

**K-State Graduate
Research, Arts, and Discovery (GRAD)
Forum**

Program Booklet

Thursday, March 29, 2018
Regnier Hall

Sponsored by:
Graduate Student Council
Graduate School
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PROGRAM SCHEDULE

Morning Oral Presentations

9:00am - 11:25am	Biological Sciences 1	2124 Regnier Hall
9:30am - 11:55am	Agricultural Sciences	2123 Regnier Hall
10:00am – 11:45am	Social Sciences, Humanities, and Education 1	2141 Regnier Hall
10:15am - Noon	Engineering, Math, and Physical Sciences	1137 Regnier Hall

Afternoon Oral Presentations

1:00pm - 3:40pm	Biological Sciences 2	2124 Regnier Hall
1:15pm - 3:40pm	Social Sciences, Humanities, and Education 2	2141 Regnier Hall

Poster Sessions

9:30am - 5:00pm	Posters on display	<i>Regnier Atrium</i>
10:00am - Noon	Poster judging Interdisciplinary Research Social Sciences, Humanities, and Education	
1:30pm - 3:30pm	Poster judging Engineering, Math, and Physical Sciences Agricultural Sciences Biological Sciences	

Awards Ceremony

4:30pm *Ekdahl*

The awards ceremony will include a special talk from Dr. Timothy Keane, Professor and Director of Research, Scholarship, and Creative Activity for the Department of Landscape Architecture and Regional & Community Planning.

Oral Session Schedules

Biological Sciences 1

2124 Regnier Hall

9:00AM – 11:25AM

- 9:00 **EFFECT OF MUTATION IN CLOSTRIDIUM DIFFICILE SIN LOCUS**
Brintha Parasumanna Girinathan
- 9:15 **LEFT VENTRICULAR STRAIN AND STRAIN RATE RESPONSES TO SUBMAXIMAL EXERCISE IN PROSTATE CANCER PATIENTS TREATED WITH ANDROGEN DEPRIVATION THERAPY**
Hunter Post
- 9:30 **ASPARAGINE PLAYS A CRITICAL ROLE IN VACCINIA VIRUS REPLICATION**
Anil Pant
- 9:45 **GUT BACTERIAL COMMUNITY OF THE LONE STAR TICK (*Amblyomma americanum*)**
Paulina Maldonado-Ruiz
- 10:00 **EFFECT OF DIETARY NITRATE ON BLOOD PRESSURE AND VASCULAR CONTROL IN POST-MENOPAUSAL HYPERTENSIVE WOMEN**
Jacob Caldwell
- BREAK**
- 10:25 **CANTALOUPE FACILITATES TRANSMISSION OF SALMONELLA BETWEEN HOUSE FLIES**
Jessica L. Thomson
- 10:40 **VENTRICULAR-ARTERIAL COUPLING IN PROSTATE CANCER PATIENTS TREATED WITH ANDROGEN DEPRIVATION THERAPY AT REST AND DURING EXERCISE**
Garrett M. Lovoy
- 10:55 **FECAL MICROBIOTA TRANSPLANTATION IMPROVES OUTCOME IN NURSERY PIGS FOLLOWING CO-INFECTION WITH PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PRRSV) AND PORCINE CIRCOVIRUS TYPE 2D (PCV2D)**
Laura Constance
- 11:10 **IN VIVO ULTRASONOGRAPHY MEASUREMENTS OF PENNATION ANGLE OF THE BICEPS FEMORIS FOLLOWING IASTM**
Lauren E. Pacinelli

Agricultural Sciences

2123 Regnier Hall

9:30AM – 11:55AM

9:30 **CONSUMER JUICINESS ACCEPTABILITY SUPPORTS THE BEEF MARBLING INSURANCE THEORY**

Brittany A. Olson

9:45 **DESCRIPTIVE SENSORY AND VOLATILES COMPOSITION EVALUATION OF DRY CAT FOOD MANUFACTURED WITH DIFFERENT GRAINS**

Huizi YU

10:00 **THE EFFECTS OF THE LIPEX FINISHING DIET REGIMEN ON PORK QUALITY AND COLOR STABILITY**

Stephanie R. Davis

10:15 **EFFECTS OF THE LIPEX FINISHING DIET ON PORK CHOP OMEGA-3 CONTENT AND PALATABILITY**

Olivia S. Khatri

10:30 **EVALUATION OF THE QUALITY CHARACTERISTICS OF PREMIUM PORK LOINS**

Lauren L. Prill

BREAK

10:55 **SETTLING VOLUME AND MORPHOLOGY CHANGES IN CROSS-LINKED AND UNMODIFIED STARCHES FROM WHEAT, WAXY WHEAT AND WAXY MAIZE IN RELATION TO THEIR PASTING PROPERTIES**

Weiwei Wang

11:10 **ISSUES AND SUCCESSES IN TESTING A PRODUCT CATEGORY IN AN UNFAMILIAR COUNTRY**

Tyler Murley

11:25 **LEXICON DEVELOPMENT AND NAPPING FOR THE SENSORY DESCRIPTION OF RYE BREAD IN NORTHERN EUROPE AND THE UNITED STATES**

Meetha Nesam James

11:40 **EFFECT OF XANTHAN GUM ON DOUGH PROPERTIES, GLUTEN MICROSTRUCTURE, AND BREAD QUALITIES MADE FROM WHOLE GRAIN WHEAT FLOUR**

Lauren Tebben

Social Sciences, Humanities, and Education 1

2141 Regnier Hall

10:00AM – 11:45AM

10:00 **YOUNG CHILDREN’S ABILITY TO DISCRIMINATE BETWEEN ANTISOCIAL AND PROSOCIAL TEASES**

Tucker L.Jones

10:15 **AN EXPLORATORY STUDY OF CHANGE MECHANISMS FOR AMBIVALENCE REDUCTION IN YOUNG ADULT CYCLICAL RELATIONSHIPS: FACTORS THAT PROMOTE AND DETRACT FROM DECISION-MAKING RESILIENCY**

Michelle Washburn-Busk

10:30 **LEISURE ACTIVITIES AND CLASSES OF DEPRESSIVE SYMPTOM TRAJECTORIES**

Preston Morgan

10:45 **IMPACT OF FOUR-WEEK ONLINE INTERVENTION ON AUTONOMY, ATTITUDE TOWARD PHYSICAL ACTIVITY AND PERCEIVED BEHAVIOR CONTROL**

Rebecca Gasper

11:00 **IMMERSIVE ZOO EXPERIENCE FOR CONSERVATION STEWARDSHIP: EVALUATING THE EFFECTIVENESS OF TARONGA ZOO’S TIGER TREK IN DRIVING BEHAVIOR CHANGE IN ZOO GUESTS**

Ashley Kelly

11:15 **HOW GROUPS OF STUDENTS FRAME DISCUSSION IN PHYSICS**

Dina Zohrabi Alae

11:30 **AFFILIATING OR ALIENATING? WHITE INDIVIDUALS’ PERCEPTIONS OF BLACK RACIAL SLURS USED BY BLACK INDIVIDUALS TOWARD WHITE INDIVIDUALS**

Conor O’Dea

Engineering, Math, and Physical Sciences

1137 Regnier Hall

10:15AM – Noon

10:15 AN ENHANCED, HIGH-RESOLUTION GLOBAL INVENTORY OF DAMS AND ARTIFICIAL WATER IMPOUNDMENTS

Blake A. Walter

10:30 REMOTE THERMAL INFRARED IMAGING FOR RAPID SCREENING OF SUDEDEN DEATH SYNDROME IN SOYBEAN

Nicholle Hatton

10:45 DEVELOPMENT OF A MACHINE VISION SYSTEM FOR REAL-TIME MEASUREMENT OF SEED SPACING AND SEEDING DEPTH OF CORN

Sylvester Badua

11:00 DEVELOPING NEW LASER SOURCES AT THE EXTREME EDGE OF ULTRAFAST OPTICAL TECHNOLOGY

Adam M. Summers

11:15 NOVEL STRATEGIES FOR RECOVERY OF ORGANIC ACIDS FROM WHEY – ADDRESSING THE PRESSING ISSUES IN BIOTECHNOLOGY

Haripriya Naidu

11:30 MILD CONDITION POST-SYNTHESIS ETCHING OF INP NANOCRYSTALS

Mohammad Sadegh Yazdanparasat

11:45 INHIBITION ROLE OF 6-THIOPURINE AND ITS EXCRETION METABOLITES ON BILIRUBIN EXCRETION PATHWAY

Chamitha J. Weeramange

Biological Sciences 2

2124 Regnier Hall

1:00pm-3:40pm

- 1:00 **EFFECTS OF LONG-TERM FERTILIZATION AND FIRE REGIME ON KEY NITROGEN-CYCLING PROCESSES IN TALLGRASS PRAIRIE**
Priscilla Moley
- 1:15 **EXPOSURE TO LONG-LASTING INSECTICIDE NETTING REDUCES THE DISPERSAL CAPACITY AND MOVEMENT OF STORED PRODUCT BEETLES IN THE LABORATORY**
Rachel Wilkins
- 1:30 **EFFECT OF INTEGRATING THE ENTOMOPATHOGENIC FUNGUS, *BEAUVERIA BASSIANA* AND THE ROVE BEETLE, *DALOTIA CORIARIA* IN REGULATING WESTERN FLOWER THRIPS, *FRANKLINIELLA OCCIDENTALIS* POPULATIONS UNDER GREENHOUSE CONDITIONS**
Yinping Li
- 1:45 **WATER SOLUBLE CARBOHYDRATES ACCUMULATION IN WHEAT STEMS USING NIR SPECTROSCOPY**
Anju Giri
- 2:00 **EFFECTS OF DROUGHT STRESS ACROSS POPULATION AND LIFE STAGE IN WILD FOXTAIL MILLET *SETARIA ITALICA SPP. VIRIDIS***
Sam L. Sharpe

BREAK

- 2:25 **COLD STRESS RESILIENCE AT EARLY SEEDLING IN SORGHUM DETERMINED BY INTEGRATING AERIAL IMAGERY AND DESTRUCTIVE PHENOTYPING**
Anuj Chiluwal
- 2:40 **TOXICITY OF FINE POWDERS OF FILTER CAKE AND TRIPLEX AGAINST SITOPHILUS ORYZAE ADULTS ON CONCRETE ARENAS**
Tesfaye Tadesse
- 2:55 **REGULATORS OR CONFORMERS? MECHANISMS OF HYDROGEN SULFIDE TOLERANCE IN AN EXTREMOPHILE FISH**
Nick Barts
- 3:10 **DIFFERENT FIRE SEVERITIES RESULT IN DISTINCT SUCCESSIONAL TRAJECTORIES IN SOIL MICROBIAL COMMUNITY**
Sam Fox
- 3:25 **TEMPORAL CHANGES IN SOIL MICROBIAL PROPERTIES ACROSS CROP DEVELOPMENT**
Che-Jen Hsiao

Social Sciences, Humanities, and Education 2

2141 Regnier Hall

1:15PM – 3:40PM

- 1:15 **EXAMINING ARTIST RESIDENCIES AND THEIR IMPACT ON RURAL COMMUNITIES**
Angel Llanes
- 1:30 **AN EMPIRICAL ANALYSIS OF INCOMPLETE COST PASS-THROUGH IN COMMERCIAL AVIATION USING NESTED LOGIT MODEL**
Ying Lin
- 1:45 **POLARIZATION OF AMERICAN WORKERS: THE BIG SQUEEZE FROM OCCUPATIONAL EXPOSURE TO VALUE-ADDED IMPORTS**
Han Wang
- 2:00 **BLOOD AND SOIL: WHAT RICHARD DARRÉ’S ROMANTIC MYTH SAYS ABOUT PRESENT-DAY AMERICA**
Jacob Miller
- 2:15 **COMPETITIVE CONDUCT AND ANTITRUST POLICY ACTIONS IN THE US DAIRY INDUSTRY-THE CASE OF DEAN FOODS AND FOREMOST FARMS USA**
Shengnan Fang

BREAK

- 2:40 **IMPORT PROTECTIONS IN CHINA’S GRAIN MARKETS: AN EMPIRICAL ASSESSMENT**
Bowen Chen
- 2:55 **STOCK PRICES AND THE ECONOMY IN AMERICA**
Kristen Huang
- 3:10 **POPULISM IN MARINE LE PEN’S SECOND PRIMARY ADVANCEMENT SPEECH: A NEO ARISOTELIAN CRITIQUE**
Marlene Pierce
- 3:25 **QUEER COMMUNITIES IN THE FLINT HILLS REGION OF KANSAS COMMUNICATING CONCERNS OF MENTAL HEALTH THROUGH BODY ART**
Jakki Forester

Poster Titles and Presenters

Interdisciplinary Research

Regnier Atrium

On display: 9:30AM – 5:00PM

Judging: 10:00AM-Noon

1. **URBAN CINESEMIOTICS: CHICAGO IN *THE BLUES BROTHERS* AND *THE UNTOUCHABLES***
Hamed Goharipour
2. **RAPID AND SIMULTANEOUS DETERMINATION OF FURFURAL AND 5-HYDROXYMETHYLFURFURAL IN BIOMASS HYDROLYSATE BY HPLC**
Jun Li
3. **MODELING ACCUMULATION IN BETA AND GAMMA DOSE RATE FOR VERY THIN LAYERS: IMPLICATIONS FOR LUMINESCENCE DATING OF DUST DEPOSITS**
Nina Ataee
4. **SYNTHESIS OF NOVEL COPPER-ACTIVATED DRUGS AGAINST MRSA**
Anjana Delpa Acharige
5. **EFFECT OF LIGHT CHARACTERISTICS ON THE SENSORY PROPERTIES OF RED LETTUCE**
Weilun Tsai
6. **INVESTIGATING MARIGOLDS AS A DYESTUFF FOR A SMALL BUSINESS: EXTRACTION, COLORFASTNESS TO LAUNDERING, AND CARE OF SILK AND LINEN**
Kowshik Saha

Social Sciences, Humanities, and Education

Regnier Atrium

On display: 9:30AM – 5:00PM

Judging: 10:00AM-Noon

7. **COMPARING CLASSROOM FRUSTRATIONS FOR STUDENTS WITH AUDITORY PROCESSING DISORDER VERSUS THEIR TYPICAL PEERS**
Ellen Bodine
8. **TO PREVENT OR ALLEVIATE NEGATIVE OUTCOMES? THE ROLE OF DIFFICULTY IN RISK MITIGATION**
Lisa Vangsness
9. **ENGAGING PUBLIC HEALTH PRACTICE AND ACADEMIA: A MODEL FOR PUBLIC HEALTH PARTNERSHIP AT KANSAS STATE UNIVERSITY**
Heather Poole
10. **ACCEPTABILITY AND FEASIBILITY OF BEST PRACTICE SCHOOL LUNCHES: A RANDOMIZED CROSSOVER TRIAL**
Jillian Joyce
11. **FIREFIGHTER RECRUIT PERFORMANCE IMPROVES AFTER A 10-WEEK HIFT PROGRAM: A PILOT INVESTIGATION**
Brittany S. Hollerbach
12. **EXPLORING UNOBSERVED HETEROGENEITY OF FOOD SAFETY BEHAVIOR: A META-ANALYSIS**
Naiqing Lin
13. **MAPPING JAPANESE SNACKS**
Gongshun Yang
14. **AN INFOGRAPHIC MENU: IMPROVING DECISION MAKING IN RESIDENTS WITH DEMENTIA**
Priscilla Brenes

Engineering, Math, and Physical Sciences

Regnier Atrium

On display: 9:30AM – 5:00PM

Judging: 1:30AM-3:30PM

15. **VAPOR PHASE PLOTTING OF ORGANOSILANE SUB-MONOLAYER GRADIENTS**
Judith Bautista
16. **FULL UTILIZATION OF BIOMASS FOR FUELS AND CHEMICALS: A BIOREFINERY CONCEPT**
Youjie Xu
17. **VALIDATION OF THE SPORT-LIS SURFACE SOIL MOISTURE PRODUCT IN THE MISSOURI AND ARKANSAS-RED-WHITE RIVER BASINS**
Kelsey McDonough
18. **BIOLOGICAL-BASED EXTRACTION OF BIOMOLECULES FROM MICROALGAE**
Chelsea Dixon
19. **UNIFORM, ORTHOGONAL FUNCTIONALIZATION OF A METAL-ORGANIC FRAMEWORK**
Christopher Satterfield
20. **BED-BASED INSTRUMENTATION FOR UNOBTRUSIVE SLEEP QUALITY ASSESSMENT IN SEVERELY DISABLED AUTISTIC CHILDREN**
Charles Carlson

Agricultural Sciences

Regnier Hall

On display: 9:30AM – 5:00PM

Judging: 1:30AM – 3:30PM

21. **DEVELOPMENT OF LARGE PATCH RESISTANT, COLD HARDY ZOYSIAGRASS CULTIVARS FOR THE TRANSITION ZONE**
Mingying Xiang
22. **DETERMINING THE IMPACT OF ROAST DEGREE, BEAN SIZE AND BREWING TIME ON THE SENSORY CHARACTERISTICS OF COLD DRIP UGANDAN COFFEE**
Denis Seninde
23. **EFFECT OF DISTILLERS DRIED GRAIN ON PROCESSING PARAMETERS OF EXTRUDED DOG AND CAT FOODS**
Spencer Smith
24. **PROTEIN QUALITY EVALUATION OF CHICKEN PROTEINS FOR PET FOOD**
Megan Morts
25. **DEVELOPMENT AND APPLICATION OF A LEXICON TO DESCRIBE THE FLAVOR OF SORGHUM VARIETIES**
Thao Tran
26. **EFFICACY OF SPINOSAD AGAINST MAIZE WEEVIL (*SITOPHILUS ZEAMAI*) IN POPCORN**
Nan Gao
27. **UNDERSTANDING HOW CONSUMERS DETERMINE THE READINESS OF WHEAT DOUGH USING THE THINK ALOUD TECHNIQUE**
Adriana Lezama-Solano
28. **PREPARATION, FRACTIONATION, PURIFICATION AND IDENTIFICATION OF ANTIOXIDANT ACTIVE PEPTIDES FROM CORN GLUTEN MEAL**
Ruijia Hu
29. **MICROBIOLOGICAL CHARACTERISTICS OF PORK CARCASSES AND VACUUM PACKAGED BLADE STEAKS DURING STORAGE AT 0±1°C**
Francisco Najar

Biological Sciences

Regnier Hall

On display: 9:30AM – 5:00PM

Judging: 1:30AM – 3:30PM

30. **PREDICTING ENERGY EXPENDITURE IN MALES AND FEMALES DURING HIGH-INTENSITY FUNCTIONAL TRAINING**
Jesse A. Stein
31. **CHARACTERIZATION OF A NOVEL LEUCINE BIOSYNTHESIS TRANSCRIPTION FACTOR IN ASPERGILLUS NIDULANS**
Joel T. Steyer
32. **EFFECTS OF GUANIDINOACETIC ACID ON LEAN GROWTH AND CREATINE PRODUCTION IN CATTLE**
Mehrnaz Ardalan
33. **IDENTIFYING IMMUNO-DOMINANT AND NEUTRALIZING EPITOPES FROM K88 FIMBRIAE OF ENTEROTOXIGENIC ESCHERICHIA COLI**
Ti Lu
34. **HIGH INTENSITY FUNCTIONAL TRAINING IMPROVES FLEXIBILITY IN OVERWEIGHT AND OBESE ADULTS**
Justin A. DeBlauw
35. **MICROVASCULAR ENDOTHELIAL FUNCTION ACROSS THE CANCER SURVIVORSHIP CONTINUUM**
Heather Banister

Oral Presentation Abstracts

Biological Sciences 1

EFFECT OF MUTATION IN CLOSTRIDIUM DIFFICILE SIN LOCUS

Brintha Parasumanna Girinathan, Jose Espinola-Lopez, and Revathi Govind

Division of Biology, College of Arts and Sciences

BACKGROUND AND PURPOSE: *Clostridium difficile* is the major cause of hospital acquired diarrhea and pseudomembranous colitis. It produces dormant spores, which serve as infectious vehicle responsible for transmission of the disease and persistence of the organism in the environment. *C. difficile* genome carries two SinR like proteins in an operon and we named them as SinR (112 aa) and SinR' (105 aa) respectively. **METHOD:** In this study, we disrupted the *sinRR'* in *C. difficile* R20291 strain and have performed various phenotypic assays, genetic and biochemical experiments to identify the function of these two proteins in *C. difficile* physiology. **RESULTS/FINDINGS:** Initial transcriptome analysis of the *sinRR'* mutants revealed their pleiotropic roles in controlling various important pathways including sporulation, toxin production and movement in *C. difficile*. We have found that in *C. difficile* R20291 strain, the *sinRR'* mutant is asporogenic, non-motile in nature and produced less toxins. We have found that the low motility and toxin production in *sinRR'* mutant was due to the lower production of *sigD* and the asporogenic phenotype was due to inactive Spo0A. Pull down experiments with purified SinR and SinR' demonstrated their tight interaction with each other. Finally using hamster model, we have demonstrated that *sin* locus is needed for successful *C. difficile* infection. **CONCLUSION:** Identifying and characterizing this unique locus is a key finding which might help us better understand the dynamics of these major regulatory circuits, thereby develop novel strategies to control this infection.

