

THE OFFICE OF UNDERGRADUATE RESEARCH PRESENTS THE 14TH ANNUAL RESEARCH POSTER SYMPOSIUM

K-State Student Union Ballroom Sunday, April 13, 2014 1:30 p.m.-3:30 p.m.



TABLE OF CONTENTS

Abigail Agnew1
Mauri Zumalt1
Jenny Barriga2
Tayler Christian
Raquel Ortega
Sergio Ortiz
Daniel Buyanovsky
Monica Farfan 4
Ramone Armstrong
Kelsey Castinado
Kiera Brown
Hector Martinez
Eduardo Acosta7
Thuy Cao7
Chayce F. W. Wynn
Daniel Dissmore
Megan Cantu
Carlos Cardona
Irma Ailon10
Marcus Dominguez
Ismael Hernandez11
Jazmin Zeledon11
Denise Durham
Branford Harris
Miriam Macedo13
Eddy Gomez13
Austin White14
Daniela Guereca14
Jonathan Bernard15
Nallely Barron-Garcia15
Izabella Carmona
Mayra Perez-Fajardo16
Michael Cesena17
Natira Staats17
Erwin Chege18
Jeffrey Murray
Dominic Deleon
Maira Cotton-Caballero19
Mark Mathis II
Jennifer Delzeit

Monica Diaz-Serrano	.21
Micke Ramirez	.21
Katherine Nguyen	.22
Navanté Peacock	22
Sofia Sabates	.23
Phillip Hill	24
German Cuevas	.24
Larry Rodriguez	25
Thuan Daniel Quach	25
Emmanuel Garcia	.26
Daniel Perez	.26
Breyana Ramsey	.27
Delia Hernandez	27
Daijah Porchia	.28
Felicia Walker	.28
Savannah Hoang	.29
Samantha Knese	.29
Antonio Rodriguez	.30
Samantha Pratt	.30
K. Matthew Castinado	.31
Alaina Littlejohn	.31
Alan Ramirez.	.32
Cipriana Sapien	.32
Alejandro Marquez	.33
Halle Sparks	.33
William L. Duren	.34
Armando Marquez	.34
Obdulia Covarrubias Zambrano	.35
Jamilah B. Watkins	.35
Rebecca Renteria	.36
Sterling Muse	.36
Yubisela Toledo	.37
Shaquan White	.37
Yojana Mendoza	.38
Geordy Williams	.38
Arisa Yamashita-Taylor	.39
Hannah Gray	.39
Sonjay Baker	.40
Eduardo Solorzano-Torres	.40
Simone Holliday	.41
-	

Note: Mentors' titles have been omitted for the sake of consistency. For the complete list of collaborators and their credentials, please view the posters.

Aspects of Cross-Cultural Relationships of Buyer/Suppliers and Sales Managers/Sales Persons

Abigail Agnew, Dawn Deeter-Schmelz Department of Marketing College of Business Administration

This qualitative research study looks to examine the relationship dynamics between sales people and customers, and sales managers and sales people, who are operating cross-culturally. For instance; an American producer selling parts to a Brazilian manufacturing company, or a sales manager in London overseeing employees in China. To do this, employees of several different businesses involved in various global industries were interviewed and asked to list what they felt were the most difficult aspects of working with individuals coming from a different culture. The interviews were transcribed and then coded using a set of terms which addressed the various issues cited by the interviewees. There has been research of this sort put forth before. The relationships developed by people in various business partnerships are generally what make or break a company. This project takes that a step further; looking into how cultural differences affect the way that firms do business with one another, as well as looking at what adaptations might be made when supervising individuals who were raised in other cultures. I have seen that the things that people have the most trouble with in these sorts of situations are communication difficulties, the simple fact of deep-seated cultural differences, and problems developing trust between the involved parties. Interviewees have noted that adaptation to a country's culture, and finding ways to develop more friendly relations (with both customers and employees) are good ways to overcome some of these difficulties.

