, 1986, 1992). Hobday suggested that natural light can have positive effects in creating a healthy living environment (2006). Horticultural therapy in a garden setting has been shown to be therapeutically beneficial for persons with visual impairment (Perkins School for the Blind, 1998). This project argues that well-designed outdoor environments can have significant therapeutic effects on dual sensory impaired persons. Successful outcomes of outdoor environments that foster the development of skills such as sensory training and stress management (Mattson, 1992; Marcus & Barnes) are presented. Based on existing research on 'nature-as healer' (Ulrich, 1984, 1986; Kaplan et al., 1998) design issues of site planning, accessibility, orientation and way finding are discussed (Perkins School for the Blind, 1998; Imrie, 2006) and leads to the development of recommendations for the design of supportive outdoor environments, which are intended to positively impact the well being of this population group by providing access to the numerous health benefits that have been found to be associated with nature interaction while also contributing to the design profession.

FOOD SAFETY PRACTICES IN CONTINUING CARE RETIREMENT COMMUNITY FOODSERVICE OPERATIONS IN KANSAS

Ju Won Choi, Kevin R. Roberts, Kevin Sauer
Department of Hospitality Management and Dietetics, College of Human Ecology

Foodborne illnesses (FBIs) contribute to millions of illnesses and thousands of deaths annually (Centers for Disease Control and Prevention, 2005; Mead et al., 1999). The elderly are especially susceptible to FBIs, the fatality rate in Continuing Care Retirement Communities (CCRCs) for certain FBIs is 10 to 100 times higher than the general population (Buzby, 2002) and thousands of Kansans live in CCRCs (Feinberg, Newman, Gray, & Kolb, 2004). This study sought to investigate employees' food safety practices in CCRCs. Observations conducted in a CCRC facility in Kansas explored three key food safety behaviors: handwashing (ten items), use of thermometers (six items), and food handling/cleaning and sanitizing work surfaces (nine items). On average five employees were observed in 12 observations for a total of 65 employee observations. Employee behavior was coded as correct/incorrect. Overall behaviors related to food handling/cleaning and sanitizing were correctly performed more often than other behaviors. Handwashing compliance remained low. Washing hands after they become contaminated, handling chemicals, and before putting on gloves were only performed correctly 8%, 13%, and 13% of the time, respectively. Related to handwashing procedure, only 1% cleaned under their fingernails. End-point cooking temperatures and sanitation of food preparation areas after they become contaminated only occurred 29% and 30% of the time, respectively. Food safety issues with the elderly population cannot be underestimated. This study provides data for academicians, health inspectors, and government agencies working with Kansas CCRC operations that are useful to guide programming and policy development.

HIV IN THE HEARTLAND: NEGOTIATING DISCLOSURE, STIGMA, & THE HIV COMMUNITY

Sarah Donley
Department of Sociology, Anthropology, and Social Work, College of Arts and Sciences

Over the past 28 years the AIDS epidemic continues to affect the American population and HIV/AIDS remains a relevant social problem. Living with HIV affects every aspect of an individual's life. It involves a personal negotiation at the onset of diagnosis, a social negotiation when one decides to disclose to others in the face of stigmatization, and finally, a communal negotiation when individuals seek formal support via ASO's (AIDS service organizations), and/or informal support through family members and friends. The purpose of this research is to investigate these negotiations over the course of HIV infection and how these processes inform decisions to disclose, how stigma influences lived experiences, and the ability of individuals to be involved/use the HIV community. The data come from 18 HIV+ individuals, ten men and eight women, living in various locations throughout the Midwest (Kansas, Missouri, Nebraska). Using the experiences of these men and women, my research gives insight into the reaction after diagnosis, disclosure patterns, experiences of stigma, and how these experiences hinder/promote involvement in the HIV community in the lives of these positive people.