LEFT VENTRICULAR STRAIN AND STRAIN RATE RESPONSES TO SUBMAXIMAL EXERCISE IN PROSTATE CANCER PATIENTS TREATED WITH ANDROGEN DEPRIVATION THERAPY

Hunter Post, Garrett Lovoy, Heather Banister, Shelbi Sutterfield, Jacob Caldwell, and Carl Ade

Department of Kinesiology, College of Human Ecology

BACKGROUND AND PURPOSE: Androgen Deprivation Therapy (ADT), like that used to treat prostate cancer patients (PCa), is known to increase cardiovascular disease risk and mortality by impairing left ventricular (LV) mechanics. Although understood in animal models, it remains poorly understood how ADT influences cardiac function in humans. The aim of this investigation was to measure LV mechanics at rest and during submaximal exercise in PCa patients, with and without a history of ADT. We hypothesized that change in LV strain (S), strain rate (SR), and tissue velocities from rest-to-exercise would be impaired in those with a history of ADT treatment. **METHODS:** To date, 7 PCa patients (n=3 ADT; n=4 Non-ADT) have completed echocardiographic measurements at rest and during submaximal cycling exercise. Tissue Doppler echocardiography was used to measure myocardial tissue velocity and deformation from the mid-interventricular septum. **RESULTS/FINDINGS:** The change in systolic S from rest to exercise was significantly different between groups (p=0.03). The change in systolic SR from rest to exercise was significantly different between groups (p=0.03). There were no changes observed between groups from rest to exercise in early diastolic filling SR (p=0.35), systolic reserve index (p=0.07), and diastolic reserve index (p=0.14). There were also no significant changes observed between groups in tissue velocities; S-wave (p=0.09), and E-wave (p=0.31). **CONCLUSION:** This preliminary evidence suggests that ADT in PCa patients significantly impairs LV function as determined by changes in systolic SR and S in response to submaximal exercise. These findings may hold significant risk-stratification value that precede clinically diagnosable symptoms.

ASPARAGINE PLAYS A CRITICAL ROLE IN VACCINIA VIRUS REPLICATION

Anil Pant, Shuai Cao, and Zhilong Yang

Division of Biology, College of Arts and Sciences

BACKGROUND AND PURPOSE: Vaccinia virus (VACV), the prototypic member of poxviruses, is a large and complex virus with linear double-stranded DNA. It is used as a model to study poxvirus infection, as a tool to develop novel cancer therapy and as recombinant vaccines against other infectious diseases. Like other viruses, VACV relies on cellular metabolism for survival. Although VACV prefers glutamine to glucose for replication, the intermediary metabolite of glutamine metabolism responsible for the glutamine dependence remains elusive, as does the underlying cellular mechanism. Our objective is to identify specific metabolite of glutamine metabolism required for VACV replication, and the underlying mechanism. **METHOD:** VACV replication was investigated in Human Foreskin Fibroblasts infected with VACV in growth media containing different amino acids as supplements to quantify the virus. Western blot was carried out to test the level of proteins in VACV infected cells. **RESULTS:** We found that asparagine, an amino acid that requires glutamine for its *de novo* synthesis, can specifically rescue VACV replication in glutamine-depleted media. Moreover, inhibition of asparagine synthetase, a gene catalyzing biosynthesis of asparagine, severely impairs VACV replication. We also found that asparagine is required for VACV protein synthesis and maintaining/stimulating cellular functions important for VACV protein synthesis. **CONCLUSIONS:** We identified asparagine as an important metabolite for efficient VACV replication and identified one mechanism underlying the asparagine-mediated rescue of VACV replication from glutamine dependence. The outcome of this study will not only enhance our understanding of fundamental VACV replication but also improve the usage of VACV for vaccine development and cancer therapy.

GUT BACTERIAL COMMUNITY OF THE LONE STAR TICK (*Amblyomma americanum*)

Paulina Maldonado-Ruiz¹ and Ludek Zurek^{1,2}

¹*Department of Entomology, College of Agriculture;* ²*Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine*

BACKGROUND AND PURPOSE: The lone star tick is an important vector of animal and human pathogens. This tick also harbors a bacterial community with commensal and symbiotic relationships in the gut. However, the role of these bacteria in the tick fitness and vector competence for pathogens is unknown. In this study, we used a culturing approach to assess the prevalence, abundance, and diversity of bacteria in the gut of field collected adult lone star ticks. **METHOD:** Ticks (n=31) were collected in northeastern Kansas. Ticks were surface sterilized, individually homogenized, spread plated on trypticase soy agar, and incubated at 26 °C for 72 hrs. Bacterial colonies were counted and identified by amplification and sequencing of 16S rDNA. Sequences were identified using BLASTn search of the GeneBank at NCBI. **RESULTS/FINDINGS:** No culturable bacteria were recovered from 42% of ticks and the mean bacterial concentration was only 11.8 ± 5.4 CFU/tick. We found low bacterial diversity represented by 3 phyla: Actinobacteria (50%), Firmicutes (40%), Proteobacteria (10%) and 16 genera with a heavy bias toward Gram-positive and catalase-positive bacterial species. **CONCLUSION/SIGNIFICANCE:** We propose that the culture-independent studies likely overestimate the bacterial prevalence and diversity in a tick gut due to amplification of DNA fragments from dead cells and/or cells from tick surface. Most bacterial species were from taxa typical for a soil microbiome, suggesting that they were acquired from the environment. Our results indicate that *A. americanum* epithelial immunity functions to control Gram-negative and catalase-negative bacteria and it is therefore likely based on reactive oxygen species.

EFFECT OF DIETARY NITRATE ON BLOOD PRESSURE AND VASCULAR CONTROL IN POST-MENOPAUSAL HYPERTENSIVE WOMEN

Jacob Caldwell, Jesse Craig, Hunter Post, Garrett Lovoy, Shelbi Sutterfield, Heather Banister, Dryden Baumfalk, Steven Copp, and Carl Ade.

Department of Kinesiology, College of Human Ecology

BACKGROUND AND PURPOSE: Individuals with hypertension exhibit abnormal blood pressure (BP) responses during rest-to-exercise transitions, significantly increasing the likelihood of a stroke, acute myocardial ischemia, and sudden cardiac death. Dietary nitrate supplementation can lower resting blood pressure in patients with hypertension and improves bulk muscle blood flow in older healthy adults. However, investigations using dietary nitrate supplementation in post-menopausal women diagnosed with hypertension are lacking. It was hypothesized the BP response to exercise would be lower and muscle blood flow would be increased in the nitrate-rich (NR) versus nitrate-poor (NP) treatment. **METHODS:** Ten hypertensive post-menopausal women underwent a randomized double-blind placebo-controlled trial with a NR and NP supplement. Forearm blood flow (FBF) was measured in the brachial artery of the exercising limb. Beat-by-beat blood pressure was recorded throughout both trials. After resting measurements were completed, patients performed hand-grip exercise at 20% maximal voluntary contraction for five minutes to obtain steady-state blood flow and blood pressure responses to exercise. **RESULTS:** No differences were found for BP between NR and NP conditions during the rest-to-exercise transition ($p > 0.05$; all). During steady-state exercise, FBF and forearm vascular conductance (FVC) were significantly lower during steady-state NR condition ($p < 0.05$; both). **CONCLUSION:** Acute NR supplementation did not improve the BP response to hand-grip exercise in hypertensive post-menopausal women. Interestingly, however, steady-state FBF ($\sim 30 \text{ ml min}^{-1}$) and FVC ($\sim 27 \text{ ml min mmHg}^{-1}$) were significantly reduced during the nitrate-rich condition, suggesting a reduced O_2 cost for a given workload because blood flow typically matches metabolic rate.

CANTALOUPE FACILITATES TRANSMISSION OF SALMONELLA BETWEEN HOUSE FLIES

Jessica L. Thomson¹, Ludek Zurek¹, and Dana Nayduch^{1,2}

¹*Department of Entomology, College of Agriculture;* ²*USDA-ARS, Arthropod-Borne Animal Diseases Research Unit, Manhattan, KS*

BACKGROUND AND PURPOSE: *Salmonella enterica* serovar Typhimurium (*S. Typhimurium*) is a pathogen harbored by livestock that can contaminate fresh produce, such as cantaloupe, and cause food-borne illnesses. We previously demonstrated that house flies acquire and harbor *S. Typhimurium* after exposure to inoculated cattle manure. However, fly to fly transmission of the bacterium, after acquisition, has not been demonstrated. Because house flies are attracted to human food, we investigated the transmission of *S. Typhimurium* from inoculated flies to cantaloupe, from inoculated cantaloupe to flies, and between inoculated and control flies in the presence and absence of cantaloupe. We hypothesized that *S. Typhimurium* is transferred from inoculated food to control flies (CF), from inoculated flies (SF) to food, and from fly-food-fly (SF-food-CF) and that transmission success would increase with exposure time. **METHODS:** Mated female house flies were exposed to manure inoculated with sterile PBS (CF) or *S. Typhimurium* (SF) for 12 h. To test transmission of *S. Typhimurium*, flies were placed in jars containing either: 1) a single SF with fresh cantaloupe (fly-food transmission); 2) four CF with *S. Typhimurium*-inoculated cantaloupe (food-fly transmission); or 3) a single SF with four CF with and without fresh cantaloupe (fly-fly transmission, with and without food). **RESULTS:** Our results indicate that *S. Typhimurium* multiplies on cantaloupe, *S. Typhimurium* is transferred to and acquired from cantaloupe by flies, and the presence of cantaloupe facilitates fly to fly transmission. **CONCLUSION/SIGNIFICANCE:** Understanding bacterial transmission between flies and food can help in assessing the role flies play in health and food safety for this pathogen.

VENTRICULAR-ARTERIAL COUPLING IN PROSTATE CANCER PATIENTS TREATED WITH ANDROGEN DEPRIVATION THERAPY AT REST AND DURING EXERCISE

Garrett M. Lovoy, Post H.K., Banister H.R., Sutterfield S.L., Caldwell J.T., and Ade C.J.

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BACKGROUND: Androgen deprivation therapy (ADT) in prostate cancer has been suggested to promote an unfavorable cardiovascular disease risk profile and long-term cardiovascular mortality. Impairments in vascular structure and function are known to occur with ADT; however, the effects of ADT on ventricular-arterial coupling, a measure of effective arterial elastance (Ea) and left ventricular end-systolic elastance (Ees), are not well known. Therefore, this study sought to evaluate ventricular-arterial coupling at rest and during submaximal exercise in prostate cancer patients with and without a history of ADT. **METHODS:** To date, 7 prostate cancer patients with (n=3) and without (n=4) a history of ADT treatment have completed the study. Ea, Ees, and ventricular-arterial coupling (Ea/Ees) were measured at rest and during supine submaximal exercise. A high Ea/Ees is reflective of a compromised interaction between ventricular and arterial systems. **RESULTS:** At rest Ea, Ees, and Ea/Ees were similar between ADT and non-ADT groups. Ea was not different between groups during exercise (p=.03). Moderate-intensity exercise-induced increases in Ees decreased in the ADT group (p=.05). Ea/Ees was also higher in the ADT group during exercise compared to the non-ADT group, but did not reach statistical significance. **CONCLUSION:** The findings from this study provide preliminary data that indicates ADT in prostate cancer patients may adversely alter left ventricular end-systolic elastance during exercise. Additional data will contribute to the evaluation of the interaction between ventricular and arterial systems in patients receiving ADT.

FECAL MICROBIOTA TRANSPLANTATION IMPROVES OUTCOME IN NURSERY PIGS FOLLOWING CO-INFECTION WITH PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME VIRUS (PRRSV) AND PORCINE CIRCOVIRUS TYPE 2D (PCV2D)

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BACKGROUND: PRRSV and PCV2 are two of the most costly viruses affecting the swine industry, resulting in respiratory disease and reduced growth. The gut microbiome, or collection of microorganisms living in the gastrointestinal tract, has been shown to impact outcome following PRRSV/PCV2 co-infection in nursery pigs. **OBJECTIVE:** Determine the effects of modulating the microbiome through fecal microbiota transplantation (FMT) on outcome following co-infection. **METHODS:** Pigs were divided into two groups at weaning and housed separately. The FMT group was administered the fecal transplant and the control group was administered a mock-transplant of sterile saline for 7 consecutive days prior to co-infection. All pigs were co-infected with PRRSV and PCV2d and followed for 42 days post-infection (dpi). **RESULTS:** Morbidity and mortality was significantly higher in the control group compared to the transplanted group; 70% mortality compared to 20% mortality was seen in the control and transplanted groups, respectively (p = 0.0447, Mantel-Cox test). The majority of control pigs lost weight (70%) whereas only 30% of FMT pigs had evidence of weight loss at any time during the study. On 21 and 28 dpi, increased PCV2d and PRRSV replication, respectively, were detected in control pigs. Antibodies for PRRSV and PCV2 were detected with the FMT pigs having higher antibody titers for both viruses. Upon examination at necropsy, the FMT group had reduced severity of lung lesions. **CONCLUSION:** This study provides evidence that microbiome modulation through FMT prior to co-infection with PRRSV and PCV2d improves outcome and suggests that a microbiome therapeutic may be an alternative method for disease control.

IN VIVO ULTRASONOGRAPHY MEASUREMENTS OF PENNATION ANGLE OF THE BICEPS FEMORIS FOLLOWING IASTM

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BACKGROUND AND PURPOSE: Ultrasonography (US) has been proven as a reliable tool for examining muscle architecture *in vivo*. Specifically, pennation angle (PA) may be assessed as the positive angle between the deep fascia and the line of muscular fascicle. Instrument assisted soft tissue mobilization (IASTM) is an approach to soft tissue manipulation to release scar tissue and remove fascial restrictions. However, it is unclear whether changes in skeletal muscle architecture characteristics occur. The objective of this study is to examine PA before (Pre) and following (Post) an IASTM treatment. **METHODS:** Seventeen healthy females (mean±SD: age=21.12±0.78 years) volunteered to participate for this investigation. PA measurements were collected from the right biceps femoris, at 50% of the distance between the greater trochanter and the lateral joint line of the knee, before (Pre) and after (Post) IASTM treatment. The IASTM protocol included 3 sets of 7 strokes in both proximal and distal directions at a treatment angle of 45°. **RESULTS:** A one-way repeated measures analysis of variance (ANOVA) was used to analyze PA data across time. An alpha value of $P \leq 0.05$ was considered statistically significant. There was no significant difference in PA following IASTM ($p=0.082$). **CONCLUSION:** The results from this study demonstrated no change in PA following IASTM. It remains unclear at this time if IASTM has a significant effect on other characteristics of muscle architecture. More research is required utilizing ultrasonography for muscle architecture measures following soft tissue mobilization methods.

CONSUMER JUICINESS ACCEPTABILITY SUPPORTS THE BEEF MARBLING INSURANCE THEORY

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INTRODUCTION: Tenderness, juiciness, and flavor contribute to a consumer's overall beef eating experience, but can be detrimentally affected by increased cooking temperature. One theory, known as the insurance theory, proposes that increased marbling can counteract the negative effect of increased cooking temperatures. Therefore, the objective of this study was to determine whether increased marbling reduces the negative impact increased degree of doneness has on consumer palatability scores. **MATERIALS AND METHODS:** Paired beef strip loins (Institutional Meat Purchase Specifications #180) were collected from 4 USDA quality grades [Prime, Top Choice (Modest and Moderate marbling), Low Choice, and Select; $n=12$ pairs/quality grade]. Steaks were cooked on a clamshell grill (Cuisiart Griddler Deluxe, Model GR-150, East Windsor, NJ), to one of six designated degrees of doneness (very-rare, rare, medium-rare, medium, well-done or very well-done. Consumers ($n=360$) were fed 8 samples representing differences in quality grade and degree of doneness, and evaluated samples for juiciness, tenderness, flavor, and overall liking on continuous line scales. Additionally, consumers rated each trait either acceptable or unacceptable. **RESULTS:** For consumer palatability scores, the negative impact of increasing final internal cooking temperature on juiciness, tenderness, flavor and overall like was the same across all quality treatments. However, when evaluating on an acceptability basis, an increase in marbling score does appear to modify the point at which a sample becomes unacceptable for juiciness. **CONCLUSION:** These results indicate that marbling could play a role in compensating for the negative effects of advanced degrees of doneness on juiciness acceptability.