Honors/Leadership: Leadership Scholarship; Project IMPACT Scholarship; Business Administration Dean's Scholarship; Rake 'N' Run

Degradation of Textile Dyes in Miscanthus sinesis Mauri Zumalt, Lawrence C. Davis Department of Biochemistry and Molecular Biophysics College of Arts and Sciences

Miscanthus sinesis is a type of grass that has been tested on several textile dyes. Although some textile dyes are toxic to plants, Miscanthus has shown the ability to degrade certain types of dyes. Though other plants such as *Arabidopsis thaliana* and *Helianthus annuus* (annual sunflower) have been tested, Miscanthus is different in that it is both a monocot and a perennial. Enzymes from a root extract of Miscanthus are added to the various synthetic dyes and the color change is determined through spectrophotometry. Mediators such as 1-Hydroxybenzotriazole (HOBt), and polyvinylpyrrolidone (PVP), an enzyme stabilizer are also added to the dyes plus enzyme to help measure the enzyme activity. The comparison between the degradation of different dyes is also being investigated to see if the different chemical properties of each dye make a difference on the degradation. Miscanthus has so far been compared to *Arabidopsis thaliana* and *Helianthus annuus* in its ability to break down the textile dyes, though more research is needed. Dyes of other chemical classes react quite differently with Arabidopsis and sunflower, so Miscanthus needs to be tested too. Future work includes comparing the extract and whole roots and also adding different concentrations of hydrogen peroxide, which oxidizes the dye. The long-term goal is finding better plants to degrade the many different dyes.

Honors/Leadership: Davis Scholarship for a Developing Scholar in Biochemistry and Molecular Biophysics; Memorial Scholarship



Cell-Based Delivery of Chemotherapeutics and Antibiotics

Jenny Barriga¹, Sebastian Wendel¹, Deryl L. Troyer², Stefan H. Bossmann¹ ¹Department of Chemistry College of Arts and Sciences ²Department of Anatomy and Physiology College of Veterinary Medicine

Cell-based delivery systems have the potential to effectively treat localized damaged tissue including solid tumors and sites of bacterial infection. Defensive cells (neutrophils and monocytes) are known to migrate to tumors and can be used as vehicles for targeted delivery. Additionally, defensive cells actively detect and consume bacteria efficiently including the non-pathogenic bacterium, *Micrococcus luteus*. *M. luteus* can be loaded with chemotherapeutics or antibiotics prior to uptake by defensive cells. The resulting cell-delivery system is a defensive cell containing drug loaded *M. luteus* and Fe/Fe₃O₄ nanoparticles that travels to the inflamed site and releases the drugs in response to an alternating current magnetic field. Here drug uptake and retention in *M. luteus* will be presented.

Honors/Leadership: Accepted to Stanford University Biophysics PhD Program; Academic Honors (4.0); Goldwater Scholarship Recipient; NIH Bridges to the Future; National Institutes of Health Scholarship; Internship: National Cancer Institute; Research Experience for Undergraduates, Kansas State University; Phi Kappa Phi; Rake 'N' Run; Mittens for Many; Bilingual: English/Spanish

Brewing Coffee Party Activism in Tea Party Territory: A Grounded Case Study

Tayler Christian, Alisa Garni Department of Sociology College of Arts and Sciences

Dr. Garni and I are conducting an ethnographic study of the recent emergence of a "Coffee Party" in northeastern Kansas, otherwise a conservative Republican and Tea Party stronghold. Nationally, the Coffee Party markets itself as a "social benefit organization," versus a political party. Since its inception via Facebook in 2010, people with a variety of political affiliations have joined the movement on-line, and a few local chapters have formed to facilitate in-person meetings. In contrast to its rival Tea Party, members of the Coffee Party publicly support government as an important mechanism for "representing and enacting public will." Paradoxically, a very active local chapter of the Coffee Party has emerged in rural Northeast Kansas, where the Tea Party might expect to have more success in recruiting participants. How and why did this chapter form? What impact is it having on the community? Since many members of the local Coffee Party advocate for liberal social policies where such policies tend to be unpopular, how does this chapter affect local discourse and policy making? To answer these questions, we will spend a year or more conducting fieldwork with Party members, affiliates, community residents, and both local and state leaders. Initial findings suggest that local Party members are dedicated social activists, and strong religious commitments inform many of their views and activities. At the same time, many Party members feel outnumbered in their own community, and negotiating social and political polarization presents both a challenge and a goal for Party members.

Honors/Leadership: National Society of Collegiate Scholars; College of Arts and Sciences Research Scholarship; SWO (Social Work Organization), Vice President; Alpha Chi Omega, member; Manhattan Crisis Center, volunteer



Protease Detection Through Nanoparticles for Early Cancer Diagnosis

Raquel Ortega¹, Dinusha Udukala¹, Thilani Samarakoon¹, Deryl L. Troyer², Stefan H. Bossmann¹ ¹Department of Chemistry College of Arts and Sciences ²Department of Anatomy and Physiology College of Veterinary Medicine