KONZA PRAIRE PRESERVE: RECONCILING SCIENCE AND THE AESTHETIC EXPERIENCE

Tyra Olstad
Department of Geography, College of Arts and Sciences

The Nature Conservancy and Kansas State University jointly manage Konza Prairie Biological Station – a Long-Term Ecological Research Station nestled in the Flint Hills of Kansas – with an eye toward science, education, and conservation. Although most of the site is reserved as an outdoor laboratory for scientific research, three public trails allow visitors to see and experience one of the few remaining pockets of the once-vast tallgrass prairie. Interpretive materials promise wide open vistas and rich natural landscapes, but people who visit Konza do not experience a purely wild place – the signs, fences, boxes, and wires necessary for experimentation may subtly undermine the prairie aesthetic. In an effort to cultivate more holistic appreciation of tallgrass ecosystems, I use conscious, systematic reflection on personal observations as well as critical analysis of publicly-available materials to study humanistic perceptions of Konza and attempt to reconcile myriad understandings of place and space.

THE EVOLVING PERFORMANCE OF THE FEMALE BODY IN MARGARET ATWOOD'S THE YEAR OF THE FLOOD

Christy Pottroff
Department of English, College of Arts and Sciences

Many critics have addressed Margaret Atwood's construction of the unstable female body and recognized its threat to the binaries of patriarchal societies in her novels. While the majority of this criticism has focused on Atwood's earlier novels, these themes of construction and subversion are very present in her future landscapes of speculative fiction. In my reading of Atwood's most recent novel, The Year of the Flood, I will use Judith Butler's theories of gender to analyze the construction and performance of Ren and Toby's bodies as surfaces that are inscribed with the values of the societies within the future capitalist world. Ren and Toby's bodies are situated and evolve in relation to heterosexual gender norms of the patriarchal society in which they currently reside. The future world presented by Atwood contains sub-cultures with strikingly different values in which the female characters must navigate. In order to survive, Toby and Ren must adapt their bodies to perform the acceptable female gender roles within each culture. This explicit and evolving performance of the female body across cultural boundaries subverts the rigid gender binary still dominating this future landscape. Within each sub-culture, the gendered constructions are reinforced and regulated through male surveillance and patriarchal language. Though these constructions are rigidly naturalized in The Year of the Flood, the female characters are able to subvert their gender identities through performance and reiteration to escape from and exceed the limitations of these socially imposed gender norms.

DEVELOPMENT OF MODULES FOR A FOOD DEFENSE WORKSHOP FOR GRADUATE STUDENTS AND WORKING PROFESSIONALS

Keith Pritts[1], Kelly J.K. Getty[1], Abbey L. Nutsch[2], Sheryl Hodge[3]
[1]Department of Food Science Institute, College of Agriculture; [2]Department of Animal Sciences and Industry, College of Agriculture; [3]Office of Educational Innovation and Evaluation

Kansas State University has collaborated with Purdue University and Indiana University to develop a food safety and defense curriculum for graduate students and working professionals. Thirteen stakeholders with expertise in food safety and defense, and public health participated in a DACUM (Developing A CurriculUM) process that identified 210 knowledge domains for food defense professionals. A survey validated the DACUM results and 297 professionals responded. The DACUM process and survey information were used to develop curriculum content presented to food defense stakeholders during a 2-day workshop. Survey participants ranked Food and Agriculture Systems, Food Safety and Defense, and Threats to Food and Agriculture as topics important in a food defense curriculum. Of the 14 workshop modules presented, K-State developed modules on Threats to Food and Agriculture Systems and Vulnerability Assessments Methods. Key knowledge domains from DACUM were identified and developed into learning objectives for each module. The 2-day workshop was attended by graduate students and working professionals (41 total). Participants evaluated module content and value of the presentation. Module learning objectives were judged (1=not at all, 2=somewhat, 3=thoroughly) and presentation value (1=strongly disagree and 5= strongly agree). Threats to Food and Agriculture Systems modules averaged 2.75 for meeting learning objectives, and 4.3 for presentation value, whereas the Vulnerability Assessment Methods module averaged 2.65 and 3.89, respectively. Modules from the workshop are being developed into a distance education course for graduate students and working professionals.