DESCRIPTIVE SENSORY AND VOLATILES COMPOSITION EVALUATION OF DRY CAT FOOD MANUFACTURED WITH DIFFERENT GRAINS

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BACKGROUND AND PURPOSE: Grain sorghum is an underutilized crop, especially for value-added applications such as food for humans and pets, due to the prevalent misconceptions of sorghum related to bitter taste and astringency caused by tannins. This study was designed to test the above hypotheses in relation to use of sorghum in dry extruded cat food. **METHOD:** Total eight dry cat foods produced with rice, corn, and three grinding levels (0.5, 1.0 and 1.6) of red or white sorghum were compared by using descriptive sensory analysis and Headspace-Gas chromatography and Mass spectrometry. **RESULTS/FINDINGS:** Significant differences among the eight cat food samples were found on appearance attributes of brown, fibrous and texture/mouthfeel attributes of fracturability and gritty. No significant difference was found in terms of aroma and flavor attributes. The volatile compounds composition of the eight dry cat foods were found similar, thirty aromatic compounds tentatively identified and semi-quantified. The Red and White sorghum with grinding level of 1.0 were found most close to Rice and Corn in terms of sensory characteristics. **CONCLUSION:** This study provided scientific evidence in using grain sorghum as a promising ingredient to replace rice and corn without impact on sensory perception. This result gave guides on the focus (texture and mouth-feel related product perceptions) for future sorghum cat food formula optimization.

THE EFFECTS OF THE LIPEX FINISHING DIET REGIMEN ON PORK QUALITY AND COLOR STABILITY

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BACKGROUND: Omega-3 fatty acids are known to provide many health benefits, but can have a detrimental effect on fresh meat color stability. The objective of this study was to determine the effects of the LIPEX finishing diet regimen on center cut pork chop Omega-3 content and color stability. **METHOD:** Twenty-eight finishing pigs were subjected to a 49-d feeding trial. Treatments consisted of a 2×2 factorial design with Sex ($n=14$ barrows and gilts each) and Diet as main effects. Dietary treatments consisted of a two-phase, standard finishing diet regimen or a two-phase, LIPEX finishing diet regimen (EXL Milling, Lloydminster, SK, Canada). Boneless pork loins were aged 14 days and halved immediately behind the *Spinalis dorsi*. A 2.54-cm chop taken from the anterior portion of the loin was utilized for fatty-acid composition analysis. Another chop was cut from the posterior portion was utilized for 7-d simulated retail display objective and subjective evaluation. **RESULTS:** There were no Sex × Diet interactions for all variables measured in the study ($P>0.10$). The LIPEX finishing regimen increased loin chop Omega 3 content by 178%, Omega 6 content by 54%, and decreased the Omega 6:3 ratio by 41% ($P<0.01$). There were no two- or three-way interactions between Diet, Sex, and Day, or Diet and Sex main effects for L*a* values, surface oxy- and metmyoglobin percentages, or visual panel chop redness and surface discoloration scores ($P > 0.14$). **CONCLUSION:** Feeding the LIPEX finishing diet regimen increased center cut chop Omega-3 fatty acid content without negatively impacting fresh chop color stability.

EFFECTS OF THE LIPEX FINISHING DIET ON PORK CHOP OMEGA-3 CONTENT AND PALATABILITY

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INTRODUCTION: Omega-3 fatty acids are known to provide many health benefits; however, increasing Omega-3 levels in red meat is often associated with increased off-flavors detected by consumers. The objective of this study was to examine the effect of the Lipex finishing diet on Omega-3 fatty acid content and trained panel palatability scores. **MATERIALS AND METHODS:** This study was designed as a 2×2 factorial with Sex and Dietary Treatment as main effects. During the finishing phase, gilts and barrows ($n=14$ each) were randomly assigned to either a standard finishing diet or a Lipex finishing diet. After harvest, pork loins were aged 14 days and cut perpendicular to the longitudinal axis of the loin, immediately behind the *Spinalis dorsi* (approximately the 10th rib). A 2.54-cm chop taken from the anterior portion of the cut was used for fatty acid and proximate composition analyses. Two 2.54-cm chops from the posterior portion of the cut were assigned for Warner-Bratzler shear force and trained sensory panel analyses. **RESULTS:** There were no Sex × Dietary Treatment interactions for all variables measured ($P>0.10$). Incorporating Lipex into the finishing diet increased chop Omega-3 content by 178% and decreased the Omega 6:3 ratio by 41% ($P<0.01$). The Lipex diet did not affect proximate composition, cook loss, Warner-Bratzler shear force, or trained sensory panel scores ($P>0.12$). **CONCLUSION:** Data indicated incorporating Lipex into the finishing diet of pigs can be a means to increase pork chop Omega-3 content, while not having a negative effect on palatability.

EVALUATION OF THE QUALITY CHARACTERISTICS OF PREMIUM PORK LOINS

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INTRODUCTION: The objective of this study was to determine the quality attributes of premium pork loins. Examining differences in pork quality may ultimately explain the variation in pork eating quality. **MATERIALS AND METHODS:** Thirty pork loins representing five premium (**PRE**) and two commodity (**COM**) brands were collected from commercial abattoirs. Purge loss, cook loss, instrumental color, marbling, Warner-Bratzler shear force (**WBSF**), and slice shear force (**SSF**) data were collected on all loins. **RESULTS:** Commodity-A loins had the greatest purge loss, whereas PRE-A, C, and D had the least ($P < 0.05$). Within cook loss, PRE-C had similar loss to COM-B, which had the greatest ($P < 0.05$). For instrumental color, differences were seen within a^* and b^* with PRE-B having the greatest. Furthermore, COM-B had the lowest pH and a^* value ($P < 0.05$). Premium-A and -E had the greatest amount of visual marbling ($P < 0.05$), although chemical intramuscular fat content indicated PRE-E had the greatest amount and COM-A had the least ($P < 0.05$). Additionally, PRE-C sheared the toughest for both SSF and WBSF ($P < 0.05$), whereas PRE-A, -B, -D, and -E were all similar for WBSF ($P > 0.05$). **CONCLUSION:** The differences seen within the quality traits evaluated show a large amount of variation among brands marketed as premium. Industry focus should be on narrowing the gap of the quality offered to consumers among premium pork products.

SETTLING VOLUME AND MORPHOLOGY CHANGES IN CROSS-LINKED AND UNMODIFIED STARCHES FROM WHEAT, WAXY WHEAT AND WAXY MAIZE IN RELATION TO THEIR PASTING PROPERTIES

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BACKGROUND AND PURPOSE: Waxy wheat is a specialty wheat that can be milled into valuable products, including waxy wheat starch (WWS) and vital wheat gluten. A few studies indicated cross-linked WWS has a potential to replace waxy maize starch (WMS), which is a predominant food thickening agent. However, there is no research thoroughly characterized the properties of cross-linked WWS. The objective of this study was to correlate the morphology changes and settling volume to the pasting properties of cross-linked and unmodified starches. **METHOD:** Wheat starch, WWS and WMS, in 40% aqueous slurry with 2.0% sodium sulfate (db), were reacted with 0.01, 0.03 and 0.06% (db) POCl_3 at pH 11.5 and 25°C for 1 h. Pasting, morphology and thermal properties were analyzed by a Micro Visco-Amylograph, a light microscope, and a differential scanning calorimeter, respectively. **RESULTS/FINDINGS:** Pasting and microscopic data for WWS and its cross-linked products were similar to WMS, except changes occurred at ~5°C lower in temperature. When the same level of POCl_3 was used, cross-linked WWS had a greater settling volume than the cross-linked WMS, and at 6% solids, WWS cross-linked with 0.01% POCl_3 had a higher pasting viscosity than the cross-linked WMS, but at 7 and 8% solids, WMS cross-linked with 0.03% POCl_3 had a higher pasting viscosity. **CONCLUSION:** Cross-linked WWS gelatinized and cooked to a thick non-cohesive paste at a relatively lower temperature than cross-linked WMS, and its paste re-associated less than cross-linked WMS. Such properties increase the market potential of cross-linked WWS as a thickening agent.

ISSUES AND SUCCESSES IN TESTING A PRODUCT CATEGORY IN AN UNFAMILIAR COUNTRY

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Background and Purpose: When developing new products, it is important to understand not only the category in which the products belong, but also competitor products and characteristics of existing products that may serve as inspiration. It is common to analyze white spaces and generate ideas based on the market in one's home country; less common is it to look to other countries for inspiration for new ideas and products. Differences in politics and culture may create difficulties for researchers as they attempt to study and navigate around a foreign country. The objective of this research was to review the snack food market in Japan, understand the issues that arise when studying markets in an unfamiliar country, and generate solutions to these issues for future endeavors. **Methods:** Fifteen graduate students and faculty traveled to Kyoto, Japan to review the region's snack food market. The pool of researchers was divided into smaller groups and given areas to target in search of novel snacks and packaging. A selection of the snacks were tasted by the group and a discussion was held regarding challenges in obtaining snacks. **Results:** Issues that were found to need addressing included lack of space, navigation, translation of directions and packaging, and product transportation. Real time problem solving and group discussion lead to solutions to overcome such challenges. **Conclusion:** The experiences and insights from the research team are useful in guiding teams to accomplishing similar tasks in unfamiliar countries. This information is translatable to disciplines outside of Sensory Analysis and to products outside of snack foods.

LEXICON DEVELOPMENT AND NAPPING FOR THE SENSORY DESCRIPTION OF RYE BREAD IN NORTHERN EUROPE AND THE UNITED STATES

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BACKGROUND AND PURPOSE: Rye bread that holds a major part of the Northern European cuisine is known for its flavour versatility. Due to the huge flavour difference between Rye bread from Northern Europe and the US, this study was designed to 1) develop a lexicon which acts as a tool for understanding the flavor profile of rye bread consumed in Northern Europe and the US and 2) do napping of rye bread to understand existing market trend and white spaces. **METHOD:** A lexicon for describing rye bread flavor was developed using "Modified Flavour Profile" descriptive analysis method. A highly trained panel, defined and referenced 28 flavor attributes for 32 Northern European and US rye breads. The lexicon was tested with 18 representative samples. Napping of rye bread was also done and the samples were positioned on the 'nappe' to determine their position in the market and white spaces for new product possibilities. **RESULTS/FINDINGS:** Both Principal Component Analysis and Cluster Analysis revealed that the flavour of Northern European rye bread was spread over a wide range scoring high in sweet, overall grain, bran and rye than US rye breads which were characterised by only few flavour notes. Napping data helped to find the white spaces in the rye bread market. **CONCLUSION:** Rye bread industry, researchers and consumers will benefit from this lexicon with precise definitions and references that reliably differentiate and characterize the flavour attributes of rye bread. White spaces identified in the nappe will help to target areas for new product development.

EFFECT OF XANTHAN GUM ON DOUGH PROPERTIES, GLUTEN MICROSTRUCTURE, AND BREAD QUALITIES MADE FROM WHOLE GRAIN WHEAT FLOUR

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BACKGROUND AND PURPOSE: Whole grain wheat contains more nutrients than refined wheat and is associated with several health benefits. However, whole wheat bread is often less appealing due to distinctive flavor, gritty mouthfeel, harder texture, darker color, and small volume. This study aimed to determine the effect of xanthan gum (XG) on whole wheat dough and bread, especially dough properties, gluten microstructures, loaf volume, and bread texture. **METHODS:** Bread was prepared from whole wheat flour with addition of XG at 0.1 to 1.0%. Dough mixing properties were determined using a mixograph. Dough was also evaluated for extensibility, stickiness, and elongational viscosity. Gluten protein structure and composition were analyzed using FT-IR spectroscopy and RP-HPLC. Fresh bread was evaluated by specific volume, moisture content, texture profile analysis (TPA), and crumb structure. Moisture content and hardness were measured again after 48h of storage to determine staling. DSC was used to determine changes to bread stored for 1d and 7d at 4°C. **RESULTS:** XG increased the specific loaf volume of whole wheat bread from 3.74 cm³/g to 4.38 cm³/g. Initial hardness decreased more than two-fold. Hardness at 48h was also decreased, but the rate of staling based on hardness was not reduced. The crumb structure had more and larger air cells with somewhat thicker walls. DSC suggested that starch retrogradation and complexation with lipid was affected somewhat by XG. **CONCLUSION:** Xanthan gum represents an opportunity to increase loaf volume and hence bread yield and for improving the sensory appeal of whole grain bread due to decreased hardness.

YOUNG CHILDREN'S ABILITY TO DISCRIMINATE BETWEEN ANTISOCIAL AND PROSOCIAL TEASES

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BACKGROUND AND PURPOSE: The present study was designed to examine 5- to 8-year-old children's ability to discriminate between antisocial and prosocial teases and determine whether their age and experiences within the home are associated with their ability to recognize these two types of teases. **METHOD:** Sixty-seven children and their parents participated in the present study. Parents completed an online questionnaire that assessed the extent to which their child experiences antisocial/prosocial teasing in the home and their judgment concerning their child's ability to discriminate between these teases. During individual interview sessions, each child was presented with four narrated picture stories adapted from our prior research that depict an antisocial tease or a prosocial tease and were asked to respond to questions about the teases. **RESULTS:** Results revealed that the children were able to discriminate between antisocial and prosocial teases. Although the children's parents/legal guardians indicated that the children had more frequent experience with prosocial than antisocial teases in the home, the children were better able to correctly identify the intent of antisocial teasers than prosocial teasers and the parents/legal guardians (correctly) indicated that their child would be better able to recognize an antisocial tease than a prosocial tease. **CONCLUSION:** Despite the finding that the children's comprehension of antisocial teasing tended to exceed their comprehension of prosocial teasing, our findings indicate that being relatively young (i.e., 5/6 years old vs. 7/8 years old) and having relatively frequent experience with antisocial teasing in the home may be associated with some children's difficulty in recognizing the intent behind antisocial teases.

AN EXPLORATORY STUDY OF CHANGE MECHANISMS FOR AMBIVALENCE REDUCTION IN YOUNG ADULT CYCLICAL RELATIONSHIPS: FACTORS THAT PROMOTE AND DETRACT FROM DECISION-MAKING RESILIENCY

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BACKGROUND AND PURPOSE: People who have experienced at least one or more breakup and renewal in their dating relationship (termed "relationship cycling") are at significantly higher risk of experiencing lower satisfaction and higher conflict, violence, and instability during marriage (Clifford, Vennum, Busk, & Fincham, 2017; Vennum et al., 2015). While the research continues to expand on what we know about the concurrent and enduring risks for distress associated with relationship cycling, little is known about what interventions may reduce these risks. The purpose of this study was to obtain the perspectives of emerging adults who had experienced stressful levels of ambivalence in their cyclical relationship processes to inform prevention and intervention efforts with couples at risk for relationship cycling. **METHOD:** After conducting five focus groups with emerging adults with experience in cyclical relationships, the data were qualitatively coded using meaning units. **RESULTS/FINDINGS:** The results of this study provide important initial ideas for addressing ambivalence and enhancing "decision-making resiliency" (DMR), a term that emerged from the data, defined as an individual's capacity to utilize one's value system and confidence in themselves to make and abide by difficult decisions. Researchers identified specific factors that participants reported promoted and detracted from "decision-making resiliency". **CONCLUSION:** Building off of what is known about the nuances of cyclical relationships, this study aims to inform assessments and intervention(s) for helping professionals (e.g., therapists, relationship educators) aimed at bolstering resilience and decision-making skills in cyclical couples to reduce further distress.

LEISURE ACTIVITIES AND CLASSES OF DEPRESSIVE SYMPTOM TRAJECTORIES

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BACKGROUND AND PURPOSE: It is important to understand what individual activities are linked with expected changes in depressive symptom trajectories. **METHOD:** Using 1,876 heterosexual German couples from the longitudinal Panel Analysis of Intimate Relationships and Family Dynamics study, we tested separate growth mixture models of men's and women's depressive trajectories. **RESULTS/FINDINGS:** The results supported two classes of depressive trajectories for both men (entropy = .93) and women (entropy = .94). Both had a low-stable class characterized with low initial depressive symptoms that were stable across four years (95% of women and 93% of men), whereas men had a moderate initial level class that increased in depression across time (7%) and women had a moderate initial level class that decreased across time (5%). Women who eat out at restaurants more frequently were twice as likely to be in the moderate-and-decreasing class of depression trajectories, compared to the odds of being in the low-and-stable class ($b = .73, p < .01, OR = 2.08$). Also, women who went out with friends more frequently had significantly higher initial levels of depression, but significantly lower rates of depression across four years. Men who played in sports more frequently, and men who spent more time with friends had significantly higher rates of initial levels of depression. **CONCLUSION:** Depression is a pervasive and complex presenting concern for therapists to treat. Rates of change in depression across time is in part a function of how and with whom people spend their leisure time.

IMPACT OF FOUR-WEEK ONLINE INTERVENTION ON AUTONOMY, ATTITUDE TOWARD PHYSICAL ACTIVITY AND PERCEIVED BEHAVIOR CONTROL

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BACKGROUND AND PURPOSE: Physical inactivity is associated with the development of numerous health problems. One approach to address this issue is to target individuals' motivations and attitudes towards physical activity. The purpose of the present study was to evaluate and compare the impact of online modules on individual sense of autonomy, attitude, and perceived behavioral control (PBC) relating to physical activity. **METHOD:** Four online modules were created and delivered over the course of four weeks via Qualtrics. Participants were randomized into a Control (n=46) and Intervention (n=47) group. Both groups completed modules relating to different topics, including *'finding the reason why'*, *'how to become more active'*, *'external influences'* and *'making a plan'*. In addition to receiving information, the Intervention group also answered questions within the module to apply the content to them personally. Repeated measures ANOVAs were utilized to examine changes in attitude, autonomy, and PBC from pre-post intervention. **RESULTS:** Participants in both groups reported an increase in overall attitude towards physical activity [$F(1,47)=4.284, p=.044$], PBC [$F(1,47)= 5.987, p=.018$], and sense of autonomy [$F(1,47)=14.59, p=.000$]. Most of the change in attitude was due to a decrease in negative attitudes, whereas positive attitude toward physical activity was similar pre-post intervention. No significant differences were detected between groups. **CONCLUSION:** A brief online intervention can impact participant attitudes and autonomy toward physical activity. A greater sense of autonomy and better attitude may translate to increased physical activity behavior. This suggests that future interventions may benefit from incorporating brief online modules to improve individual perceptions of physical activity.

IMMERSIVE ZOO EXPERIENCE FOR CONSERVATION STEWARDSHIP: EVALUATING THE EFFECTIVENESS OF TARONGA ZOO'S TIGER TREK IN DRIVING BEHAVIOR CHANGE IN ZOO GUESTS

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BACKGROUND AND PURPOSE: This project evaluates the effectiveness of the immersive zoo experience; Tiger Trek at Taronga Zoo in Sydney, Australia, in its ability to drive pro-conservation behaviour change related to Certified Sustainable Palm Oil as well as increase pressure on manufacturers to use 100% Certified Sustainable Palm Oil. This exhibit utilises best practices for exhibit design and interpretation that are known to facilitate behaviour change, therefore data should be generalisable to other zoo exhibits adopting these practices. **METHOD:** Survey data will be collected from zoo guests prior to entering the Sumatran Tiger Trek exhibit, upon exiting the exhibit as well as at one, three and six month intervals post visit to investigate the immediate and long-term impacts of the exhibit on guests' pro-environmental behavioural intentions and actual behaviours. The study uses the Integrated Model of Behaviour Change (De Vries, Reubsat & De Nooijer, 2004) due to the incorporation of diverse, holistic and innovative potential influencers of behaviour including predisposing factors, information, awareness, motivation, intention, ability and barriers. **RESULTS/FINDINGS:** The findings of this study will identify areas for development and improvement to help Taronga zoo and other conservation organisations drive change through their own communities to deliver positive outcomes for conservation and biodiversity. **CONCLUSION:** Amid a rapidly growing human domination of earth's ecosystems and increasing anthropogenic extinctions, zoos are often expected to embrace a modern role as proactive conservation organisation. Many are leading the way through innovation and the integration of emerging technologies in the development of educational and inspirational guest experiences.