Fluorescence-based assays offer an inexpensive, simple, and sensitive way to measure the reactivity of proteases. Proteases, such as matrix metalloproteinases (MMP's) and urokinase plasminogen activator (uPA), are enzymes that cleave other proteins and speed up biological processes in the human body. It is known that MMP's and uPA are necessary for the survival of cancer cells and are therefore overexpressed in these cells. By measuring the activity of MMP's and uPA in cancer cells, one can use these proteases as a biomarker for the diagnosis of breast cancer and assure an early and correct diagnosis. One way to measure MMP and uPA activity is by the use of nanoparticles. By using an Fe/Fe₃O₄ nanoparticle as a nanoplatform specific to each MMP and uPA, the fluorescence resulting from the cleaved consensus sequences of cyanine dyes and porphyrins results in detection as sensitive as down to 1*10 -16 mol 1 -1. I have measured the fluorescence of MMP-11, MMP-3, MMP-9 and uPA in blood serum and tissue samples of breast cancer patients. To prepare the assay, I add 75 microliters of the nanoparticle solution to 3mL of the assay compound and 30 microliters of either the blood serum or tissue sample. A 60 minute incubation period suffices to obtain reliable results for the activity of MMP-11 and uPA. The purpose of this research is to determine the fluorescence increase of the MMP's and uPA and also to determine the disparity of the fluorescence increase among the proteases studied.

Honors/Leadership: Academic Honors (4.0); Bilingual: English/ Spanish.

Using Commercial Tools to Validate a Bed Sensor Suite for Nighttime Monitoring of Severely Disabled Children Sergio Ortiz, Austin White, Punit Prakash, Steven Warren Department of Electrical and Computer Engineering College of Engineering

A bed sensor suite is being developed to monitor the well-being of severely disabled children at Heartspring in Wichita, Kansas. The suite employs various types of unobtrusive sensors to acquire useful physiological data, including ballistocardiograms (BCGs), movement, and ambient conditions (e.g., temperature, pressure, humidity, light levels, and noise). One sub-system used to determine heart rate and breathing rate (both extracted from a BCG) employs an electromechanical film sensor placed below the mattress. Additionally, load cell sensors located at the corners and sides of the bed allow the acquisition of additional BCGs that are well suited for movement, respiration rate, and ideally heart rate detection, allowing redundant tracking of sleep patterns that can be compared to sleep patterns of neurotypical children. Because these sensing techniques are not standard, sleep data collected from both the film and the load cells will be compared to data from three commercial units: an accelerometer-based Fitbit designed to track sleep solely based on movement; a Beddit system designed to acquired heart rate and respiration rate; and a commercial polysomnograph (the "gold standard" for sleep studies) that provides a combination of EEG, EOG, EMG, and ECG data.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; Project IMPACT Scholarship; Hispanic Scholarship Fund Scholarship; Society of Hispanic Professional Engineers (SHPE); Formula Car Team; Alternative Spring Break, Kansas City; Martin Luther King- A Day On, Not a Day Off; Rake 'N' Run; Bilingual: English/Spanish



Properties of Sorghum and Wheat Flour Mix

Daniel Buyanovsky¹, Kingsly Ambrose² ¹Department of Food Science and Industry ²Department of Grain Science and Industry College of Agriculture

Sorghum flour is a gluten-free product that comes from the sorghum plant. The property of being gluten-free makes it a possible candidate to replace some of the gluten flours in most of the modern day baked products. Unfortunately, sorghum flour by itself produces a dry and gritty product that has very little consumer appeal. Furthermore, during mixing of sorghum flour with other ingredients such as wheat flour, the ingredients tend to segregate resulting in a non-uniform product. Mixing of sorghum flour with wheat flour should have a good baking quality to increase consumer acceptance. In order to produce a product with positive handling, processing and baking properties replications of mixes are being tested for handling and baking characteristics. Property tests that were conducted include: Flow rate index, Compressibility, Stability, and Tapped density. The tests were carried out on pure samples of sorghum and whole wheat flour followed by ratios of 10/90, 20/80, and 30/70 respectively. The preliminary results indicate that mixing wheat flour with sorghum flour in different ratios, improves the handling characteristics.

Honors/Leadership: Fairchild Scholarship; Memorial Scholarship; Developing Scholars Talent Show, Chemistry Magic; Presenter: Introduction to Chemical Engineering, "Diaper Creation Project," Kansas State University; Rake 'N' Run

Risk factors associated with *Corynebacterium pseudotuberculosis* infection among horses residing in Kansas and Nebraska: a case control study (121 cases).