INVENTORY AND ANALYSIS OF THE BLACK VERMILLION RIVER SYSTEM RIPARIAN CORRIDORS AND THE DEVELOPMENT OF EROSIONAL RATING CURVES FOR NORTHEAST KANSAS AND ASSOCIATED HYDROPHYSIOGRAPHIC REGIONS

Christopher Sass
Department of Landscape Architecture/Regional and Community Planning, College of Architecture

This study inventoried and analyzed riparian corridor vegetation changes throughout the Black Vermillion watershed (NE Kansas) from 1857 through 2007. Research questions included: 1) What changes in riparian corridor width have taken place since 1857 (Territory Surveys) and why? 2) How has land cover adjacent to riparian corridors changed since 1857? Territory of Kansas survey maps and notes completed in 1857 were used as baseline reference conditions concerning corridor width and woody species present in riparian corridors. Inventory and analysis of the riparian vegetation change over time and adjacent land cover aid in understanding present ecology of these riparian corridors and are important to stream and riparian ecosystem rehabilitation. Woody riparian corridors increased in width throughout the watershed from 1857 until about 1956 (probably due to a decrease in prescribed burning and lack of grazing), which is the pre-channelization period for this watershed. After channelization, average riparian corridor widths dropped significantly as the river was shortened a total of 15.8 miles. Most often, land cover changed from native, tallgrass prairie to cultivated cropland or pasture. Woody species composition has changed over time from established mature woodland to a pioneer. Vegetation along banks increases shear strength of bank material. Understanding vegetation in this system allowed a baseline condition for streambank erosion rates common throughout Northeast Kansas in agricultural watersheds. Rosgen protocol was used to monitor streambank erosion rates in the watershed. Early data are showing large amounts of erosion are being contributed by banks.

MEASURING COLLEGE AND UNIVERSITY DINING SERVICES DIRECTORS' KNOWLEDGE, ATTITUDES, CHALLENGES, AND IMPLEMENTATION OF SUSTAINABLE DEVELOPMENT

Ying Zhou, Betsy Barrett
Department of Hospitality Management and Dietetics, College of Human Ecology

Kelly (2009), a NACUFS guest director, stated that the first step in starting a green dining services program is to understand what sustainability is and is not. Many dining services directors may have heard about sustainability, yet can they apply their knowledge to developing practical outcomes and solutions? To date, this knowledge has not been measured for managers of college and university services and research is needed to determine their current knowledge, attitudes, challenges and implementation about sustainability. The primary purposes of this study are to determine what college and university foodservice directors know about sustainability, what are their attitudes about sustainability, what sustainable programs have been implemented in their operations and what are the challenges to implementing a sustainable program in their facilities. A secondary purpose would be to determine differences in sustainability by age of foodservice director, number of meals served and area of the country. The population for this study will be members of National Association of College & University Food Services (NACUFS) directors who have e-mail addresses. An instrument will be developed based on previous research and focus group input. An online survey using the Axio system will be e-mailed to the directors. The online letter will introduce the instrument, the research goals, and provide a timeframe for completion. A response rate of 20% is desired to conduct statistical analysis. The data will be analyzed using SPSS version 16.0 (correlation analysis and regression analysis).