HOW GROUPS OF STUDENTS FRAME DISCUSSION IN PHYSICS

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BACKGROUND AND PURPOSE: In order to understand learning in physics, we need to know how students engage in physics class and how this is related to solve physics problem successfully. **METHOD:** We use epistemological framing to interpret students' behavior during in class group problem-solving in an Electromagnetism Fields 1 course at Kansas State University. We present markers for where discussion falls on these two frames. The data for this study came from the classroom which is arranged with students sitting around tables in groups of four with a whiteboard near each table. **RESULTS/FINDINGS:** Our analysis includes two framing; sense-making and answer-making. There is some behavior which is answer-making and there is some behavior which is sense-making, but we find that the group spends most of its time in region between two frames where problem-solving happen. **CONCLUSION:** Problem solving is a process of negotiating answer-making and sense-making activities collaboratively in a group. In addition, we identify a set of factors that help to explain the Instructor role.

AFFILIATING OR ALIENATING? WHITE INDIVIDUALS' PERCEPTIONS OF BLACK RACIAL SLURS USED BY BLACK INDIVIDUALS TOWARD WHITE INDIVIDUALS

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BACKGROUND AND PURPOSE: Racial slurs have historically been used to disparage. However, research suggests not all situations in which they are used are perceived negatively. Slur reappropriation is the adoption of slurs by the groups they were meant to target as a means of affiliation. We examined whether this ingroup affiliation may extend beyond ingroup use between Blacks to intergroup use such as when a Blacks use “nigga” toward Whites. **METHOD:** In four studies we used vignettes depicting a Black individual using a racial slur toward a White individual and measured Whites’ perceptions of the slur as threatening, trivial, and as expressing negative emotions toward the target. **RESULTS/FINDINGS:** We showed that Whites perceived Black racial slurs used by Blacks toward Whites more positively than White racial slurs and non-racial insults (Study 1, $n = 303$). However, higher levels of racial prejudice in Whites were related to more negative perceptions of Black slurs used by Blacks toward Whites (Study 2, $n = 194$). Interestingly, higher levels of racial prejudice were associated with perceiving slurs as trivial (leading to less negative perceptions of these Black slurs) or as threatening (leading to more negative perceptions of these Black slurs; Study 3, $n = 353$). Both reactions led to greater perceived acceptability of prejudice toward Blacks (Study 4, $n = 458$). **CONCLUSION:** Black racial slurs used by Blacks toward Whites can foster ingroup affiliation with Whites lower in prejudice. However, Whites higher in prejudice may perceive these racial slurs as either trivial or threatening, and consequently justify discrimination toward Blacks.

AN ENHANCED, HIGH-RESOLUTION GLOBAL INVENTORY OF DAMS AND ARTIFICIAL WATER IMPOUNDMENTS

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BACKGROUND AND PURPOSE: Since the 1950s-60s, the world has seen a dramatic increase in artificial water impoundments in an unprecedented effort to eliminate the spatial and temporal variations in water accessibility. Water supplies in some regions are already highly stressed in order to satisfy the ever-growing demand for agriculture, industrial, and domestic uses. With nearly 30% of the world's population living in water scarce regions, an improved understanding of total stored surface water has never been more needed. Yet, a complete and spatially-explicit inventory of such storage capabilities is lacking worldwide. **METHOD:** Using a recently completed high-resolution global waterbody mapping extracted from thousands of Landsat images and several open-source dam registries, we here aimed to inventory dams and artificial reservoirs across the world. Geospatial analysis and novel programming techniques allowed for the consolidation of five dam datasets and the subsequent extraction of the associated reservoirs. **RESULTS/FINDINGS:** The following techniques resulted in the identification of 90,000 dam and reservoir pairs that covers 646,673km² and stores a total of 7,313km³. **CONCLUSION:** The results will expand our understanding of the spatial distribution of artificially impounded surface water and help quantify the amount of water readily available. At a time of increasing concern for water security, these datasets can be used to better implement water policies, logically construct new artificial water impoundments, or create improved water budget plans to ensure water supplies into the future.

REMOTE THERMAL INFRARED IMAGING FOR RAPID SCREENING OF SUDDEN DEATH SYNDROME IN SOYBEAN

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BACKGROUND AND PURPOSE: A fungal infection in soybeans caused by *Fusarium virguliforme*, commonly referred to as sudden death syndrome or SDS, can cause yield losses of over 70%. Infected plants are scored by hand, based on severity and extent of infection. This manual process is time intensive and not practical for large acreages. Diseased plants have shown elevated canopy temperatures and canopy temperature measurements could potentially exhibit disease within plants. Diseased plants emit higher temperatures due to disease symptoms decreasing the amount of available healthy leaf surface therefore decreasing the number of stomata available for evapotranspiration. However, thermal infrared sensors have not been utilized to capture changes in canopy temperatures to detect SDS in soybean. Therefore, the goal of this study was to 1) use a thermal infrared sensor to assess plant health and vitality and 2) evaluate canopy temperatures over the growth season to assess disease development. **METHOD:** A thermal infrared camera was mounted on a small unmanned aerial systems and aerial imagery was captured five times over the growing season. The first flight was achieved once foliar symptoms first began to develop. The remaining four flights occurred before, during, and after full pod fill when symptoms had reached their apex. **RESULTS/FINDINGS:** Preliminary results show that diseased plants exhibited elevated canopy temperature as symptoms develop. Elevated canopy temperature changes were observed at early SDS symptom development. **CONCLUSION:** Thermal imaging can be utilized to detect diseased plots. Future studies will be conducted to understand how to mitigate the disease based on the thermal measurements.

DEVELOPMENT OF A MACHINE VISION SYSTEM FOR REAL-TIME MEASUREMENT OF SEED SPACING AND SEEDING DEPTH OF CORN

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BACKGROUND AND PURPOSE: Proper seed placement is a critical measure of precision planters performance. However, growers manually measure seed spacing and seeding depth that requires large amount of work and susceptible to errors. Automating the seed placement assessment could provide real-time more reliable information on planter performance for automatic implementation of planter settings for enhanced seed placement accuracy. Therefore, the objective of this study was to 1) develop a high speed imaging, global position and trench depth measurement system and 2) quantify system capability to accurately assess seed placement when planting corn.. **METHOD:** A computer vision system was developed for automatic measurement of real time seed spacing and seeding depth during planting. It consists a high speed camera, light section sensor and an angle sensor. These components are mounted on a 3D-printed frame which are attached to the test row unit. A cultivation assessment test apparatus was used to evaluate the performance of the system. High speed images were stitched to create a mosaic quantify seed spacing and depth during planting **RESULTS AND CONCLUSION:** The system was able to capture high speed images of seeds planted at 1 mph and 4.5 mph ground speeds. Preliminary results showed that the calculated seed spacing using the image mosaics could be assessed with a measurement accuracy of 95.4%. The target seeding depth of 2 inches was achieved for 65% of the time during the conduct of the experiment. For future tests, the image stitching algorithm should be improved and the system should be evaluated during actual planting conditions.

DEVELOPING NEW LASER SOURCES AT THE EXTREME EDGE OF ULTRAFAST OPTICAL TECHNOLOGY

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BACKGROUND AND PURPOSE: The history of science is also the history of measurement. As better measurement technologies have developed, so too has science. My research focuses on developing tools to precisely measure some of the fastest processes known in nature. Examples include rotations and vibrations of molecules, formation of chemical bonds and electronic properties of semi-conductors. These processes represent the most fundamental, dynamic building blocks of our natural world. Understanding these dynamics is essential for the continued advancement of technologies in medicine, computation, and material sciences. **METHODS:** An essential tenant of measuring a dynamic process lies in the fact that a measurement technique must be faster than the dynamics being measured. Optical laser pulses, with durations as short as or shorter than several femtoseconds (10^{-15} seconds), represent the state-of-the-art in ultrafast measurement techniques. Using the unique properties of non-linear optics such as High Harmonic Generation, Optical Parametric Amplification and Difference Frequency Generation, it is possible to produce ultrafast pulses with wavelengths spanning from X-rays to Long Wavelength Infrared. In addition to their extremely short durations, these pulses can be focused to produce extremely high intensities, greater than 100 terawatts per square centimeter. **RESULTS & CONCLUSION:** We demonstrate a technique capable of generating high-energy laser pulses with wavelengths ranging from $5\mu\text{m}$ to $9\mu\text{m}$. This represents the most intense, broadband pulses ever created at these wavelengths. Also, a unique method for shaping the spatial mode of an ultrafast laser is shown along with the work towards using it to produce ultrafast pulses at X-ray wavelengths.

NOVEL STRATEGIES FOR RECOVERY OF ORGANIC ACIDS FROM WHEY – ADDRESSING THE PRESSING ISSUES IN BIOTECHNOLOGY

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BACKGROUND AND PURPOSE: Whey, a by-product of casein and yoghurt manufacturing process is often wasted or sprayed on arable land causing runoff problems. Processing of these underutilized substrates to produce a wide range of commercial products via biological processes is of great significance. However, low productive fermentation and complex product recovery processes severely limits its potential industrial application. This research aims to establish an efficient approach for the production and recovery of organic acids from valuable waste materials such as whey. **METHOD:** Fermentation of whey was conducted in batch reactor using *L. buchneri* at low pH values. Several weak base anion exchange resins were tested for the recovery of organic acids from synthetic and original fermentation broths. Furthermore, uptake studies were conducted at different pH values to test its effect on the efficiency of ion exchange resins for the recovery of organic acids. **RESULTS:** The fermentation of whey produced approximately 15 g L⁻¹ and 26 g L⁻¹ of lactic and acetic acids while other by products of propylene glycol and ethanol contributed to a total of 40 g L⁻¹. Weak base anion exchange resins with high basicity showed higher uptake capacities. **CONCLUSIONS:** This novel low pH fermentation process combined with ion exchange recovery process overcomes several bottlenecks in the recovery of valued-added compounds from waste materials. Experiments on continuous fermentation with immobilized bioreactor system with process modeling would help in process design and scale up. Experiments focusing on fixed-bed column studies will help to understand the scalability of the recovery process.

MILD CONDITION POST-SYNTHESIS ETCHING OF INP NANOCRYSTALS

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BACKGROUND AND PURPOSE: Quantum dots (QDs) are a class of materials that have a lot of applications in photovoltaic devices. Cadmium based QDs have been intensively studied due to their emission in visible region. Considering the toxicity of cadmium and growing need for highly efficient and elementally nontoxic QDs, researchers are trying to enhance indium phosphide (InP) QDs fluorescence efficiency for its application in displays, solar cells and other photovoltaic devices. Here we show a new method for etching InP QDs for obtaining emissive NCs. **METHOD:** In this study, InP nanocrystals (NCs) was prepared as reported previously. NCs are washed for several times and then etching reagents are added to them. The reaction mixture kept under vigorous stirring for several hours to several days. The size and fluorescence of NCs studied over time by recording UV-Vis and photoluminescence spectra of NCs. **RESULTS/FINDINGS:** The initial InP QDs have no emission due to non-radiative processes occurs on the surface. By etching particles, due to surface passivation, emissive nanocrystals are obtained. Smaller NCs are prepared by increasing the etching reagents. **CONCLUSION:** For the first time, InP NCs are etched under mild condition in nonaqueous solvent without using acid. The final NCs were dispersed in water.

INHIBITION ROLE OF 6-THIOPURINE AND ITS EXCRETION METABOLITES ON BILIRUBIN EXCRETION PATHWAY

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BACKGROUND AND PURPOSE: 6-thiopurine (6TP) is a potent drug that has been used to treat acute lymphocytic leukemia for decades. Despite the potent therapeutic activity of this drug, it fails to provide remission due to the severe liver toxicity or jaundice associated with its administration. To decrease this major side effects, patients are on and off treatment regiment that allows toxicities to subside. This regiment greatly reduce 6TP therapeutic efficacy. Given that 6TP administration results in jaundice, caused by accumulation of high levels of bilirubin in the body, we hypothesize that this is from the direct inhibition of the bilirubin excretion pathway. **METHOD:** We have investigated the inhibition properties and roles of 6TP and its oxidative excretion metabolites towards UDP-glucose dehydrogenase (UDPGDH) and UDP-glucuronosyl transferase (UGT1A1); two-enzyme responsible for bilirubin excretion mechanism both in vitro and in vivo. **RESULTS/FINDINGS:** We have found that 6TP weakly inhibits UDPGDH, but also found that its main oxidative excretion metabolites possess a nearly six-fold greater inhibition. Through these findings, we have concluded that the C2 and C8 positions of 6TP play a direct role in the reported toxicities. Neither 6TP or its excretion metabolites were shown to inhibit UGT1A1. **CONCLUSION:** Through understanding how 6TP and its metabolites interfere with bilirubin excretion pathway, structure activity relationship studies can be carried out to construct new class of 6TP analogs that will, in hope, possess reduced or eliminated toxicities. These analogs can be used against leukemia and other cancer, with our newly developed delivery molecule.

EFFECTS OF LONG-TERM FERTILIZATION AND FIRE REGIME ON KEY NITROGEN-CYCLING PROCESSES IN TALLGRASS PRAIRIE

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BACKGROUND AND PURPOSE: Nitrous oxide, a greenhouse gas with about 300 times more warming potential than carbon dioxide, is primarily produced by the soil microbial processes of nitrification and denitrification. Frequent fire as well as fertilizer application are two common land management practices with the potential to greatly affect nitrification and denitrification, and therefore nitrous oxide production. In this study, we were interested in determining nitrification and denitrification rates in soils with a history of annual burning, annual fertilization, both, and neither. **METHOD:** The Konza Prairie Long-Term Ecological Research program has maintained a plot-level manipulation in which plots have been burned annually, fertilized annually, both, or neither for the past 30 years. We sampled each of these plots every five weeks from April to late September and determined both the nitrification and denitrification potentials of these soils using phosphate buffer extraction and acetylene inhibition technique, respectively. **RESULTS/FINDINGS:** We found both nitrification and denitrification potentials to be highest in unburned, annually fertilized plots, and lowest in annually burned, unfertilized plots. Denitrification potential was highest in June and lowest in April. **CONCLUSION:** The suppression of fire and addition of nitrogen fertilizer enhances soil nutrient content, increasing potential microbial nitrous oxide production. In contrast, annual burning removes nitrogen and promotes plant and microbial retention of nutrients over gaseous losses. This information can be used by land managers interested in reducing greenhouse gas emissions.

EXPOSURE TO LONG-LASTING INSECTICIDE NETTING REDUCES THE DISPERSAL CAPACITY AND MOVEMENT OF STORED PRODUCT BEETLES IN THE LABORATORY

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BACKGROUND AND PURPOSE: The lesser grain borer, *Rhyzopertha dominica*, and red flour beetle, *Tribolium castaneum*, are two notorious primary and secondary pests of stored products. Extensive research has been done to prevent the establishment and subsequent infestation of the insects in stored product facilities. Long-lasting insecticide netting (LLIN) for mosquitoes has proved effective in controlling the spread of malaria, but little research has been conducted on the LLIN's behavioral effects of stored product insects. **METHODS:** In this study, a movement and dispersal assay were performed. In the movement assay, the video-tracking software, Ethovision, recorded the movement of *R. dominica* and *T. castaneum* after 1-10 min exposure to LLIN or control netting and were run after a waiting period of 1 min, 24 hr, 72 hr, or 7 d. In the dispersal assay, *R. dominica* and *T. castaneum* were exposed 5 minutes to LLIN or control netting, and then adults were given the opportunity to disperse to new food patches at three different distances. **RESULTS:** The results from the movement assay showed a significant reduction in horizontal movement and significant increase in angular velocity for beetles exposed to LLINs, indicating that movements were more erratic and less directed. The dispersal assay revealed that exposure to LLIN significantly decreased the dispersal ability of both species with averages of 0-3 adults from a group of 20 beetles reaching the new food patch. **CONCLUSION:** LLINs can be an effective tool for the prevention of stored product insect establishment and colonization.

EFFECT OF INTEGRATING THE ENTOMOPATHOGENIC FUNGUS, *BEAUVERIA BASSIANA* AND THE ROVE BEETLE, *DALOTIA CORIARIA* IN REGULATING WESTERN FLOWER THRIPS, *FRANKLINIELLA OCCIDENTALIS* POPULATIONS UNDER GREENHOUSE CONDITIONS

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BACKGROUND AND PURPOSE: Western flower thrips (WFT), *Frankliniella occidentalis* (Pergande) (Thysanoptera: Thripidae), is an important insect pest causing substantial economic losses on horticultural crops worldwide. However, WFT populations have developed resistance due to intensive insecticide applications. Therefore, implementing alternative plant protection strategies is warranted, such as combining entomopathogenic fungi with arthropod natural enemies. The objective of this study was to determine the effectiveness of using an entomopathogenic fungus, *Beauveria bassiana* in conjunction with a soil-dwelling predatory rove beetle, *Dalotia coriaria* to regulate WFT populations under greenhouse conditions. **METHOD:** Two eight-week greenhouse experiments were conducted using chrysanthemum, *Dendranthema x morifolium* plants with five treatments including: *B. bassiana* alone, rove beetle alone, *B. bassiana* and rove beetle combination, standard insecticides, and water control. The number of WFT adults captured on yellow sticky cards was assessed weekly. A final quality assessment of foliar damage caused by WFT feeding was also recorded. Furthermore, a cost comparison associated with treatments and application rates was performed. **RESULTS:** Overall, the weekly number of WFT adults captured on the yellow sticky cards was not significantly different among the five treatments. Moreover, there was no significant difference regarding foliage quality among the five treatments. However, the cost savings was 57% (in US dollars) for the *B. bassiana* and rove beetle combination compared to standard insecticides. **CONCLUSION:** Therefore, integrating the entomopathogenic fungus, *B. bassiana* with the rove beetle, *D. coriaria*, may provide sufficient regulation of WFT populations, as well as reduce input costs associated with insecticide applications.