 Farfan M¹, Davis EG², Boysen C², Raghavan RK³
¹ Department of Animal Science and Industry College of Agriculture
²Department of Clinical Sciences
³Department of Diagnostic Medicine Pathobiology College of Veterinary Medicine

Pigeon fever, dry-land distemper, and/or false strangles are synonymous terms for infectious disease caused by *Corynebacterium pseudotuberculosis* in horses. The soil-borne bacterium survives well under arid conditions and cases are most commonly observed during late summer to fall seasons. The bacterium enters the skin through skin abrasions, lacerations and is also vectored by insects such as stable flies. An infected horse most commonly displays clinical signs such as forming an external abscess, particularly in the pectoral area, around the head, or in the inguinal region. The purpose of this case-control investigation was to determine potential environmental and/ or spatial risk factors that may favor disease among horses in Kansas and the local region. Cases were determined by positive tests for characteristic abscess formation, positive bacterial culture of purulent material obtained from the lanced abscess, or positive serologic evidence of exposure to organism (>1:512) (n = 55). Horses negative for these tests admitted to the VHC at the same time as clinical cases, yet without evidence of *C. pseudotuberculosis* infection were considered controls (n = 240). Using Bayesian geostatistical analysis we determined low soil moisture content (OR = 2.74, 95% CrI = 2.30, 3.27), total (land) edge contrast index (OR = 2.03, 95% CrI = 1.35, 3.06), and higher land surface temperature (OR = 4.09, 95% CrI = 3.50, 4.79) in locations where horses lived were significant risk factors for pigeon fever. These findings help us to predict when and where horses are at risk and therefore make specific preventative health recommendations.

Honors/Leadership: McNair Scholars; Project IMPACT Scholarship; Memorial Scholarship; MAPS; MANRRS; HALO; Agriculture Ambassador; Telefund: College of Agriculture; Insect Zoo Open House; Travel: Equine Study Abroad Tour: Scotland, Ireland, & England; Bilingual: English/Spanish



Spatial Distance and Construal Levels of Consumers' Decision Process

Ramone Armstrong, Janis Crow Department of Marketing College of Business Administration

The purpose of this project is to test persons' decision processes when choosing between businesses that are located close together versus ones separated by distance. The goal of this project is to identify the type of decision processes consumers make when choosing from various retail stores. The outcomes could provide evidence to improve the likelihood of retail store traffic. We are examining consumers' decision processes by using the Construal-Level Theory (CLT), when they choose among businesses with similar product offerings depending on the travel distance. CLT proposes that increasing the reported spatial distance of events leads individuals to represent distant events by their central, abstract, global features (high-level construal) rather than close events by their peripheral, concrete, local features (low-level construal). Prior research has examined consumers' who choose a business located closer will engage in a simplistic, heuristic-type, decision process, whereas, consumers choosing a spatially distant location will engage in a more effortful strategy. The study uses an experimental design to survey participants to describe their decision processes when choosing among businesses varied by location and density.

Honors/Leadership: Memorial Scholarship; Rake 'N' Run; Bilingual: English/Spanish

Chapel as Healing Place: A Study of Two Spaces on the Kansas State University Campus

Kelsey Castinado, Susanne Siepl-Coates Department of Architecture College of Architecture, Planning and Design

The research compares two buildings, Danforth and All Faith's Chapels. A chapel is usually defined as a sacred space for intimate services or meditation. The theoretical framework for this research was developed from works about healing places by Gesler and Venolia. Gesler argues that healing is multidimensional and that healing places are characterized by built, natural, social and symbolic aspects of architecture. Venolia describes specific characteristics of healing environments. Chapels can be considered "healing" places because their architectural qualities can positively affect the physical, mental, spiritual, emotional and social well-being of users, thus potentially allowing healing to occur. During frequent site visits the spaces were experienced for extended periods of time and observations were recorded. Written notes and diagrams were used to communicate personal experiences and observations of the characteristics described in the literature. While both studied spaces are used as chapels, their architectural qualities differ significantly. Research results indicate that Danforth Chapel is more likely to affect the well-being of its users than All Faiths Chapel.

Honors/Leadership: Gamma Phi Beta, Philanthropy Chair; Mission Trip to Haiti



Incarcerating the mother-child relationship: Investigations into prison nursery programs

Kiera Brown, Lisa A. Melander, Miranda Rickel, Austin Rice Department of Sociology, Anthropology, and Social Work College of Arts and Sciences

An increase in incarceration rates in the United States has become a serious problem, especially when considering the impact these rates have on familial relationships. In particular, the increase in female incarceration rates have resulted in more children growing up without the presence of their mother, which has been associated with detrimental outcomes such as offender recidivism as well as mental health and social issues for their children. In order to combat these deleterious effects, nine facilities in the United States have introduced prison nursery programs. These programs provide a housing space inside a secure correctional facility whereby incarcerated women co-reside with their newborn infants for a period of time, during which the mother acts as the primary caregiver for her infant while completing an imposed judicial sentence (Byrne, Goshin, & Blanchard-Lewis, 2012). The purpose of the current research project is to identify gaps in the prison nursery literature in order to conduct an original empirical study. Our review of the literature has identified the following research themes: mother-child attachment, mother recidivism, mental health of mother, and child well-being. In the future, our research team will conduct research at the York Correctional Facility in York, Nebraska to explore the relationships with noncustodial children and longitudinal child outcomes, which are topics that are understudied in this field.