REINFORCED CONCRETE CONFINED CIRCULAR COLUMN: NEW ECCENTRICITY BASED MODEL

Ahmed Abd El Fattah
Department of Civil Engineering, College of Engineering

The development of column interaction diagrams for unconfined concrete is a standard analysis procedure. However, the need to develop analysis tools for the actual ultimate capacity of columns is evident. Modern codes and standards are introducing the need to perform extreme event analysis. In previous studies, various models were implemented to assess the ultimate confined capacity of columns under concentric axial loads. On the other hand the effect of confinement in case of the eccentric axial load and the corresponding bending moment are not investigated in such models. So it is demanded to relate the strength and ductility to the degree of confinement utilization in a new model. The more the eccentricity the less the confinement engaged tell the effect of the confinement vanishes at pure bending. Radial loading with constant eccentricity is approached in the nonlinear moment of area concept that considers the finite layer procedure and the secant stiffness approach, to achieve equilibrium points of P-strain and M-curvature up to failure. Three different comparisons are approached to ensure the accuracy of the analysis. The first step is to compare the unconfined analysis results with the well-known software (CSI-Section builder). Secondly, the ultimate capacity of the confined section is compared with experimental data. And finally, the new eccentricity model is compared with the widely used Mander model, which is applicable to concentric column, to examine the accuracy versus safety.

LONG-TERM SALT SCALING DURABILITY OF CONCRETE CONTAINING FLY ASH

Brandon Bortz
Department of Civil Engineering, College of Engineering

Fly ash is a by-product of coal-fired power plants. This material can be used as a partial cement substitute in Portland cement concrete. The use of fly ash is environmentally beneficial by making use of an industrial by-product that would otherwise be landfilled and improving the concrete durability. However, research on fly ash concrete has shown that in some cases concrete with a high volume of fly ash can have deicer salt scaling. Salt scaling is the flaking of concrete surface resulting in lower skid resistance and service life. In this study, concrete mixes with six types of fly ashes were tested in the laboratory using the ASTM 672 Standard. Curing compound, a waxy coating sprayed on the fresh concrete surface to reduce

evaporation, was used to compare the effects of curing on salt scaling of concrete containing high volumes of fly ash. The different variables that were measured were type of fly ash, curing conditions, and cementitious content included in the mix. The preliminary results show that curing compounds will improve the salt scaling resistance of concrete containing a fly ash that only marginally exhibits. However, the salt scaling performance of concrete that contains fly ash from a source that performs poorly in ASTM C 672 is not markedly improved by the use of a curing compound. Experiments are ongoing to help better understand the mechanism of fly ash concrete resistance to salt scaling.

PYRAZOLE: A CRYSTAL ENGINEERING APPROACH FOR BETTER PESTICIDES, HERBICIDES, AND FUNGICIDES

Evan Hurley, Christer Aakeroy, John Desper
Department of Chemistry, College of Arts and Sciences

In the United States, Kansas is a leader in the agricultural as well as the livestock industries. In order for the state to have continued success, proper care and protection of crops is essential. To protect these crops, various types of agricultural chemicals are used. Among the recent candidates, pyrazole-based agricultural chemicals, such as pyrazolynate and RPA 406194, have shown promising activity and selectivity toward weeds and insects, respectively. Understanding the chemistry of pyrazole-based agricultural chemicals may lead to better overall crop yields and control of unwanted weeds and insects. To potentially control the properties of various pyrazole-based agricultural chemicals, we have chosen pyrazole as our molecule of study. Pyrazole is part of the backbone of pyrazole-based agricultural chemicals, and getting a handle on this molecule and understanding its chemistry may give better insight on how to control the properties of the pyrazole-based agricultural chemicals. To accomplish this, co-crystals of pyrazole (and substituted pyrazole) and aromatic carboxylic acids are synthesized. The resulting crystal structures are examined to help determine any trends and or reliable interactions between donor (carboxylic acid) and acceptor (pyrazole) molecules. We believe that this approach will give a better overall handle on the pyrazole-based agricultural chemicals and thereby the ability to control the macroscopic properties for weed and insect control, as well as better crop yield.

EFFECT OF SINUSOIDAL SPECTRAL PHASE ON STEPWISE EXCITATION OF ATOMS

Hyounguk Jang, Bachana Lomsadze
Department of Physics, College of Arts and Sciences

The broad bandwidth of ultrafast lasers would seem to imply that they are not practical devices for precision spectroscopy. However, we show here that the application of a sinusoidal spectral phase to the transform-limited output optical pulses from an ultrafast laser allows us to do precision spectroscopy. As a test case we examine the step-wise excitation of atomic rubidium. For this system we measured the structure of the rubidium system to better than 1% of the laser's bandwidth and a contrast ratio in excess of 35.