WATER SOLUBLE CARBOHYDRATES ACCUMULATION IN WHEAT STEMS USING NIR SPECTROSCOPY

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BACKGROUND AND PURPOSE: The capacity for storage and utilization of water soluble carbohydrates in the stem (WSC) is an important trait to support grain filling, particularly under stress. WSC has been found to be an important contributor to yield, biomass, and harvest index under stress. However, it is very challenging to measure WSC in several genotypes in the breeding program using conventional method. So, the main objectives of this study is 1) develop a quantitative near infrared spectroscopy (NIRS) model for determination of water soluble carbohydrates 2) describe the variation of WSC in wheat varieties in relation to yield and yield components. **METHOD:** A set of 30 varieties were planted in western Kansas in a randomized complete block design with 4 replicates in each treatment. The NIRS and WSC were measured in finely ground 20-wheat-stems fifteen days after flowering. **RESULTS AND CONCLUSIONS:** The calibration and cross-validation of NIRS data with measured WSC concentration resulted in R^2 around 0.9 and SECV (Standard Error of Cross Validation) of 4% using partial least square regression in 25% of samples. Accumulation of WSC was significantly higher below top node compared to the stem part above top node. WSC has significant positive correlation with yield and grain weight. Plant height affected more on translocation than on the accumulation of water soluble carbohydrates.

EFFECTS OF DROUGHT STRESS ACROSS POPULATION AND LIFE STAGE IN WILD FOXTAIL MILLET *SETARIA ITALICA SPP. VIRIDIS*

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BACKGROUND AND PURPOSE: Drought is a major source of abiotic stress for plants, and poses an increasing threat to conservation, economic activities, and agriculture as climate change increases the stochasticity of precipitation events worldwide. Drought tolerance varies widely in the plant kingdom, both between species and across differently adapted populations within species. Water stress decreases photosynthesis, and can diminish vegetative growth and reproductive allocation, both of which have serious consequences for agricultural and bio-energy crops. **METHOD:** Previous work has shown that the effects of drought stress vary across different life stages. My research examines the physiological and transcriptomic effects of drought stress across life stages in the wild foxtail millet, *Setaria italica* subspecies *viridis*, a close relative of the agriculturally important foxtail millet, *Setaria italica*. We will compare photosynthesis, fluorescence, thermography, flowering, and seed production in differently adapted accessions of *S. italica ssp viridis* exposed to drought stress at three different life stages (pre-reproductive, bud-stage, and flowering). Leaf tissue samples for gene expression analysis will be collected before, during, and after the experimental period of drought. **RESULTS/FINDINGS:** In a pilot study using *S. italica ssp. viridis* accessions from Iran and Russia, photosynthetic rate reached zero in an average of 15.7 days for the Iran accession, which flowered during drought treatment, and 14 days in the Russia accession, which did not flower, suggesting that flowering may influence drought response. **CONCLUSION:** This research will help elucidate the effects of population adaptation and life stage on drought stress response in a close relative of an important agricultural crop.

COLD STRESS RESILIENCE AT EARLY SEEDLING IN SORGHUM DETERMINED BY INTEGRATING AERIAL IMAGERY AND DESTRUCTIVE PHENOTYPING

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BACKGROUND AND PURPOSE: Sorghum is highly sensitive to cold temperature which limits its cultivation in temperate conditions. This study was conducted to quantify early vegetative stage cold tolerance in four promising cold stress tolerant sorghum lines by integrating aerial imagery and destructive phenotyping. **METHODS:** Four promising cold stress tolerant sorghum lines (ARCH10747-1, ARCH10747-2, ARCH12012 and ARCH12045), a known early stage cold tolerant check line (SQR) and a susceptible US elite line (RTx430) were accessed for their resilience to early stage cold stress under field and controlled environments. Seedlings were harvested one month after emergence and leaf area, shoot weight and root weight were recorded as a measure of early seedling vigor. Seedling emergence rate and number were recorded. Aerial phenotyping using UAV (Unmanned Aerial Vehicle) fitted with RGB and multispectral cameras recorded reflectance based vegetation indices. **RESULTS AND CONCLUSION:** No difference in seedlings emergence and early seedling vigor was found among the genotypes in both field and controlled environment under normal temperature conditions and regular plantings. However, with cold stress exposure in controlled environment and during early plantings in field, ARCH lines recorded superior seedling emergence and early seedling vigor compared to check cold-tolerant line (SQR). The results indicate presence of novel cold tolerant allele/s in these lines for minimizing early stage cold damage and exhibited potential to be integrated into ongoing breeding programs. Analysis of the aerial images collected at higher temporal frequency is currently ongoing and findings will also be discussed in the context of other field and growth chamber investigations.

TOXICITY OF FINE POWDERS OF FILTER CAKE AND TRIPLEX AGAINST *SITOPHILUS ORYZAE* ADULTS ON CONCRETE ARENAS

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BACKGROUND: Filter cake and Triplex are powdered by-products of aluminum sulfate and soap factories, respectively. There is limited data about the use of these powders as insecticides. This study was aimed at determining contact toxicity of both powders against *Sitophilus oryzae* (L.), a common pest in stored grains.

METHODS: Lethal concentrations of both powders to *S. oryzae* were determined by exposing 10 adults for 12 h in 9 cm diameter concrete arenas inside Petri dishes dusted with filter cake and Triplex at each of the 10 concentrations (0-9 g/m²). Lethal times were determined by exposing adults to 3 g/m² filter cake and 9 g/m² Triplex for 1-24 h. Each treatment was replicated 3 times. After the intended exposure time, adults were transferred to 150-ml round plastic containers with 30 g of wheat and held at 28°C and 65% r.h. for 14 d to determine mortality. Adult progeny production, percent insect damaged kernels (%IDK), and percent weight loss (%WL) were determined after 42 d. **RESULTS:** A 99% mortality of adults was obtained at 8.49 g/m² of filter cake and 21.4 g/m² of Triplex concentrations following a 12 h exposure. The lethal times for 99% mortality of adults after exposure to 3 g/m² of filter cake and 9 g/m² of Triplex were 27.2 and 38.6 h, respectively. A 100% reduction in adult progeny produced, %IDK and %WL was obtained after a 12 h exposure to ≥ 3 g/m² of filter cake. **CONCLUSION:** Both powders were effective by contact against *S. oryzae* when applied to concrete surfaces.

REGULATORS OR CONFORMERS? MECHANISMS OF HYDROGEN SULFIDE TOLERANCE IN AN EXTREMOPHILE FISH

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BACKGROUND AND PURPOSE: Under stress, organisms may adopt two strategies to maintain function: regulation, in which organisms regulate internal concentrations of a substance to maintain homeostasis, or conformity, in which internal concentrations match that of the environment. Hydrogen sulfide (H₂S) environments provide an opportunity to test how these strategies may facilitate adaptation to harsh conditions, because the mechanisms for both conformity (modification of toxicity targets) and regulation (modification of detoxification enzymes) are known. H₂S inhibits cytochrome c oxidase (COX), which halts aerobic ATP production, and it is regulated by sulfide:quinone oxidoreductase (SQR). Populations of *Poecilia mexicana* inhabit sulfidic and non-sulfidic streams in replicated river drainages, facilitating comparisons of mechanisms that mediate adaptation to a single source of selection. Genetic analyses provided evidence for both conformity (evolution of a sulfide-resistant COX) and regulation (increased gene expression of detoxification enzymes), but functional implications of these changes are currently unknown. If fish are regulators, tolerant and non-tolerant populations should differ in the threshold at which homeostasis fails, but if they are conformers, they should differ in the concentration that results in loss of organismal function. **METHOD:** I utilized MitoA, a probe that binds H₂S in mitochondria, to determine how internal H₂S concentrations scale upon exposure to environmental H₂S in two population pairs of *P. mexicana*. **RESULTS:** We found that sulfidic populations maintain internal concentrations of H₂S at low environmental exposures, and that one sulfidic population is capable of maintaining internal concentrations across treatments. **CONCLUSION:** This work provides functional evidence that regulation is an important mechanism for H₂S tolerance.

DIFFERENT FIRE SEVERITIES RESULT IN DISTINCT SUCCESSIONAL TRAJECTORIES IN SOIL MICROBIAL COMMUNITY

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BACKGROUND AND PURPOSE: Wildfires burn large areas of forested land annually, and they are projected to increase in frequency. The fires, however, are rarely uniform and result in patchwork of landscape mosaics that differ in duration and intensity of fires, i.e., severity. Overall, our study aims to gain a deeper understanding of microbial community trajectories over several years following fires of different severities. **METHOD:** Ten pairs of plots were established in the Pringle Falls Experimental Forest in Oregon. For each pair, one plot served as a background control (low severity burn), whereas another mimicked a whole log combustion and included logs piled in 1.5m x 8m x 1m structure for added fuel (high severity burn). The soils were sampled from 0-10cm in depth at each plot before the burn, three weeks after the burn, as well as 2 and 4 years after the burn. DNA was extracted from these soil samples, and ribosomal RNA gene barcode regions were PCR-amplified and sequenced on MiSeq Illumina platform. Community richness, diversity, and composition were compared among the severity treatments and over time. **RESULTS/FINDINGS:** The data show that microbial communities rapidly change in response to fire and the recovery from fire is slow and differs among landscape patches that experienced fires of different severities. **CONCLUSION:** Fire events, high severity events in particular, have lasting impacts on organisms above ground. Our studies indicate that high severity fire disturbances cause similar long-term impacts on microbial communities below ground.

TEMPORAL CHANGES IN SOIL MICROBIAL PROPERTIES ACROSS CROP DEVELOPMENT

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BACKGROUND AND PURPOSE: Microbial activity within the soil is critical for plant growth and development, and a major determinant of crop performance and yield. The temporal change in soil microbial properties with crop rotation is poorly characterized in claypan soils. The objective of the research is to assess how climate, tillage practice, and crop development changes soil microbial properties in claypan soils. **METHOD:** Soil microbial communities were examined through both PLFA analysis and 16S rRNA gene sequencing on an Illumina MiSeq system. Hydrolase and oxidase activities were also measured in this study. Soil physical and chemical properties including pH, moisture content, and soil nutrients were examined. Crop yields were compared with soil properties. **RESULTS/FINDINGS:** Soil pH was lower as corn growing and then increased in one pH degree as soybean growing. Both hydrolase and oxidase activities and population were lower as soybean growing. Carbon and nitrogen-required enzyme activity were greater at wheat planting and following dormant phase. Fungi population was higher in winter. Although soil water content significantly declined in summer, microbial activity and biomass did not change simultaneously. Tillage reduced microbial activity and microbial biomass on average but the changes were only in top 5 cm. While both fungi and bacteria were abundant in the no-till system, the fungal to bacterial ratio was similar in no-till and tillage systems. Specific hydrolase activity per microbial biomass did not change with crop growing phases or seasons. **CONCLUSION:** The interaction between crops and abiotic factors together with tillage effects determined the microbial biomass and activity in claypan soils.

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EXAMINING ARTIST RESIDENCIES AND THEIR IMPACT ON RURAL COMMUNITIES

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BACKGROUND AND PURPOSE: The relationship of art and communities can be fostered through the organization of programs such as artist residencies. This project examines the relationships that these residency programs have with their surrounding communities and the impacts such programs can have on rural environments such as Kansas. This integration of art and community within rural areas may provide a unique opportunity for attracting visitors and promoting economic growth in these areas. **METHOD:** To fully understand the prospects of these programs, we are investigating Volland, Kansas as a preliminary site for an artist residency program. To provide necessary requirements for such a program to succeed, we explored other artist residency programs domestically and internationally, interviewing artists, curators, and program directors to gain an in-depth knowledge of these residencies, evaluating their programmatic elements and determining how their success could be translated to our program. The project consists of the design and implementation of a piece of architecture in Volland, Kansas that integrates itself within the historical fabric and natural environment. Through the designed program and physical structure, the hypothesized outcome is for the residency to garner interest in Volland, Kansas, sparking economic prosperity and artistic growth within the small community and its surrounding rural neighbors. **OBSERVATION AND RESULT:** Once the implementation is complete, the analyzation of how effective the program is can be conducted. However, the limitation of this application is so unique that it cannot be implemented everywhere, and potential points of interest must recognize in detail the opportunities and side effects of such programs.

COST PASS-THROUGH IN COMMERCIAL AVIATION

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BACKGROUND AND PURPOSE: The significant decline in crude oil price worldwide since the mid-2014 directly resulted in substantial fuel expenses reduction for US airlines; whereas whether an average passenger benefit from airlines' fuel costs savings has caused much public debate. A well understanding of how airlines' fuel costs changes resulted from changes in crude oil price is passed through to airfares is not only relevant to consumers and air carriers but also to policymakers and researchers. Previous studies provide empirical evidence of the existence of the pass-through from jet fuel price changes to airfares. However, there is no such work that examines the market channels through which changes in crude oil price is transmitted into airfares and what could be the potential sources that may play a role in influencing the size of pass-through. **METHOD:** We present an empirical analysis of the impact of changes in crude oil price on airfares using a nested logit demand model together with a static Bertrand firm competition and simulations of the changes in crude oil price through each market channel to investigate their relative importance. **RESULTS AND CONCLUSION:** We find an incomplete pass-through rate of 0.02~0.03. This pass-through is mainly driven by the supply side market channel and it remains nearly constant when we simulate the crude oil price from 10% to 100%, suggesting airlines' willingness to pass along a cost shock is very small regardless of the size of the shock. We also find that the average pass-through rate decreases with market distance and the elasticity of consumer demand.

POLARIZATION OF AMERICAN WORKERS: THE BIG SQUEEZE FROM OCCUPATIONAL EXPOSURE TO VALUE-ADDED IMPORTS

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BACKGROUND AND PURPOSE: It is well known that international trade in goods and services has become increasingly important for the United States' economy in the past few decades. The degree to which U.S. exposure to international trade flows affects U.S. wages is still under debate and it has received less attention from the economics profession. **METHOD:** We link U.S. industry-level value-added trade data with U.S. worker-level data from the Current Population Surveys from 1995 to 2002. **RESULTS/FINDINGS:** We find that U.S. occupational exposure to value-added imports has a negative effect on the wages earned by intermediate routine workers, which leads to wage polarization among American workers. In particular, the polarization of wages is primarily driven by occupational exposure to value-added imports of final goods from middle-income countries, while exposure to final goods imported from high-income countries has a smaller impact on polarization. On the other hand, occupational exposure to value-added imports of intermediate goods from middle-income countries is associated with a positive wage effect for least-routine workers, signaling to the presence of strong complementarities between the group of least-routine workers and imports of intermediate goods from this group of countries. **CONCLUSION:** These findings may provide important subsidies to explaining a potential link between economic globalization and the empirically verified polarization of wages in the U.S. economy.

BLOOD AND SOIL: WHAT RICHARD DARRÉ'S ROMANTIC MYTH SAYS ABOUT PRESENT-DAY AMERICA

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BACKGROUND AND PURPOSE: In August 2017, white nationalists descended on Charlottesville chanting "Blood and Soil," a phrase from *A New Nobility Based on Blood and Soil* (1929), written by Nazi Minister of Agriculture Richard Darré. Contemporary observers diagnosed the phrase as tired, racist, and unsettling (Cunningham, *The New Yorker*), but they gave less attention to Darré's original stance. Darré argued the decline of small farms meant the demise of German culture. He attributed this loss to urbanization and a surging industrial economy, which threatened German's true Agrarian roots. These arguments are akin to those made by contemporary American agrarians such as Wendell Berry. *Blood and Soil* later became a seminal text for the Nazi party and was a primary reason for Darré's appointment as agricultural minister. **METHOD and RESULTS:** Using Northrop Frye's mythic concepts of romanticism, my rhetorical analysis of Darré's text reveals that he constructed a dualism: natural, Aryan nobility versus non-natural, non-Aryan deviants. Darré called for noble Germans to build a "wall" to keep out the "shadowings" and "weeds," demonizing a generalized other who Hitler later specified. Darré sought to instill in his audience a perceived crisis of population, place, livelihood, and culture brought on by industrialized notions of progress. President Trump similarly romanticized a natural way of life, appealing to "Blood and Soil" supporters' and sympathizers' sense of loss. **CONCLUSION:** Implications abound for critical race analyses of the American agrarian movement, implicit bias neuroscience, process philosophy, and research on Neo-Nazi discourse.

COMPETITIVE CONDUCT AND ANTITRUST POLICY ACTIONS IN THE US DAIRY INDUSTRY- THE CASE OF DEAN FOODS AND FOREMOST FARMS USA

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BACKGROUND AND PURPOSE: On April 1, 2009, Foremost Farms USA, a Wisconsin-based dairy producers cooperative, sold its consumer products division, which included two dairy processing plants in De Pere and Waukesha, to Dean Foods. The Department of Justice (referred to DOJ) filed a lawsuit on January 22, 2010 against Dean Foods, with the purpose to disassemble the acquisition. Based on the IRI retail scanner data, the primary objective of this paper is to empirically test the effectiveness of Department of Justice's final judgment in this case. **METHOD:** We empirically analyzing demand and supply in differentiated products in the five IRI markets that might be affected by this acquisition. On the demand side, we individually analyze four common sizes of milk by random coefficient logit models, and derive the predicted markups and recover the marginal cost. Then, the non-nested likelihood ratio statistical test is performed to compare which model better approximates price-setting behavior during the merger period and divestiture period respectively. **CONCLUSION:** The results of non-nested test suggest that except the size of 32 ounces milk, in the merger period Dean Foods jointly priced the new brands of milk that it acquired from Foremost Farms USA with its pre-existing brands, and such cooperative price-setting behavior supports the DOJ's anticompetitive concern. Referring to the divestiture period, the non-nested test statistics confirm the effectiveness of the DOJ's divestiture decision.

IMPORT PROTECTIONS IN CHINA'S GRAIN MARKETS: AN EMPIRICAL ASSESSMENT

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BACKGROUND AND PURPOSE: In 2016, the U.S. government sent a dispute request to the WTO, questioning that China is restricting the grain imports through an inappropriate administration of Tariff-rate Quotas (TRQ). The request renewed interests in the role of China in the global grain markets and the economic effects of its import protection policies. This paper aims to provide empirical analysis on this issue by measuring the degree of import protections and quantifying the effects of the TRQ policy on China's grain import demand. **METHODS:** We extend the classical TRQ model to consider the effects of TRQ administration. We then estimate the commodity specific import demand elasticities and calculate for the counterfactual import demand, assuming that the import protections were not imposed. **RESULTS AND CONCLUSION:** We find that the nominal protection rates in China's grain markets were high in 2015. We also find evidence that China's TRQ policy reduced the sensitivity of import demand of rice and wheat to the world prices. The counterfactual analysis suggests substantial increases in the grain imports if without the import restrictions. In specific, the quotas for maize and rice would have been filled in 2015. In terms of trade values, China would have imported 6.6 billion dollars of grain in 2015, instead of 3.7 billion that was observed. The restriction leads to 267 million dollars loss in the export values of the U.S. wheat industry.