Honors/Leadership: Rake 'N' Run

A Parametric System for Modularized Gabion Construction Hector Martinez, Michael D. Gibson Department of Architecture College of Architecture, Planning, and Design

Rubble gabions, made from wire mesh and rubble fill, has wide potential for low-cost construction around the world. Previous research proposed an improved method to build with gabions using prefabricated steel sheet. In continuation of our research on the benefits of rubble gabion construction and architecture, we have begun to explore new ideas using a parametric design program called Grasshopper to advance how such a system could be integrated with building form and be prefabricated.

Grasshopper is a parametric modeling program that is integrated with a conventional 3-D computer modeling platform and is emerging as an important tool for architectural students and professionals. Unlike conventional computer-aided design, parametric modeling allows designers to generate and manage complexity, vary individual components and efficiently fabricate them, and produce many variations of a design that can advance optimization and performance. Through this process, this research will move from a rectilinear form of repeating elements to a system that can be constructed of unique components that will fit together to make a form that achieves a specific spatial and programmatic result rather than a simple box.

By studying a more flexible form for this system, the research will further illuminate the potential of this system with respect to affordability, environmental performance, and the humanistic impact on place and function.

Honors/Leadership: Kansas Undergraduate Research Day at the Capitol, Topeka; Opportunity Scholarship; RTKL Award; National Organization of Minority Architect Students; Hispanos Unidos en Manhattan; Rake 'N' Run; Travel: Mexico; Bilingual: English/Spanish



Riding the Fungal Highway: Motility of Bacteria on Fungal Hyphae

Eduardo Acosta¹, Zhao Peng², Frank White² ¹Division of Biology College of Arts and Sciences ²Department of Plant Pathology College of Agriculture

The capacity of fungi to serve as vectors for the dispersion of bacteria was analyzed in a bacterial/fungal culture in the laboratory. We hypothesized that bacteria might use fungal hyphae for dispersal in the environment, including into plant tissue. To test the hypothesis, we tested the ability of an *Enterobacter* species that is found in close association with the plant pathogenic fungus *Rhizoctonia solani* to move along the hyphae of the pathogen. The movement of the bacteria was compared to other bacterial strains. Mutations of *Enterobacter* strain were engineered in genes that are predicted to alter motility, and the mutants were tested for their ability to move along fungal hyphae. We hypothesize that the disruption of flagellar genes will hinder the mobilization of *Enterobacter* through fungal hyphae by incapacitating the flagellar assembly and, as a consequence, normal flagellar motility. Flagellar genes *FlgH* and *FlgE* were selected for mutation. Truncated genetic copies of the selected genes were generated by polymerase chain reaction (PCR) and cloned into a pKNOCK-Km suicide vector which was propagated in *E. coli* and introduced into *Enterobacter* by means of electroporation. *Enterobacter* strains will be assayed for motility on agar plates as well as along fungal hyphae in an *Enterobacter/Rhizoctonia solani* mixed culture.

Honors/Leadership: Academic Honors (4.0); NIH Bridges to the Future; Golden Key International Honor Society; Pre-Dental Club; Kansas Mission of Mercy Dental, volunteer; Dental Mission Trip, Panama; Bilingual: English/Spanish

ACE-like Enzyme in Insect Molting Fluid *Thuy Cao, Neal Dittmer, Michael Kanost* Department of Biochemistry and Molecular Biophysics

College of Arts and Sciences

Insects have an external exoskeleton they must shed in order to grow. During the time they are molting, insect epidermal cells produce enzymes to break down the old exoskeleton. One of the enzymes we have identified in molting fluid is a protease (an enzyme that digests proteins) similar in sequence to angiotensin-converting enzyme (ACE). In mammals, ACE is an important enzyme for maintaining blood pressure. However, insects do not have a closed circulatory system, yet contain several ACE-like enzymes which suggests other potential functions for ACE-like protease (ACEL). We are studying ACEL in the molting fluid of *Manduca sexta*, the tobacco hornworm, to learn more about the role of the enzyme in insects. We looked at expression of ACEL in different tissues of the caterpillar using polymerase chain reaction (PCR) to see if the enzyme is specific to the molting process or participates in multiple biological processes. From this experiment, we find that ACE is strongly expressed in the epidermis and the midgut cells even when the caterpillar is not molting. Using electrophoresis, we tested the protease activity by observing clear areas on an in-gel protease assay. We are now using cell culture techniques to stably produce recombinant ACEL to study its function. We are continuing to study the biochemical properties and biological functions of ACEL in *M. sexta*.