NOVEL PHOTOCATALYTIC WATER SPLITTING WITH THE N-DOPED IN2O3/ TIO2 D10-D0 CONFIGURATION COMPOSITE OXIDE SEMICONDUCTORS

Yenting Kuo
Department of Chemistry, College of Arts and Sciences

Hydrogen may be an important fuel of the future if H2 could be derived from water by photochemical means. We have approached this challenge/goal by synthesizing a nanostructured p-n junction photocatalyst by combining an n-type Indium oxide semiconductor with a p-type Titanium oxide semiconductor. This unique p-n junction can increase the separation time of photoelectrons and photoholes, which is important because 90% of photoelectrons and photoholes normally recombine within 10 ns. There are several studies that also show that 60-80% of photoelectron and photohole recombinations occur on a nanosecond time scale in a TiO2 colloid. An ammonolysis procedure helped us to partially convert In2O3 and TiO2 into nitrides yielding an array of p-n junction nanoparticles. These materials were characterized using scanning electron microscopy, X-ray (XRD), UV-vis diffuse reflectance spectrometry, and B.E.T. surface area and pore size distribution analysis. Photocatalyst activity was evaluated by an inner irradiation-type reaction vessel connected to a closed, glass gas circulation system. Good photochemical activities with pure water and slight acidic water were realized, and will be discussed.

SOLARCHEMICAL PRODUCTION OF AMMONIA USED FOR FERTILIZATION

Ronald Michalsky, Peter H. Pfromm
Department of Chemical Engineering, College of Engineering

Ammonia ranks among the five most manufactured products of the chemical industry. In the U.S., 80% of ammonia produced is consumed as fertilizer. The Haber Bosch process producing ammonia industrially consumes up to 5% of all natural gas produced and 2% of the global energy production. Currently, 525 to 750 kg of natural gas consumed to produce 1000 kg of ammonia causes significant fossil based CO2 emissions. The investigation of a solarchemical and essentially fossil fuel free process to produce ammonia is presented here. Addressing the costly construction of furnaces operating at above 1500°C, a reaction network proceeding at ambient pressure and at 500 to 1500°C was developed. To estimate optimum operating conditions, a solar furnace was constructed to concentrate solar radiation into a tubular reactor. Using water as hydrogen source, ammonia and chromium oxide were formed by corrosion of chromium nitride. Utilizing a simple balance and atomic surface composition spectroscopy techniques, 35% conversion of chromium, heated in a nitrogen flow, to chromium nitride was obtained after less than 6min. Closing the reaction

cycle proposed, use of reducing gas mixtures, based on solar biomass gasification, and solar radiation yielded chromium from its oxide. In future research, the influence of ultraviolet radiation and the potential to avoid the need for a carbon source will be investigated. Solarchemical ammonia might be produced in scalable and technologically simple plants. By utilizing solar radiation fossil fuel dependency and related CO2 emissions are avoided while costs for energy requirements are reduced concurrently.

POST BUCKLING BEHAVIOR OF HEMISPHERICAL SHELL SUBJECTED TO CONCENTRATED LOAD

Shanin Nayyeri Amiri, Hayder A. Rasheed
Department of Civil Engineering, College of Engineering

This study presents the theoretical, numerical, and experimental results for metal hemispherical shells loaded vertically at the very top into the post buckling range. It illustrates the importance of geometry changes on the buckling load as well. The hemispherical shell is rigidly supported around the bottom circumference and the load is applied by rigid cylindrical boss at the very top of the shell. The subsequent lack of uniqueness of the deformation mode is referred to as degeneration of the deformation. Mechanisms for the initial collapse and subsequent propagation of the plastic deformation for rigid-perfectly plastic shells are formulated on the basis of Drucker and Shield's limited interaction yield condition. The effect of the radius of the boss, used to apply the loading, on the initial and final collapse load is studied. In the numerical model, the material is assumed to be isotropic and linear elastic perfectly plastic without strain hardening obeying the Von Mises yield criterion. In the end, the results of analytical solution are compared and verified with numerical solution results by using ABAQUS software. Good agreement is observed between the load-deflection curves that have been obtained from three different approaches.