STOCK PRICES AND THE ECONOMY IN AMERICA

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BACKGROUND AND PURPOSE: This paper is to investigate the relationship between economic indexes and stock prices of technology companies in America by time series econometrics. This paper is to examine investment strategies whether investors should focus on the economy. There are six models to investigate the relationship between each economic index and stock prices of Apple, Amazon and Alphabet. **METHOD:** Data testing is to know whether data is stationary. Vector Autoregression (VAR) analysis is to know the relationship between variables without immediate effects. By VAR analysis, the results of relationships between variables and the results of forecasting errors will be known. **RESULTS/FINDINGS:** Data is stationary and further analysis is sufficient, but there are cointegration relationships in a model. The economic index and stock prices have relationships and stock prices in same industries affect each other. Errors can be explained by own innovations by VAR analysis. **CONCLUSION:** Data is stationary, but data has no homoskedasticity and no normality. Investors should focus on stock prices in same industries and related economic indexes. The economy may affect stock prices and stock markets. Thus, Lucas Model is not violated indicating that stock markets may fluctuate with the economy.

POPULISM IN MARINE LE PEN'S SECOND PRIMARY ADVANCEMENT SPEECH: A NEO ARISTOTELIAN CRITIQUE

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BACKGROUND AND PURPOSE: The 2016 election cycle was rife with far right candidates, and by extent populism, across the globe. France's Prime Minister election was no exception. Marine Le Pen, leader of the Front Nationale (FN) party, advanced to the final two candidates on a platform full of populist policy and rhetoric. Though her advocacy was similar in nature to that of her father, the previous FN candidate, the general French populace viewed her advocacy much more favorably. **METHOD:** Through a neoclassical approach, I examine Le Pen's speech from her second primary advancement. Qualitative analysis of the speeches content, organization, style, and delivery is examined to determine whether or not this speech was effective and what lasting effects it may have. **RESULTS/FINDINGS:** This speech allowed Le Pen to accomplish three things. Firstly, it allowed both Le Pen and the FN to gain political agency. Secondly, it spurred international engagement with French politics, specifically in support of her candidacy. Lastly, it allowed Le Pen to cultivate a unique identity separate from her family's legacy. **CONCLUSION:** Though she ultimately didn't get elected, Le Pen's populist ideals as exemplified in this speech was the catalyst for changing the French political landscape and redefining herself as a politician.

QUEER COMMUNITIES IN THE FLINT HILLS REGION OF KANSAS COMMUNICATING CONCERNS OF MENTAL HEALTH THROUGH BODY ART

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BACKGROUND AND PURPOSE: The purpose of this research is to explore and more deeply understand how queer individuals in the Flint Hills region of Kansas, who have body art/non-surgical body modifications, communicate concerns of/with mental health through their body art/non-surgical body modifications. Queer individuals identify with a sexuality other than heterosexual and/or a gender identity other than cisgender. Body art/non-surgical body modifications are defined as tattoos, piercings, intentional branding, and/or decorative scarring. **METHOD:** Through engaging in a decolonial interview study, conversations with those who assisted with this research allowed the narratives of their embodied experiences to surface through discussing their body art/non-surgical body modifications. Photographs were also taken to visually represent what these individuals described. **RESULTS/FINDINGS:** The results of this study are two fold. The first track centers on how queer individuals memorialize loss of others in their lives through body art/non-surgical body modifications as a way to cope and grieve. The second track centers on these individuals' experiences with their own mental health. This includes attempts at prevention of engagement with self-harm or self-mutilation, and narratives about events in their lives that sparked concerns with mental health and why they wanted to communicate that moment on their bodies in a permanent or semi-permanent way. **CONCLUSION:** The implications of this research show the importance and need of engaging in critical conversations with members of the queer community about mental health. Additionally, this research engages in how queer individuals communicate more hidden parts of their identity in visible ways through body art/non-surgical body modifications.

Poster Abstracts

Interdisciplinary Research

URBAN CINESEMIOTICS: CHICAGO IN *THE BLUES BROTHERS* AND *THE UNTOUCHABLES*

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BACKGROUND AND PURPOSE: Given the fact that most of human knowledge and experiences about the world are attributed to visual perception, the power of the film to make the urban images in people's mind is considerable. Films provide exceptional visual experiences that can enable us to study the ways in which people and places interact as stories unfold. Although it has become an accepted argument that the city is constructed as much by representations as by the built environment, urban studies have not paid the warranted attention to the cinematic form. This study illustrates how the city may be read through films. **METHOD:** Attempts to interpret the cinematic representation have included a wide variety of perspectives. Semiotics has become a particularly well-developed branch of film studies over the past decades, making major contributions to our understanding of the constitution of the film image or sign, and the meaning. Also, intertextual relations of the texts (films), based on urban theory, enables a comparative study on the cinematic representation of Chicago in the two films. **RESULTS/FINDINGS:** The cinematic features of these two films reproduce the motion of Chicago and facilitate our presence in the flow of the city which can be analyzed based on Jane Jacobs' urban theory. **CONCLUSION:** My study shows how cinema can help complete urban planners' understanding of "representation of space" by showing "representational urban space". I believe that reading films can move us toward a new way of thinking about the process of urban planning.

RAPID AND SIMULTANEOUS DETERMINATION OF FURFURAL AND 5-HYDROXYMETHYLFURFURAL IN BIOMASS HYDROLYSATE BY HPLC

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BACKGROUND AND PURPOSE: Sugar degradation products caused by biomass pretreatment, such as furfural and 5-hydroxymethylfurfural (HMF), are major inhibitors of enzyme and yeast activities during the enzymatic hydrolysis and fermentation of biomass. Thus, monitoring their contents in biomass hydrolysate is crucial. Currently, the most acceptable detection technique for them is HPLC employing an organic acid column to separate them as recommended by the National Renewable Energy Laboratory (NREL). The running time is up to 50-55 min and the peak width of them are up to 5 and 4 min, respectively, causing inaccurate quantitation, especially at low contents. Therefore, developing a rapid and sensitive detection method for them is necessary. **METHOD:** The extraction procedure was employed to collect furfural and HMF from partially neutralized biomass hydrolysate. The HPLC with a C18 column and an UV detector was employed to determine them. **RESULTS/FINDINGS:** *n*-butanol, one of fermentation products in bioethanol plants, was the most suitable solvent for extracting them with wide linear ranges of 0.01-0.5 mg/mL ($R^2 > 0.9994$), low limits of detection and quantitation (less than 0.003 and 0.009 mg/mL), and good recoveries (98.34-101.45%). **CONCLUSION:** Compared to the NREL method, it didn't differ significantly in determining furfural and HMF in biomass hydrolysate, but reduced the running time to less 28 min (from the pretreatment to the finish of analysis), almost half of the 55-min running time for the NREL method. Moreover, if large amounts of samples need to be analyzed, the time-saving advantage of current method is more obvious due to having the capacity of batch extraction.

MODELING ACCUMULATION IN BETA AND GAMMA DOSE RATE FOR VERY THIN LAYERS: IMPLICATIONS FOR LUMINESCENCE DATING OF DUST DEPOSITS

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BACKGROUND AND PURPOSE: Optically stimulated luminescence (OSL) dating has proven to be one of the most prominent methods in determining absolute age of sediments. For age calculations two parameters are needed, the equivalent dose and the dose rate. The dose rate is either measured directly (in the field) or indirectly (radioelement concentration methods). In the indirect method dose rate is usually derived by applying conversion factors assuming a homogeneous environment. Nonetheless, we cannot keep this assumption of homogeneity in complex cases. The purpose of this project was to model the dose rate in a heterogeneous environment, very thin dust layer. **METHOD:** DosiVox software is a powerful tool for dose rate simulations, based on particle-matter interactions, that allows the definition of a three dimensional space. We utilized DosiVox to model accumulative beta and gamma dose rates in attic dust collected from a building in Galena, KS, with thickness of 5.3 mm deposited on timber floor boards and surrounded by air from the top. Here we explore how accumulation of dust over time alters beta and gamma dose rate by modifying dust layer thickness. **RESULTS AND CONCLUSIONS:** Model results indicate there is a gradual increase in both beta and gamma dose rate with accretion of dust, while the rate of this accumulation is not the same in both cases. Depending on the rate of dust deposition, this result affects the equivalent dose distribution; the slower the dust is deposited the further the equivalent dose distribution broadens.

SYNTHESIS OF NOVEL COPPER-ACTIVATED DRUGS AGAINST MRSA

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INTRODUCTION: According to the estimation of a group of scientists from the University of Georgia, the number of bacteria species on Earth exceeds trillions. Among these bacteria, *Staphylococcus aureus* is one of the bacteria, which asymptotically colonizes in the anterior nares of 30% of people population. Moreover, depending on the tendency of each host, it can cause a wide spectrum of diseases such as minor skin infections to mortal infections, such as pneumonia, Methicillin Resistant *Staphylococcus aureus* (MRSA) infections, sepsis, and more. Despite the development of novel antibiotics during the last 50 years, the bacterial resistance to those drugs remains the major concern in the health sector. Numerous research groups are pursuing the discovery of novel drugs against MRSA. Preliminary studies have illustrated that bioavailable copper(I) ions can be utilized to inhibit the growth of MRSA. **METHOD:** Therefore, a novel series of copper-activatable drugs against Methicillin-resistant *Staphylococcus aureus* (MRSA) and other multi-resistant gram-positive bacteria was synthesized, characterized, and tested. **RESULTS AND DISCUSSION:** These drugs possess a NNSN (pyrazole based) structural motif, which enables the binding of copper(I) with modest stability constants. Although none of the novel drug candidates exhibits a stereocenter, sub-micromolar activities against MRSA are observed in the presence, but not in the absence, of bioavailable copper(I). **CONCLUSION:** Heterocyclic substrates which possess NNSN motif can be novel potential drug candidates for MRSA.

EFFECT OF LIGHT CHARACTERISTICS ON THE SENSORY PROPERTIES OF RED LETTUCE

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BACKGROUND AND PURPOSE: Light characteristics, including light quality and quantity, are important factors that affect crops growth and development. Previous research showed that light intensity impacts pigment concentration in lettuce. However, there has been a limited amount of studies assessing the effect of the visible light spectrum on the sensory properties of lettuce. The purpose of this study was to examine the effects of different light exposure treatments with respect to the sensory properties of red lettuce (*Lactuca sativa*). **METHOD:** Red lettuce samples were grown under seven different lighting treatments during autumn months in Kansas. The appearance, texture/mouthfeel, and flavor of the samples were evaluated in triplicate by five highly-trained descriptive panelists. A 0-15 scale with 0.5 increments was used, where 0 meant none and 15 meant extremely high intensity. Analysis of variance (ANOVA) and principal component analysis (PCA) was conducted for statistical analysis. **RESULTS/FINDINGS:** Significant differences were found for appearance, texture/mouthfeel, and flavor. The lettuce treated with standard polyethylene removal 1 week prior to the first harvest had a relatively higher intensity of redness, initial crispness, and toothetch mouthfeel. The luminance polyethylene treated lettuce and the clear polyethylene treated lettuce were similar which were negatively correlated to the toothetch mouthfeel, astringent, and bitterness; while positively correlated to the flavor of overall green, lettuce, and the umami taste. **CONCLUSION:** Treatments had a higher impact on the appearance than flavor or texture of the plant. Further consumer studies for different light treatments in lettuce may help understand the relationship between treatments and consumers' liking of red lettuce.

INVESTIGATING MARIGOLDS AS A DYESTUFF FOR A SMALL BUSINESS: EXTRACTION, COLORFASTNESS TO LAUNDERING, AND CARE OF SILK AND LINEN

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BACKGROUND AND PURPOSE: Due to the negative impacts of synthetic dyes on the environment, environmentally conscious dyers is now considering natural dyes. As natural dyes have limitations, the aim of this research was to determine a process for dye extraction, dye liquor preserving, dyeing Silk Crepe De Shine and 100% linen with Marigold which can be replicated by the Artisans and craft dyers. **METHOD:** Two marigold dye solutions, fresh and preserved, were compared for dyeing silk and linen fabric that could be replicated by artisans. In addition, two commercial detergents, Tide Free and Woolite, were evaluated to provide a home washing recommendation. Samples were dyed at 10% owf (on the weight of fiber) and exposed to colorfastness to home laundering (American Association of Textile Chemists and Colorists, AATCC Monograph 6-2016) with the two detergents. Color strength and color change CIEL*a*b* values were accessed according to AATCC gray scale. **RESULTS AND CONCLUSIONS:** The preserved marigold treatment had significantly ($p < 0.05$) darker and warmer color strength on both the silk and linen. Color change & staining from exposure to home laundering was not significantly different between fresh and preserved dye solutions, nor between detergents. Though color staining ratings met American Society of Testing and Materials (ASTM) standard, color change ratings, regardless of treatment, did not meet the ASTM standard for color change. The results of this study do not support home laundering for marigold dyed silk and linen. Future work should evaluate these treatments against hand laundering conditions.

Social Science, Humanities, and Education

COMPARING CLASSROOM FRUSTRATIONS FOR STUDENTS WITH AUDITORY PROCESSING DISORDER VERSUS THEIR TYPICAL PEERS

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BACKGROUND AND PURPOSE: Students with Auditory Processing Disorder (APD) face a variety of challenges, including differentiating speech from background noise in classroom settings. This study aimed to gain a further understanding of the types of frustration students with APD face in school and the solutions they use to address these frustrations. Additionally, the study explored whether these frustrations and solutions differed from those of their typically-developing (TD) peers. **METHOD:** Two students with APD and two TD students, matched for gender and age, viewed video scenarios and answered interview questions. Responses were organized and compared by group according to the questions: 1) What are the participants' school frustrations? 2) What solutions do the participants employ to handle these frustrations? **RESULTS/FINDINGS:** Notable differences in frustration between TD students and students with APD included the types of projects the students found frustrating (independent vs. group) and the degree of structure in school (less vs. more). The TD students suggested solutions that did not involve recruiting the teacher's help, such as talking with peers directly. The APD group did not mention any solutions in which they directly confronted peers. **CONCLUSION:** Educators should be aware that students with APD may struggle with group projects – and, when they do struggle, may need more teacher assistance than their typical peers. Additionally, professionals in the field of Communication Sciences and Disorders (CSD) can use this information to help their clients with APD become better advocates for themselves by informing them about ways to appropriately address peers.

TO PREVENT OR ALLEVIATE NEGATIVE OUTCOMES? THE ROLE OF DIFFICULTY IN RISK MITIGATION

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BACKGROUND AND PURPOSE: Risk mitigation decisions involve a trade-off between preventative measures and compensatory actions. For example, a student could choose to invest additional time and effort in studying for an exam or could wait and invest those same resources in pursuing extra credit only in the event that they perform poorly. Although the preventative option has immediate costs, it may result in fewer losses overall if the probability of failure is high or expected to be very costly. Existing research has explored these decisions in stable environments; but we don't know how these decisions are made in environments that rapidly change. **METHOD:** This project identified factors that contribute to when and how risk mitigation strategies are used during situations that require fast-paced decisions. Participants played a videogame that placed them in risky situations, but received "tools" that they could use to prevent or compensate for negative events. **RESULTS/FINDINGS:** Task difficulty strongly predicted whether people would engage in preventative measures. Interestingly, people did not use clues about task difficulty to make decisions or to predict future losses. Instead, they needed to experience negative outcomes before they switched strategies. We also found that people could be encouraged to use preventative strategies by making them easier to use. **CONCLUSION:** This research suggests that risk mitigation decisions are grounded in previous experiences and that it is difficult for people to anticipate their future needs. It also offers two strategies for encouraging a preventative approach to risk mitigation: making preventative measures easier to use and allowing people to experience some losses.

ENGAGING PUBLIC HEALTH PRACTICE AND ACADEMIA: A MODEL FOR PUBLIC HEALTH PARTNERSHIP AT KANSAS STATE UNIVERSITY

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BACKGROUND AND PURPOSE: The Masters of Public Health (MPH) program at Kansas State University is an interdepartmental program that trains individuals to be successful within a career in public health. As a part of graduate educational training, a field experience is incorporated so that students can practice what they have learned and gain practical workforce skills within the field. In order to better understand skills that students should possess to be successful within a field experience and career in public health sectors, the MPH program aims to create a model for engaging public health practice and academia. The goals for this project are to foster collaboration between local health departments, and Extension agents, and public health students and faculty; and to establish public health practice and academic relationships that will be sustained in order to explore an academic health department model at Kansas State University. **METHODS:** To create this model, a survey was created and given to past students, field experience preceptors and employers. Following the survey, face-to-face meetings were set with public health department directors and Extension agents to establish and nurture practice-academic relationships. **RESULTS/FINDINGS:** Data from these surveys will be analyzed for themes related to field experiences and career preparation. **CONCLUSIONS:** With stakeholder participation, findings will be applied to program practice. Feedback will allow for improvement in field experience planning and development of graduate employment strategies. Relationships built with local health department directors and Extension agents can later be used to facilitate outreach to employers and communities agencies.

ACCEPTABILITY AND FEASIBILITY OF BEST PRACTICE SCHOOL LUNCHES: A RANDOMIZED CROSSOVER TRIAL

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BACKGROUND AND PURPOSE: The updated 2012 National School Lunch Program (NSLP) standards have improved school lunch dietary quality. Significant implementation barriers exist, however, associated with acceptability and feasibility of higher quality lunches. Thus, the purpose of this study was to determine whether there are differences in acceptability and feasibility between best practice school lunches (BPSL), optimizing dietary quality, and typical school lunches (TSL), meeting baseline NSLP nutrition standards. **METHOD:** Forty elementary school-aged participants were recruited for this randomized crossover trial. Participants attended three meal conditions choosing from two lunch options each time – 1) two BPSL, 2) two TSL, 3) one BPSL and one TSL. Acceptability was assessed using weighted plate waste assessments and taste test surveys. Feasibility was assessed by measuring time, cost, skill level, and equipment needed to prepare meals. **RESULTS:** Preliminary results from 37 participants (mean age 7.6±1.7 yrs, 52% female) showed that total taste test scores (max score = 20) were not significantly different between lunch types (mean±SD; BPSL: 17.9±2.0, TSL: 17.5±2.5; $p=0.488$). There was also no significant difference in total percent plate waste between lunch types (BPSL: 43.4±17.9%, TSL: 47.6±17.6%; $p=0.409$). Mean BPSL selection rate with TSL also served was 15%. There was a significantly longer time requirement for preparation of BPSL as compared to TSL (BPSL: 107.3±25.5 min, TSL: 22.2±20.2 min; $p=0.005$). **CONCLUSIONS:** Preliminary results indicate no differences in acceptability between BPSL and TSL lunches, with significantly longer preparation time requirements for BPSL. This study could inform decision and policy-makers seeking to improve school lunch dietary quality and student acceptance.