Honors/Leadership: Academic Honors (4.0); Goldwater Scholarship Nominee; K-INBRE Start Trainee Award Nominee; NIH Bridges to the Future; Cancer Reseach Award; Bilingual: English/ Vietnamese

Imposed sedentary time and psychological health in young adults meeting physical activity guidelines: An experimental study

Chayce F.W. Wynn¹, Brooke J. Cull², Richard R. Rosenkranz², Sara K. Rosenkranz² ¹Division of Biology College of Arts and Sciences ²Department of Human Nutrition College of Human Ecology

Physical activity and sedentary behavior impact both physical and psychological health. Whether or not meeting physical activity guidelines is protective against potentially harmful psychological effects of imposed sedentary time is unknown. PURPOSE: The objective of the current study was to determine whether imposing 10 hours of sedentary time per week for 8 weeks would increase depression, stress, or anxiety in young adults. METHODS: Participants were 16 physically active healthy young adults (age 21.6 years±1.4, 10 males). Participants were randomized to the sitting group (SIT (n=8); 10 hours/week imposed sitting for 8 weeks), or the no-intervention control (CON, n=8) group. At baseline, 4 weeks, and 8 weeks, the DASS21 was used to assess depression, anxiety, and stress. RESULTS: At baseline, 14 out of 16 participants were classified as normal on all scales of the DASS21. There were no significant differences at baseline, nor significant changes within or between groups over eight weeks for depression (CON = -4.6 ± 11.4 , SIT = -0.3 ± 2.7), anxiety (CON = 0.8 ± 5.9 , SIT = -1.5 ± 2.6) or stress (CON = -2.0 ± 9.8 , SIT = -1.6 ± 4.8). A greater proportion of SIT participants increased depression scores from baseline to eight weeks (3/8) compared to CON (1/ 8) during the period of imposed sitting ($\chi 2 = 4.57$, p < 0.05), however this increase is not considered to be clinically significant. CONCLUSION: Despite imposing 10 hours of weekly sedentary time, depression, anxiety, and stress did not change in physically active young adults.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Martin Luther King Scholar; Cancer Research Award; Catalyst Honor Society; Wildcat Warm-up Counselor; Alternative Spring Break: Chicago, Kansas City; Basketball Coach for Manhattan Recreation; Floor Vice President, Goodnow Hall; Boys & Girls Club, volunteer; Rake 'N' Run; Martin Luther King Day-A Day On, Not a Day Off; Mittens for Many

Malcolm X and Dr. King: Truths and Misconceptions

Daniel Dissmore¹, Myra Gordon² ¹Department of Curriculum and Instruction College of Education ²Office of Diversity

There are many misconceptions about the philosophies and teachings of Malcolm X and Dr. Martin Luther King, Jr. Among those misconceptions is that Malcolm X and Dr. King had almost polar opposite views. This research project set out to reveal the truth about Malcolm X's and Dr. King's teachings, elucidate the similarities and differences between the two, discover the levels of knowledge and agreement that the Kansas State University faculty and student body have of the two, and determine any differences of understanding and agreement that different demographic groups might have. The first phase of the project was to gain our own understanding of the two men's teachings through examining the books and speeches of the two men. The project's second phase was to conduct a survey of the faculty and student body through Google Docs. Demographics of age, gender, race, field, place of upbringing, religion, socioeconomic status, and political ideology were examined. Questions asked in the survey were open ended and dealt with knowledge of the two men's teachings, extent of agreement, and primary sources of knowledge. The survey is still being conducted, so it is too early to analyze the results. However, the results of this research project could have important implications. If the public properly understands what Malcolm X and Dr. King taught, it may be better able to solve many of society's current problems in a constructive manner. The results of this research could determine whether new educational tools (curriculum, classes, etc.) are needed to properly educate young people about two of history's and America's most influential men and their teachings. It could also demonstrate the need for people of all ages and backgrounds to reexamine what they know.