SYNTHESIS AND CHARACTERIZATION OF PHOTOCATALYTICALLY ACTIVE TITANIUM DIOXIDE/SILICON DIOXIDE (TIO2/SIO2) MIXED OXIDE SYSTEMS FOR ENVIRONMENTAL REMEDIATION

Thelge Manindu Peiris, Dambar B. Hamal, Kenneth J. Klabunde
Department of Chemistry, College of Arts and Sciences

Use of photocatalytic systems for environmental remediation is an active research topic nowadays, because of their cleaner conversion of harmful components into non harmful compounds using readily available solar energy. Various photocatalytic systems have been reported based on TiO2, SiO2 and mixed TiO2/SiO2. TiO2 is being a semiconductor and SiO2 is being an insulator, reported to show different reaction mechanisms towards photocatalytic decomposition of gaseous pollutants. Further, the photocatalytic activity of TiO2 doped with 1% silver (Ag), carbon(C) and sulfur(S) have been studied previously and it is very important to understand the role of each component present in the system. Thus, binary oxide systems with varying molar ratios of TiO2 and SiO2 with both metal/non metal dopents were prepared and photocatalytic activities were studied under UV and Visible light. All the samples were characterized by X-ray diffraction, UV Visible absorption spectroscopy and BET surface analysis methods. The kinetics of photocatalytic degradation of a model air pollutant, acetaldehyde, was performed using a Shimadzu GCMS-QP 5000 instrument and a glass reactor with a quartz window. Change in photocatalytic activity was found with varying molar ratios of TiO2 to SiO2. The mixed TiO2:SiO2 1:1 system showed efficient decomposition of acetaldehyde compared to previously reported catalysts. The systems with different loadings of Ag were also prepared in order to study their role in decomposition of acetaldehyde. Furthermore, experiments will be carried out to enhance the surface area of these systems and thereby increase the photocatalytic activity.

LASER ASSISTED MACHINING OF SILICON NITRIDE CERAMICS

Xinwei Shen, Budong Yang
Department of Industrial and Manufacturing Systems Engineering, College of Engineering

Today, we are facing many manufacturing challenges, such as global competition (e.g. demanding high efficiency, high quality and low cost) and new territories (e.g. nanomanufacturing, energy manufacturing, new materials). As for the new materials such as advanced structural ceramics (e.g. silicon nitride) have been increasingly used in aerospace, construction equipment involving engine components, turbochargers, bearings, metal cutting, etc.. Their excellent properties such as high strength and hardness, outstanding wear resistance, good chemical stability and so on, interest researchers to develop innovative techniques to shape them. Currently, laser assisted machining (LAM) is an innovative one to cost-effectively machine such hard-to-machine materials. However, machining mechanisms that govern the LAM of ceramics and composites are not fully understood so far. A challenge is that, different with metal cutting, LAM of these materials exhibits more complicated characteristics (e.g., surface/subsurface cracks, discontinuous chips). One solution to explore the machining mechanisms of LAM is via numerical simulation. However, the major limitation of the studies so far is lack of treatment of the material microstructures which determine the thermal-mechanical dynamic behavior of the material. Therefore, our research is focusing on microstructural modeling a silicon nitride ceramic at grain scale and then exploring the mechanisms of LAM through cutting simulations. Also, a series of experiments of LAM were carried out under different operating conditions to validate the machining model. Furthermore, guidelines on parameter selection of LAM from simulation are provided so as to improve the machining performance.