FIREFIGHTER RECRUIT PERFORMANCE IMPROVES AFTER A 10-WEEK HIFT PROGRAM: A PILOT INVESTIGATION

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BACKGROUND AND PURPOSE: Firefighting is a dangerous occupation with high rates of injuries and fatalities; most line of duty fatalities are due to cardiovascular events. Additionally, firefighters struggle with poor health and low levels of fitness. Limited resources exist for fire departments that are sensitive to the culture and work requirements of their “tactical athletes”. Though there has been increasing interest in high intensity functional training (HIFT) programs, key research data are lacking for the firefighter population with few studies focusing on improving firefighter recruit performance. The purpose of this pilot investigation was to examine a novel physical training program on fire academy recruits’ fire ground performance. **METHOD:** Thirteen participants were recruited from an entry-level fire academy and randomly assigned to control (CG, n=6) or intervention exercise group (TF20, n=7). Due to attrition within the first two study weeks, 10 male fire recruits (23±3 years) completed the study (CG n=3, TF20 n=7). The CG continued current exercise habits. TF20 completed a 10-week online training program (The First Twenty) that included periodized workouts. Baseline and post-intervention, performance was measured with a simulated fire ground test (SFGT) of 8 events that must be completed within 10 min, 20 sec. **RESULTS/FINDINGS:** TF20 group showed improvement on SFGT performance (40% passing at baseline to 86% passing post-intervention), while the CG retained a 100% passing rate. **CONCLUSION:** This investigation provides promising results for the efficacy of HIFT programs to improve performance in firefighter recruits. Continued research is necessary to investigate best practices for increased firefighter recruit fitness.

EXPLORING UNOBSERVED HETEROGENEITY OF FOOD SAFETY BEHAVIOR: A META-ANALYSIS

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BACKGROUND AND PURPOSE: To effectively reduce foodborne illnesses, food handlers must perform essential food safety behaviors. However, food safety knowledge does not always translate into improved behaviors or attitudes. Managers must reduce these non-compliances, but a large proportion of behavioral variance is unexplained for food safety behaviors. Therefore, this meta-analysis will focus on understanding the cognitive processing of food safety behaviors and their uncovered heterogeneity information. **METHOD:** Studies will be included using the Boolean phase search strategy and manual review of popular journals. Two independent authors will extract the data and resolve differences. The detailed search strategy and inclusion criteria will be presented. **CONCLUSION:** Using the Theory of Planned Behavior, evidence from previous studies can be combined to show cumulative-level effect sizes. The percentages of the heterogeneities ratio compare to the total variation in observed effects can be found between different studies.

MAPPING JAPANESE SNACKS

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BACKGROUND AND PURPOSE: Japanese snacks food is a big potential market in Asia. It's special flavor and producing methods also providing creative idea to research and develop products for other market. We **METHOD:** Mapping is a method which could help developers to see a whole picture of products, and also provides product development directions for developers, liking and other relevant descriptors in a target market. We divided these products roughly, and then use several statistical methods to analysis it. **RESULTS/FINDINGS:** A Mapping of the Japanese snack market was generated showing the diversity of snacks available. Through the map, the developers could understand the areas where there are many competing products and areas where there are opportunities for new product introductions. It also highlights areas that are not present in the US market and could represent opportunities for snack food development.

AN INFOGRAPHIC MENU: IMPROVING DECISION MAKING IN RESIDENTS WITH DEMENTIA

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BACKGROUND AND PURPOSE: The senior population is increasing, and it is estimated that by 2050, there will be 83.7 million older adults in the United States. With this increase, the occurrence of neurodegenerative diseases like Alzheimer's Disease is also expected to increase. There are numerous nutrition-related complications in Alzheimer's Disease and other dementias; these include weight loss, swallowing problems, inability to recognize food, and decreased decision-making at meal time. The objective of this exploratory research study was to provide the staff of two long-term care homes with pictures of food, prepared at their facility that can be used as a tool to help residents with dementia improve decisions at mealtime. **METHOD:** One hundred and sixty pictures of food were taken and compiled in an infographic menu. This menu was given to the long-term care home staff and after 45 days, a survey was administered. **RESULTS/FINDINGS:** A total of 16 out of 20 staff members answered the survey. Less than 50% of the participants had used the menu; however, all who used the menu reported that the infographic menu helped the resident recognize food. Staff members also reported that the infographic menu helped residents by giving them a better explanation of the food and by giving them a visual representation of their menu choices. In addition, staff expressed that the infographic menu helped the residents who were unable to communicate verbally. **CONCLUSION:** These outcomes contribute to the potential use of pictures as a visual stimulus to improve decision-making at mealtime by people with cognitive impairment.

VAPOR PHASE PLOTTING OF ORGANOSILANE SUB-MONOLAYER GRADIENTS

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BACKGROUND AND PURPOSE: Chemical gradients allow for a continuous, gradual change of chemical and physical properties, reducing preparation time and costs. Inkjet printing affords complete control over gradient composition. However, if the ink properties are not carefully optimized, then the cartridge clogs up which increases the cost. To overcome these limitations, we rely on vapor phase plotting to pattern chemically graded self-assembled monolayers (SAM gradients). **METHOD:** SAMs are formed by delivering gas phase precursor to a reactive substrate surface through a glass capillary heated to 35°C and at 30 µm from the substrate. A stepper-motor-driven X,Y plotter stage is employed to raster scan the capillary tube above the substrate. **RESULTS/FINDINGS:** Two different organotrichlorosilane precursors are employed in this initial demonstration: *n*-octyltrichlorosilane and 3-cyanopropyltrichlorosilane. The dependence of SAM deposition on ambient humidity, capillary-substrate separation, raster scanning speed, carrier gas flow rate and solvent viscosity and volatility are all explored and optimum deposition conditions identified. The optimized procedures are used to form uniform SAM modified “pads,” and linear SAM gradients. Film formation is verified by sessile drop water contact angle measurements, ellipsometric film thickness measurements and by X-ray photoelectron spectroscopy (XPS) mapping. The resolution of the plotting process is found to be ~ 1 mm, similar to the capillary diameter, and can be improved by using a tapered needle with ~200 µm diameter. **CONCLUSION:** This method affords a simple means for producing chemical gradients and other surfaces with patterned wettability and may find applications in the printing of microfluidic devices, chemical sensors and gradient thin layer chromatography plates.

FULL UTILIZATION OF BIOMASS FOR FUELS AND CHEMICALS: A BIOREFINERY CONCEPT

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BACKGROUND AND PURPOSE: The major challenges to commercialize cellulosic biofuels are low fermentation efficiency, low ethanol titer, and lack of technology to fully utilize the byproduct from bioconversion process such as lignin which has been underutilized. To overcome these technical barriers, we have proposed a novel design to fully utilize each component of lignocellulosic biomass for biofuels and bio-chemicals production, which involves green technologies to produce a cellulose-rich solid with good recovery of clean lignin for improvement of plant protein-based adhesives as well as xylose for furfural upgradation. **METHOD:** The focus of this study, as a part of the whole biorefinery concept, is to develop modified simultaneous saccharification and fermentation (mSSF) to enhance ethanol titers and yields, which combines the advantages of both separate hydrolysis and fermentation (SHF) and simultaneous saccharification and fermentation (SSF) via unique decantation process. **RESULTS AND CONCLUSION:** The mSSF achieved higher ethanol concentration of 58.5 g/L and ethanol yield of 83.5% as compared to the traditional SSF process (49.9 g/L and 71.1%) at the biomass loadings of 20% (w/v). The mSSF also enabled higher ethanol titers of 72.3 g/L at higher loadings of 30% (w/v) with yields of 70.0%. The improved ethanol titers and yields would significantly lower the distillation cost and accelerate the commercialization of cellulosic biofuel production.

VALIDATION OF THE SPORT-LIS SURFACE SOIL MOISTURE PRODUCT IN THE MISSOURI AND ARKANSAS-RED-WHITE RIVER BASINS

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BACKGROUND AND PURPOSE: The basin-scale evaluation of surface soil moisture is necessary to understand seasonal and annual soil moisture trends and their implications on water resources management for food and energy production in the face of climate change. Recent advancements in satellite and software technology throughout the last decade have made the global collection and analysis of surface soil moisture data possible. SPoRT-LIS is a land information software, developed by NASA's Short-term Prediction Research and Transition Center at Marshall Space Flight Center, which integrates land surface models and satellite data to produce real-time output of key environmental variables. **METHODS:** The SPoRT-LIS surface soil moisture product (0-10 cm) was validated against in-situ soil moisture measurements from the International Soil Moisture Network in the Missouri and Arkansas-Red-White river basins. Validation was conducted at in-situ measurement depths of 5-cm and 10-cm. Validation performance was evaluated across varying soil types, land cover, depth, slope, aspect, and pixel heterogeneity to determine conditions under which the SPoRT-LIS surface soil moisture product had excellent measurement capability. **RESULTS:** Evaluation of validation performance indicates that in-situ soil moisture measurement network had the most significant influence on validation. Results demonstrate that 53% of data at a depth of 5-cm and 51% of the data at a depth of 10-cm was significantly correlated with a Spearman's rho greater than 0.5. **CONCLUSION:** Based upon validation results, the authors conclude that the SPoRT-LIS surface soil moisture product is acceptable for operational applications for seasonal and annual soil moisture trend analysis within the Missouri and Arkansas-Red-White river basins.

BIOLOGICAL-BASED EXTRACTION OF BIOMOLECULES FROM MICROALGAE

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BACKGROUND AND PURPOSE: Microalgae biomass can accumulate high levels of protein, starch, and lipids that have numerous direct applications for food and feed industries or can be transformed into a wide spectrum of high-value products for the chemical, biofuel, cosmetic, nutraceutical, and pharmaceutical industries. These biomolecules, however, are produced intracellularly such that their recovery requires cell lysis and extraction from intracellular compartments, thereby presenting two major challenges. The energy intensive nature and non-environmentally friendly attributes of current cell lysis and extraction methods limit the commercialization of microalgae-derived bioproducts and reduce the yield and/or value of those products. The goal of this research is to design a biological-based extraction and fractionation processing method and evaluate the feasibility of the method for biorefining microalgae for recovery of biomolecules in separate process streams. **METHOD:** The microalgae biorefinery developed includes biomolecule accumulation, biomass harvesting, targeted enzymatic degradation of the cell wall and organelles for release of biomolecules (native proteins and lipids), and separation of biomolecules into distinct process streams for conversion into bioproducts. **RESULTS AND CONCLUSION:** The developed method exploits biological-mechanisms, uses an extracellular to intracellular approach for cell lysis and biomolecule release, and resulted in separate streams of native proteins and lipids.

UNIFORM, ORTHOGONAL FUNCTIONALIZATION OF A METAL-ORGANIC FRAMEWORK

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BACKGROUND AND PURPOSE: Metal-organic framework (MOF) materials are crystalline, three-dimensional porous materials that are synthesized by the self-assembly of metal ions with organic molecules. The resulting materials are highly ordered frameworks, or grids, with metal cluster corners that are connected by organic linkers. MOFs are highly tunable materials because they can be synthesized from a wide range of metals and organic linkers, resulting in the constant evolution of their architectural and chemical properties, as well as their applications (catalysis, gas separations, drug delivery, etc). The development of synthetic strategies for increasing the diversity and complexity of these frameworks provides the foundational science necessary to expand the properties and applications of these materials. In this work, we develop a method to construct *uniformly* multifunctional MOF materials. **METHOD:** The organic linkers of MOFs can be functionalized after the MOF material has been assembled, through a process known as post-synthetic modification (PSM). To construct uniformly multifunctional MOFs, we proposed the construction of a mixed-ligand MOF with linkers that are modifiable and react independently, resulting in a MOF that is orthogonally functionalizable. We hypothesized that sequential PSM would afford a highly ordered, multifunctional, porous MOF material. **RESULTS/FINDINGS:** A orthogonally functionalizable MOF, KSU-1, was successfully synthesized. Our PSM strategies show independent functionalization of each organic linker leading to uniformity throughout our material. Characterization studies commonly used with MOFs verify the synthesis and orthogonal functionalization of KSU-1. **CONCLUSION:** MOF materials with uniformly multifunctional pores have similarities with biological structures, namely enzymes, and future work will involve synthesizing MOFs that are biomimetic.

BED-BASED INSTRUMENTATION FOR UNOBTRUSIVE SLEEP QUALITY ASSESSMENT IN SEVERELY DISABLED AUTISTIC CHILDREN

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BACKGROUND AND PURPOSE: The link between daytime wellness and sleep quality in severely disabled autistic children is not well understood. An unobtrusive bed-based system capable of monitoring a subject's ballistocardiogram (BCG), heart rate, breathing rate, and motion offers the potential to assess the sleep quality of a severely disabled autistic child. For a neurotypical child, sleep quality can be measured either using actigraphy or a full polysomnogram (PSG). However, the multitude of electrodes and wires required for a PSG is intolerably overwhelming for a severely disabled autistic child. Even for a simple actigraphy-based sleep tracker, the wrist band can cause discomfort or can be distracting, thus affecting the child's sleep quality. **METHOD:** Using force sensors hidden underneath the mattress and the bedposts, we are able to record a subject's BCG, respiration, and movement. From these signals, we are able to track heart rate, respiration rate, and restlessness – metrics that can be used to estimate sleep quality. **RESULTS/FINDINGS:** Preliminary results indicate that the heart beat intervals estimated from a BCG closely track electrocardiogram (ECG) R-to-R intervals, which are the standard metric used to estimate heart rate. The system can also track restlessness on overnight data collected from a severely disabled autistic child. **CONCLUSION:** An unobtrusive bed-based sensor suite offers the ability to estimate the sleep quality of a severely disabled autistic child, making it possible to investigate how their sleep quality might be linked to their daytime wellness and changes in medication or therapy.

DEVELOPMENT OF LARGE PATCH RESISTANT, COLD HARDY ZOYSIAGRASS CULTIVARS FOR THE TRANSITION ZONE

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BACKGROUND AND PURPOSE: Cold hardiness is the trait that limits the long-term survival of zoysiagrass in the transition zone. Furthermore, large patch disease caused by *Rhizoctonia solani* (AG 2-2 LP) has become the primary pest on zoysiagrass. Improved cultivars with good cold hardiness and large patch resistance are desired in the transition zone, which could reduce fungicide requirements and maintenance costs. **METHOD:** TAES 5645, a *Z. japonica* genotype that exhibited resistance to large patch in preliminary studies, was used as a breeding parent and crossed with 22 cold hardy zoysiagrasses, resulting in 2,858 progeny. These progeny were evaluated for cold hardiness and agronomic traits. Sixty progeny were identified for further evaluation in larger plots at 10 locations throughout the transition zone for turf quality characteristics and large patch resistance. **RESULTS AND CONCLUSION:** In autumn 2016, the fungus causing large patch was inoculated in plots in Manhattan, KS and a natural infestation occurred in Stillwater, OK. Progeny showed a wide range of variability in winter injury, spring green up, establishment rate, genetic color, leaf texture, turfgrass quality, and fall color. Several progeny had quality characteristics that were superior to Meyer zoysiagrass, the commonly used standard in the transition zone. In KS and OK in Nov. 2016, Meyer had 42 to 77% plot area affected by large patch; many of the progeny exhibited no symptoms. Among this group of experimental zoysiagrasses, there appear to be promising progeny that have good winter hardiness, resistance to large patch, and improved turf quality characteristics.

DETERMINING THE IMPACT OF ROAST DEGREE, BEAN SIZE AND BREWING TIME ON THE SENSORY CHARACTERISTICS OF COLD DRIP UGANDAN COFFEE

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BACKGROUND AND PURPOSE: In today's market there is a growing demand for high quality coffee with distinctive sensory characteristics. Similarly, cold drip coffee has become quite popular. Thus, the objective of this study was to determine the impact of roasting degree, bean size (grade) and brewing time on cold drip Ugandan coffee. **METHOD:** Coffees, both Ugandan Robustas and Arabicas, sourced from various origins (lowland and mountainous regions) and terroir, various processing methods and bean size were evaluated by highly trained descriptive sensory panelists after brewing using two cold drip methods. The panelists used key attributes from a previously published coffee lexicon to describe the resulting coffees. **RESULTS:** The findings showed that the coffees differed in their sensory properties based on each of the various factors. For example, roast level had the greatest impact on many characteristics such as overall coffee flavor, burnt flavor, roasted character and nuttiness. **CONCLUSION:** Results suggest both Robusta and Arabica can provide highly flavorful cold brew coffee depending on specifics of roast, bean, and brew.

EFFECT OF DISTILLERS DRIED GRAIN ON PROCESSING PARAMETERS OF EXTRUDED DOG AND CAT FOODS

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BACKGROUND AND PURPOSE: The majority of pet foods utilize traditional ingredients like corn, wheat, and soy. These ingredients, and other grains such as distillers dried grains (DDG) have been evaluated in the past with good results. Next generation-DDG (NG-DDG) are an improvement on these traditional ingredients, but have not been evaluated in pet food. Therefore, it was the objective of this project to determine the effect of processing parameters resulting from incorporating NG-DDG in extruded dog and cat foods. **METHOD:** Diets with >25% plant protein sources [corn gluten meal (CGM), soybean meal (SBM) and NG-DDG] were produced. Each diet was mixed, split into three batches, and extruded over three days. Processing parameters and kibble samples were collected every 20 minutes. Kibbles were evaluated for physical dimensions and texture. **RESULTS:** The NG-DDG kibbles were more dense (0.5537g/cm^3 ; $p<0.05$) than CGM kibbles (0.476g/cm^3), with SBM intermediate (0.5039g/cm^3). The NG-DDG kibbles had a smaller diameter ($p<0.05$) than CGM or SBM kibbles (5.18 vs. average 5.63mm), and smaller expansion ratio ($p<0.05$) than SBM (2.62 vs. 3.47mm/mm^2) with CGM intermediate (3.13mm/mm^2). The NG-DDG required a smaller ($p<0.05$) valve opening (40%) and increased ($p<0.05$) die pressure (2.99MPa) when compared to CGM, and SBM (average 55.84%, 2.1MPa). **CONCLUSION:** Possibly due to lower levels of starch, NG-DDG did not expand as well and required increased resistance and die pressure to create similar product dimensions to CGM and SBM. However, there was no difference in water or energy to create kibbles, indicating the process could be managed to produce similar products.

PROTEIN QUALITY EVALUATION OF CHICKEN PROTEINS FOR PET FOOD

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BACKGROUND: The pet food industry growth is fueled in large part by the perception of protein quality in novel ingredients. There is little nutritional information to corroborate whether the technique used to dry chicken is relevant to quality. The objective of this study was to use evaluate the protein quality of commercially available chicken dried by different methods. **METHOD:** Experimental protein sources were analyzed for protein and amino acid composition. Week old acclimated broiler chicks were allotted by weight to pen in a completely randomized design. Protein sources contribute 10% crude protein to a N-free basal ration. Chicks were fed for 10 days then weighed to determine weight gain and feed intake. Protein efficiency ratio (PER) was calculated as gain related to protein intake (g/g). **RESULTS:** Spray dried egg (SDEG), high protein chicken powder, and dehydrated chicken breast had similar PER (4.94, 4.71, and 4.44; $P < 0.05$). High fat chicken powder was lower (4.26; $P < 0.05$), and Chicken meal and chicken by-product meal still lower (3.35 and 3.25) than SDEG, with poultry by-product meal (2.55) even lower. The PER of corn gluten meal was the lowest and did not differ from zero (0.19; $P < 0.05$). **CONCLUSION:** The chick model was able to rank the protein sources based on drying technique. The lower levels of lysine and methionine suggest heat damage during drying for chicken, chicken by-product, and poultry by-product meals. This method provides a valuable tool to determine subtle differences in protein quality of ingredients considered for use in pet food.