Honors/Leadership: Medallion Scholarship; Developing Scholars Talent Show; Jazz Lab (2nd Trumpet); Jazz Combo; Concert Band (1st Chair); Cat Band; Chi Alpha; Rake 'N' Run



Playing Naturally: Pilot Study of Nature Access, Mood Regulation, and Executive Function in Children with Autism Spectrum Disorders and their Typically Developing Peers

Megan Cantu¹, Katie Kingery-Page², Debra Burnett³, Bronwyn Fees³, Marilyn Kaff⁴, Sara Fisher⁵ ¹College of Architecture, Planning and Design ²Department of Landscape Architecture and Regional & Community Planning College of Architecture, Planning and Design ³Department of Family Studies and Human Services College of Human Ecology 4 Department of Special Education, Counseling, and Student Affairs College of Education ⁵ Department of Arts, Science, and Business K-State Salina

Literature in several disciplines points to potential benefits for children from play in outdoor, nature-based environments. The natural environment has been shown to restore attention by allowing a person to engage soft attention while disengaging direct attention. However, there has been little research on whether or not children with autism could benefit from natural environments. In summer of 2013, the K-State Autism Research Team conducted a pilot study of a) how children with autism and their typically developing peers use a natural play area, and b) whether a brief recess in a natural play area correlates to improved mood regulation and executive functioning in the children. The researchers partnered with a local school district's summer camp for a study location and subject sample. The study was organized into three phases: free play in a 'learning garden', guided play in the same setting, and finally, a return to free play. Student observers mapped each child's use of the garden, documenting the child's location every minute during the thirty minute recess, for all three phases. After the mapping was done, I participated in data compilation and analysis. I transcribed the field map data into digital form using Autodesk AutoCAD. The team can view the maps on any given day and see a visual tracing of how children used the space. These findings will be used to explore what areas or activities in the garden correlate to cognitive benefits, if academic measures in the study reveal restorative focus that was not previously there.

Honors/Leadership: Midwest Student Exchange Program Scholarship; Rake 'N' Run

Introduction into Computer Programming Languages

Carlos Cardona, Dan Andresen Department of Computer Science and Information College of Engineering

Developing a new website to replace the current one for BeoCat, the supercomputer that supports many researchers across K-State, has the potential to provide researchers with better and easier support than they already receive. To develop a modern website that looked both modern and functional while including all the content and keeping it simple, I first had to learn about programming, as I had no previous programming experience. This includes mostly beginner programming languages, such as HTML, CSS and Javascript to start out, having to learn the command and functions of each. This can prove to be time consuming with so much trial and error occurring to smooth out ideas. The actual website can be developed using the rules of the languages learned. Starting out with looking at the current website and getting ideas into what old content was necessary and what new content to introduce was a fast procedure, and while using the languages becoming more proficient in them, better layouts emerged from both a programing and a viewer point of view. Now the research project is in the stages where it is time to begin assembling the website starting with the main page. Supporting more research by making the website more accessible is tested by gathering data from users; if the website not only has more viewers, but also can help more researchers, then the website is successful.

Honors/Leadership: Kauffman Scholar

Portion Size as a Preventative Intervention for Adolescent Unwanted Weight Gain

Irma L. Ailon, Erika Lindshield, Tandalayo Kidd Department of Human Nutrition College of Human Ecology

According to the Centers for Disease Control and Prevention, childhood obesity has doubled in the past 30 years and obesity in adolescents has tripled over the same time period. In 2010, one-third of adolescents, ages 12-19 years, were overweight or obese. A United States Department of Agriculture (USDA) funded research project is currently investigating factors associated with preventing adolescent overweight and obesity among 6-8th grade youth in low income racial/ethnic communities. Large portion sizes have been associated with increased energy intake which can result in unwanted weight gain. This creates a need for effective nutrition education messages on the differences between portion size and serving size to assist adolescents with decreasing their energy intake and encouraging age-appropriate recommended serving size for meals from all food groups. Controlling portion size can be an important factor in reducing unwanted weight gain. The objective for this project was to develop a lesson focusing on portion size which incorporates visual cues to help estimate recommended serving sizes related to appropriate range of daily calorie needs. The lesson will be used in conjunction with existing adolescent curricula pertaining to health and wellness.