ASSESSMENT OF SUITABILITY OF CHEMICAL SHRINKAGE AS A MEANS OF APPARENT ACTIVATION ENERGY CALCULATION

Md Siddiqui, Kyle A. Riding
Department of Civil Engineering, College of Engineering

The apparent activation energy (Ea) for cementitious materials represents the effect of temperature on the hydration of cement material. There are several methods currently used to calculate the Ea of concrete. These methods vary in the properties measured, applicability, and ease of use. In this study, the time of set, chemical shrinkage, mortar strength, and isothermal calorimetry have been used to quantify Ea for 8 different cement binder systems. This presentation will document the importance of Ea in concrete technology and construction, methods explored in this study, and recommendations for use.

SEMICONDUCTING ICOSAHEDRAL B12AS2 AND B12P2 CRYSTAL GROWTH

Clinton Whiteley, Yi Zhang, J. H. Edgar
Department of Chemical Engineering, College of Engineering

Due to their unique chemical, physical, and electrical properties, the semiconducting icosahedral borides B12P2 and B12As2 are potentially excellent candidates for betavoltaics and neutron detectors. Combining the large capture cross-section for thermal neutrons of the 10B isotope with semiconducting properties of the compound may make it possible to produce efficient, compact, and robust devices. The goal of this project is to produce high quality single crystals with low residual impurities and low dislocation densities, so the best properties possible for these materials can be realized and measured. Source materials for crystal growth were the boride compounds, which were either purchased (B12P2) or synthesized (B12As2). For synthesis, several purities of boron (94% B to 99.999% B) of differing particle sizes (22μ;m to 8mm) were used. The most successful synthesis results were from the 99% pure boron powder (22μm size) because the surface area is greatly increased over larger size pieces of B. 300g of IBA powder could be synthesized in 48h. B12P2 and B12As2 crystals of 1-3mm were produced at 1100°C in a sealed quartz ampoule with a nickel solvent. Crystals were grown with a 50°C temperature gradient across the solution and a 5°C/hr cooling rate. Compositional analysis of the B12P2 and B12As2 crystals grown in the presence of excess group V were 86 at% B and 14 at% As, i.e., the stoichiometric composition (6/1 B/As elemental ratio) for B12As2.

CHARACTERIZING THE RAPID CHLORIDE CONCRETE RESPONSE USING ARTIFICIAL NEURAL NET APPROACH

Hakan Yasarer, Yacoub Najjar
Department of Civil Engineering, College of Engineering

Reliable and economical design of Portland Cement Concrete (PCC) pavement structural systems relies on various factors, among which is the proper characterization of the expected permeability response. Permeability is a highly important factor which strongly relates the durability of pavement systems to changing environmental conditions. To properly characterize the permeability response of PCC pavement structure, Kansas Department of Transportation (KDOT) generally runs Rapid Chloride Permeability test to determine the resistance of concrete to water, chloride and other chemicals. Rapid Chloride (RC) test typically measures the number of coulombs passing through a 2" thick concrete sample over a period of six hours at a concrete age of 7, 28, and 56 days. In this research, Artificial Neural Network (ANN) and Regression-Based permeability response prediction models are developed by using the Rapid Chloride database provided by KDOT. The aim of the developed models is to reduce the duration of the testing period.

Index of Authors

(Presenting Author Only)

Acknowledgements

Graduate Student Council
K-State Research Forum Committee Members

Megan Miller	Chair, K-State Research Forum
Kara Dillard	Chair, Capitol Graduate Research Summit
Courtney George	KRF Booklet Coordinator
Elizabeth Frink	Judging Coordinator
Bracey Fischer	Promotions Designer

Event Volunteers

Tanner Banion
Steve Bellinger
Arka Chattopadhyay
Courtney George
Rhett Mohler
Kara Ross
Lindsey Swoyer
George Weston

Dr. Carol Shanklin	Dean, Graduate School Faculty Advisor, Capitol Graduate Research Summit
Dr. Kevin Lease	Associate Dean, Graduate School Faculty Advisor, K-State Research Forum