DEVELOPMENT AND APPLICATION OF A LEXICON TO DESCRIBE THE FLAVOR OF SORGHUM VARIETIES

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BACKGROUND AND PURPOSE: A sensory lexicon was developed to describe the flavor characteristic of Sorghum varieties. A total of 59 sorghum varieties, 9 of which are commercial available sorghum, were chosen for the study. The selected sorghum samples were chosen to represent genetic variations of sorghum based on origin, color and nutritional composition. **METHOD:** 6 highly trained descriptive sensory panelists used the modified flavor profile method to study the flavor characteristics of the selected sorghum varieties. Multiple cooking methods for sorghum grains such as cooking grains in water and making into cookies, were examined and applied. **RESULTS/FINDINGS:** Approximately 30 sensory attributes including beany, bran, buttery, corn-like, eggy, floral, leather, nutty, oily, petroleum, woody and wheat-like were identified, defined and referenced by the descriptive sensory panel. The research provides a lexicon: attributes with definitions and descriptive references, to describe the flavor of sorghum varieties both as grains and in finished products. **CONCLUSION:** This allows researchers to better understand differences in sorghum flavor that can be used to select varieties for certain products and to select certain characteristics for breeding.

EFFICACY OF SPINOSAD AGAINST MAIZE WEEVIL (*SITOPHILUS ZEAMAI*) IN POPCORN

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BACKGROUND AND PURPOSE: Spinosad is a reduced risk insecticide and effective against a variety of stored grain insects. This study was aimed at determining the efficacy of spinosad against *Sitophilus zeamais* in popcorn, and its delay toxicity effect. **METHOD:** Adults of the field strain (TX) of maize weevil, were exposed to popcorn treated with spinosad at label rate of 1 mg (a.i.) kg⁻¹ of grain. Fifty unsexed adults (1-2 wk old) were placed in 100g of untreated and treated popcorn, respectively. The exposure times were 1, 4, 8, 12 h, and 1, 3, 5, 7, and 14 d. Adults were transferred to 100 g clean untreated popcorn after exposure. Mortality was assessed at 0, 7, 14 and 21 d after transferring and progeny was counted after 42 d of transferring. Adults were held in the environmental growth chamber at 28°C and 65% r.h. Damaged kernels were evaluated following adult progeny assessment. **RESULTS/FINDINGS:** Mortality (0 d) of maize weevil was less than 5% after exposure to spinosad for 1 to 12 h. Mortality (0 d) increased as exposure time increased and mortality was 94%-100% when exposure time was 5 d to 14 d. Progeny reduction reached to 100% reduction after 7 d and damage kernels reached to 100% reduction after 14 d. There was no significant difference at 0, 7, 14 and 21 d mortality among exposure times except for 8 and 12 h. **CONCLUSION:** Spinosad is highly effective to against maize weevil, however, the delay toxicity effect is not always significant on maize weevil in popcorn.

UNDERSTANDING HOW CONSUMERS DETERMINE THE READINESS OF WHEAT DOUGH USING THE THINK ALOUD TECHNIQUE

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BACKGROUND: Wheat dough textural properties have been widely studied as part of rheological studies; but there is no information of how consumers perceive these properties when preparing it, and how they decide the dough is ready. **OBJECTIVE:** The purpose of this study was to determine how consumers prepare wheat dough, and how they decide it is ready after the mixing and kneading stages, using the think aloud technique. **METHODS:** Participants were people who prepare wheat dough from scratch. Consumers participated in 1-to-1 interviews where they were instructed to use the 'think aloud' technique. This method required them to speak aloud during the whole dough preparation. They were asked to tell the interviewer how they made their decisions during the preparation and how they decided the dough was ready. **RESULTS:** Some of the participants presented issues during the interview since they required to be reminded often they needed to talk aloud; nevertheless, using a 'warm-up' exercise helped them improve their interaction. Some of the consumers also had issues finding the terms to describe what they were perceiving. When describing the readiness of the mixing, participants used terms as 'uniform' and 'not wet'. For the kneading, they used terms like 'smooth', 'soft', 'elastic' and 'not sticky'. **CONCLUSIONS:** This study shows the 'think aloud' technique can be used to understand consumers' perceptions in a cooking exercise. It also provides consumers' terms that can be translated to a descriptive sensory language to describe the readiness of a dough after mixing and kneading.

PREPARATION, FRACTIONATION, PURIFICATION AND IDENTIFICATION OF ANTIOXIDANT ACTIVE PEPTIDES FROM CORN GLUTEN MEAL

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INTRODUCTION: A rising trend in food and feed manufactures and consumers is the gradual replacement of synthetic antioxidants with natural antioxidants. Corn proteins contain abundant antioxidative peptide sequences. The objectives of this study were to study the effect of various variables (types of proteases, enzyme to protein ratio, reaction time) on the antioxidant activity of corn protein hydrolysate and understand the composition-structure-activity relationships of the hydrolysates. **METHOD:** Different proteases, enzyme to protein ratios, protein contents, and hydrolysis times were evaluated. Degree of hydrolysis was analyzed based on OPA reagent. Antioxidant activities were measured using several chemical assays. Selected protein hydrolysates were fractionated and purified using membrane ultrafiltration, size exclusion chromatography, and ion exchange chromatography, and analyzed with MALDI TOF MS. **RESULTS:** Neutrase, Alcalase and Bromelain were the most effective enzymes with respect to antioxidant yield and activity. Protein solubility increased with larger enzyme to protein ratio and longer reaction time. Degree of hydrolysis increased with longer reaction time, while decreased with larger enzyme to protein ratio. Antioxidant activity first increased then leveled off. Hydrolysate compositions were further studied using chromatography and MS to help understand the composition-activity relationships. **CONCLUSION:** This research provides valuable information towards utilizing and adding value to corn byproducts and development of novel antioxidants for various foods, beverages, and animal/pet feed to retard lipid oxidation and maintain product quality.

MICROBIOLOGICAL CHARACTERISTICS OF PORK CARCASSES AND VACUUM PACKAGED BLADE STEAKS DURING STORAGE AT 0±1°C

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BACKGROUND AND PURPOSE: In the U.S., there are 626 federally inspected pork plants. Small pork plants represent 10% of the total establishments, processing up to 20 head per week. **PURPOSE:** To evaluate the effect of extended post-harvest hanging time on pork sides and the microbial shelf-life of fabricated steaks stored for 21 and 35 days, respectively, at 0±1°C. **METHOD:** Pork carcass sides ($n = 20$) were stored for up to 21 days at 0±1°C and 85±1% relative humidity. The flank, shoulder, and jowl were sampled on pork carcasses using stainless meat corers. A 21.6 cm² area corer was used to obtain flank and shoulder samples, and a 9.6 cm² area corer was used to collect jowl samples. Aerobic plate count (APC), *Enterobacteriaceae* (EB), yeast and mold populations, pH, and moisture content was determined. After hanging, shoulder blade steaks ($n = 17$), fabricated from these sides were vacuum packaged, stored up to 35 days at 0±1°C, and evaluated for APC, EB, yeast and mold populations, and pH. **RESULTS AND CONCLUSION:** The jowl had the highest APC with 1.21 log CFU/cm². Thus, water accumulation after hot water wash may be the driven factor as to why the jowl had the highest APC populations. Overall, the pork carcass microbial, pH, and moisture content results indicated that extended hanging time did not have a negative effect on the microbial quality of pork carcasses. Additionally, pork shoulder blade steaks fabricated from the same carcasses, had acceptable quality after 35 days stored at 0±1°C.

PREDICTING ENERGY EXPENDITURE IN MALES AND FEMALES DURING HIGH-INTENSITY FUNCTIONAL TRAINING

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BACKGROUND AND PURPOSE: High energy expenditure (EE) during high-intensity functional training (HIFT) may improve body composition. EE during HIFT is unknown, but likely varies between sexes. We compared HIFT EE between sexes and predicted EE using anthropometric, physical fitness and experience measures. **METHOD:** Participants (n=98, 41% female) with ≥ 4 wks HIFT experience were recruited. Height and weight were measured. HIFT experience was determined from a self-reported workout result. Dual Energy X-Ray Absorptiometry (DEXA) was used to determine percent body fat (%BF). Participants completed a graded exercise test to determine peak oxygen consumption (VO_{2peak}), and a HIFT session (as many rounds as possible of a 250-meter row, 20 kettlebell swings, and 15 thrusters in 15 minutes), while wearing a portable calorimetry system to determine EE. Independent-samples t-test was used to compare EE by sex, and multiple linear regression with stepwise selection was used to predict EE for each sex based on age, HT, WT, LVL, VO_{2peak} , and %BF. **RESULTS:** Mean EE was significantly different between females (48.9 ± 18.2 kcals/min) and males (71.2 ± 20.0 kcals/min; $p < 0.001$). For females, greater experience ($\beta = 9.92$) and weight ($\beta = 0.94$), and lower %BF ($\beta = -1.03$) predicted 67% of the variance in EE, $f(3, 40) = 24.9$, $p < 0.001$. For males, greater experience ($\beta = 15.50$) and height ($\beta = 0.96$), and lower %BF ($\beta = -0.69$) predicted 70% of the variance in EE, $f(3, 58) = 43.3$, $p < 0.001$. **CONCLUSION:** Anthropometric and experience consistently predicted EE, which was higher for males. However, since HIFT utilizes different exercises in each session, EE likely varies. Future research could assess EE across a variety of HIFT sessions.

CHARACTERIZATION OF A NOVEL LEUCINE BIOSYNTHESIS TRANSCRIPTION FACTOR IN *ASPERGILLUS NIDULANS*

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BACKGROUND: The branched chain amino acids (BCAAs) leucine, isoleucine, and valine are essential amino acids because they are not synthesized by animals and must be obtained through their diet. Many fungal species, including *Aspergillus*, *Candida*, and *Saccharomyces*, are capable of de novo synthesis of BCAAs. Proper regulation of BCAA metabolism is important for protein synthesis, growth, and virulence of fungal pathogens. The transcription factor LeuB regulates leucine biosynthesis genes in *Aspergillus nidulans* in response to leucine levels. The *leuB* deletion (*leuB* Δ) mutant is a leaky leucine auxotroph, as it grows poorly unless leucine is provided to the growth media. LeuB also regulates expression of the key nitrogen assimilation enzyme NADP-glutamyl dehydrogenase encoded by *gdhA*. We have identified a LeuB-related paralog, LeuR, that is conserved throughout the Aspergilli. **METHOD:** To determine the role of *leuR* in *Aspergillus nidulans*, we have deleted the *leuR* gene in different genetic backgrounds and examined the effects on leucine biosynthesis and *gdhA* regulation. **RESULTS:** The *leuR* deletion (*leuR* Δ) mutant has no phenotype. In contrast, the *leuB* Δ *leuR* Δ double mutant confers tight leucine auxotrophy (no growth without leucine supplementation). This reveals a role for LeuR in regulating leucine biosynthesis. Using a *gdhA-lacZ* translational fusion reporter gene and exogenous leucine, we show that LeuR regulates *gdhA* expression. **CONCLUSION:** These findings identify a novel regulator of leucine biosynthesis and *gdhA* expression, LeuR. A better understanding of the metabolism and regulation of BCAA synthesis in *Aspergillus nidulans* could provide new anti-fungal targets in human and crop pathogens.

EFFECTS OF GUANIDINOACETIC ACID ON LEAN GROWTH AND CREATINE PRODUCTION IN CATTLE

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BACKGROUND AND PURPOSE: Creatine stores high-energy phosphate bonds in muscle, which is critical for muscle activity. In animals, creatine can be absorbed from the diet and synthesized in the liver from guanidinoacetic acid (GAA) and methyl group donors such as methionine. In broiler chickens, supplemental GAA has increased growth, yield of breast meat, and creatine production, but there is no data available regarding the use of GAA to increase lean growth rate of cattle. This study evaluated the effect of supplementing GAA in the presence or absence of methionine on nitrogen retention (lean tissue growth) and the efficiency of methionine utilization. **METHODS:** Seven ruminally cannulated Holstein steers maintained in a methionine-deficiency model received abomasal infusion of two methionine levels (0 or 6 grams/day) and three amounts of GAA (0, 7.5, or 15 grams/day) in a Latin square-designed experiment that lasted 60-days. Blood, urine, and feces were collected to measure creatine production and N retention. **RESULTS:** Supplemental GAA increased plasma concentrations of creatine, suggesting that the conversion of GAA to creatine was increased by GAA supplementation. Supplementation of 15 grams/day of GAA in the presence of supplemental methionine tended to increase lean tissue growth, probably by increasing creatine synthesis. In contrast, supplemental GAA did not improve nitrogen retention when methionine was not supplemented, suggesting that the methyl groups from methionine were needed to convert GAA to creatine. **CONCLUSION:** Supplementation of GAA in combination with methionine may be a viable way to improve creatine synthesis and lean tissue deposition in cattle.

IDENTIFYING IMMUNO-DOMINANT AND NEUTRALIZING EPITOPES FROM K88 FIMBRIAE OF ENTEROTOXIGENIC *ESCHERICHIA COLI*

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BACKGROUND: F4+ (K88) enterotoxigenic *Escherichia coli* (ETEC) is the primary cause of porcine post-weaning diarrhea (PWD), yet an effective PWD vaccine for this pathogen is not available. We identified suitable antigens for an effective PWD ETEC vaccine. **METHODS:** We in silico identified epitopes from the K88 fimbrial major subunit FaeG and genetically fused each epitope to non-homologous human ETEC CFA/I adhesin subunit (CfaB), and examined immunodominant epitopes by reacting each fusion with anti-K88 antiserum. Each epitope fusion was used to immunize mice. Mouse serum samples were examined for anti-K88 IgG antibody responses and neutralization of K88 fimbria and porcine ETEC wildtype strain 3030-2 to porcine intestinal IPEC-J2 cells. We also expressed the FaeG subunit protein as the coating antigen in ELISAs and Western Blot to examine reaction with antibodies derived from each epitope fusion. **RESULTS:** 9 epitopes were identified from FaeG major subunit, which indicated by different reactivity with anti-K88 antiserum and their antibodies varied in antibody neutralizing activity. Epitopes MTGDFNGSVD, LNDLTNGGTK, GRTKEAFATP, PMKNAGGTKVGA VKVN and FNQAVTTSTQ showed stronger reactivity with anti-K88 antisera, suggesting these epitopes immunodominant. Moreover, mouse immunization data showed that epitope fusions induced various levels of anti-K88 antibody responses. Epitopes LGRGGVTSADGEL, PRGSELSAGSA and RENMEYTDGT were neither immunogenic nor neutralizing, while epitope ELRKPDGGTN was less immunodominant but strongly neutralizing, epitope FNQAVTTSTQ was immunodominant but less neutralizing. However, epitopes MTGDFNGSVD, LNDLTNGGTK, GRTKEAFATP and PMKNAGGTKVGA VKVN were immunodominant and also neutralizing. **CONCLUSIONS:** These results suggest epitopes MTGDFNGSVD, LNDLTNGGTK, GRTKEAFATP and PMKNAGGTKVGA VKVN are suitable K88 antigens for developing an effective vaccine against porcine PWD.

HIGH INTENSITY FUNCTIONAL TRAINING IMPROVES FLEXIBILITY IN OVERWEIGHT AND OBESE ADULTS

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BACKGROUND High-intensity functional training (HIFT) has become a popular form of exercise training, however it is unknown how overweight/obese populations may benefit from this type of exercise prescription. **PURPOSE:** To compare the effects of HIFT versus American College of Sports Medicine recommended aerobic and resistance training (A-RT) on physical fitness characteristics in overweight/obese, physically inactive adults. **METHODS:** Twenty-three overweight/obese (BMI 30.3±2.8) and physically inactive (<30 minutes total activity per week) adults were recruited and randomized into either 8-weeks of: HIFT (3 d/wk for 60-minute sessions) or A-RT (3 d/wk of aerobic exercise for 50 minutes; 2 d/wk of resistance exercises). Physical fitness was assessed using the Eurofit fitness measures (sit and reach, standing broad jump, vertical jump, 30-seconds of push-ups and sit-ups), 40-meter dash, stork balance test, and peak oxygen consumption via Modified Balke Protocol. Body composition was determined via dual energy X-ray absorptiometry, with all measures taken at baseline and post-training. ANCOVA was used to compare between-groups changes in physical fitness, controlling for baseline scores. **RESULTS:** After adjusting for baseline values, flexibility was the only condition that showed significant changes. Additionally, the HIFT group spent 79.3% less time exercising per week than the A-RT group. **CONCLUSION:** Our results indicate that eight weeks of HIFT demonstrate greater improvements in flexibility than ACSM recommended exercise in overweight/obese adults. However, longer duration interventions may result in greater fitness and body composition improvements. Future investigations could compare physical fitness adaptations between healthy adults and overweight/obese adults when using a HIFT exercise intervention.

MICROVASCULAR ENDOTHELIAL FUNCTION ACROSS THE CANCER SURVIVORSHIP CONTINUUM

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BACKGROUND AND PURPOSE: Chemotherapy is known to have direct cardiotoxic effects. Changes in endothelial function due to chemotherapy-induced cardiotoxicity within post-treatment years, however, remains poorly understood. The current investigation evaluated microvascular endothelial function across the cancer survivorship continuum. It was hypothesized that early cancer survivors would have an attenuated percent change in skin blood flow (SkBF) and cutaneous vascular conductance (CVC) compared to late cancer survivors and healthy matched controls. **METHODS:** Thirteen female cancer survivors (nine early survivors between 1-5 years post treatment, and four late survivors >5 years post treatment) and thirteen healthy controls participated in this study. SkBF was measured via integrated laser Doppler flowmetry. Mean arterial pressure was measured and used to calculate CVC. Endothelium-dependent cutaneous microvascular function was determined as the percent change from baseline in SkBF and CVC responsiveness to acetylcholine (ACh) induced vasodilation. **RESULTS:** Hyperemic responses to ACh for SkBF (P=0.4) and CVC (P=0.5) were not significantly different between early and late cancer survivors. SkBF (P=0.3) and CVC (P=0.1) were not significantly different in the early cancer survivors compared to controls, and no significant difference in SkBF (P=0.8) and CVC (P=0.9) between late cancer survivors and controls was found. **CONCLUSION:** Endothelium-dependent cutaneous microvascular function was not different between early cancer survivors, late cancer survivors, and healthy controls. These results suggest that microvascular endothelial function is not attenuated post 1 year of survivorship. Additional work is required to determine if endothelial dysfunction occurs during treatment and prior to a year from recovery of chemotherapy treatment.

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