Honors/Leadership: NIH Bridges to the Future; Memorial Scholarship; Developing Scholars Promise Award; Nutrition and Health Society, LULAC; Rake 'N' Run; Travel: Mexico/India/Guatemala; Trilingual: English/Awakateko/Spanish

'New Destinations' Immigration, Legislation, and Agriculture in Kansas

Marcus Dominguez, Alisa Garni Department of Sociology, Anthropology, and Social Work College of Arts and Sciences

As immigration reform stalls at the federal level, debates regarding local and state officials' authority to enforce federal immigration law are becoming more common. At the same time, many politicians aim to regulate immigration via criminal versus civil immigration systems. Kansas legislators participate actively in these debates, but state level policy on immigration remains largely undecided (i.e., legislators are debating whether to adopt E-Verify and "self-deportation" policies akin to those in Arizona and Alabama or—in line with the Kansas Business Coalition—more inclusive policy to regularize the status of new immigrant employees). Meanwhile, many immigrants have moved to Kansas to work in meat packing plants and, increasingly, in both small and large dairy operations. This raises the question, what is the relationship between changing immigration, agricultural, and legislative practices in Kansas? Kansas provides a strategic research site for examining how a mix of fluctuating local, state, and federal policies affect both recently arrived and long-term unauthorized immigrants, as well as how immigration affects farming practices across the state. We will conduct a comparative case study of three adjacent Kansas farms that are similarly affected by immigration legislation, but which pursue different employment and business practices. Through this comparison, we hope to learn more about the relationship between farming, immigration, and legislation. The results of our study may help to shed light on broader economic, political, and demographic changes in other parts of the country.

Honors/Leadership: Academic Honors (4.0); University Experience Peer Instructor; Floor Governing Board Representative; Deferred Action for Childhood Arrivals, Volunteer Service Program; Developing Scholars Talent Show Emcee; Resident Hall Student of the Month; Bilingual: English/Spanish

Effectiveness of Lean Construction Through the Implementation of Integrated Project Delivery

Ismael Hernandez, Ray Buyle Department of Architectural Engineering and Construction Science College of Engineering

The construction industry continues to find ways to maximize profitability of construction projects. A newer, more effective approach being used in the industry is Lean Construction. Lean Construction is a production managementbased approach to project delivery that is achieved by managing and improving the construction process to more profitably deliver what the customer needs. The idea of Lean management includes a set of objectives for the delivery process that is aimed at reducing waste and maximizing value. Because Lean Construction is a philosophy, different approaches to Lean management were studied for this research project. The correlation between Lean Construction and management ideas, such as Integrated Project Delivery (IPD), Just In Time scheduling, pull planning methods, customer value-based design, and a wide variety of Lean tools, were analyzed to determine their effectiveness within the Lean culture. It has been concluded that in order to have an effective Lean program, the implementation of Lean thinking must be present at the beginning of the construction process, and include the architects, contractors, and owner working together. I believe that IPD is the most effective way to implement all Lean management tools and aids in targeting value as defined by the customer.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Gates Millennium Scholarship; K-State Memorial Scholarship; Ralph and Dora Rogers Scholarship; Association of General Contractors; JE Dunn Internship; KCK Housing Authority Internship; Rake 'N' Run; Flint Hills Breadbasket Food Drive; Mittens for Many; 9/11 Day of Service, Alternative Spring Break, Kansas City; Martin Luther King- A Day On, Not a Day Off

CHARACTERIZING THE INSECT VECTOR RESPONSE TO RHABDOVIRUS INFECTION

Jazmin Zeledon¹, Karen Alviar², Dorith Rotenberg², Anna Whitfield² ¹ Division of Biology College of Arts and Sciences ²Department of Plant Pathology College of Agriculture

Arthropod vectors play an essential role in dissemination of viruses that cause diseases. Studies have revealed that arthropods can sustain extensive virus infections. However, there are limited reports of viruses being pathogenic to the vector. Our central hypothesis is that the vector innate immune system is activated by viruses resulting in transmission to hosts with little to no virulence to the vector. We are using the *Peregrinus maidis-Maize mosaic* rhabdovirus (MMV) system to study vector-virus interactions. P. maidis transmits MMV to plant hosts. MMV is not pathogenic to *P. maidis*, despite replication and persistence inside the vector. Insects respond to viral infection by activating their innate immune system including the Janus kinase/signal transducers and activators of transcription (JAK-STAT) pathway. The JAK-STAT pathway is a major component of innate immunity to viruses. We hypothesized that the JAK-STAT pathway is involved in P. maidis response to MMV. We constructed a database for JAK-STAT pathway genes using ImmunoDB, and identified *P. maidis* orthologs using tBLASTx. We discovered expressed sequence tags (ESTs) with significant similarity to signaling genes and to response genes. We used real-time PCR to examine JAK and SOCS5 gene expression. JAK expression in PBS-injected and MMV-injected insects was not significantly higher. However, SOCS5 expression in MMV-injected *P.maidis* was significantly higher than PBS-injected insects, suggesting that high virus titer upregulates expression of SOCS5 and that this pathway is responsive to virus infection in *P.maidis*. We are currently examining gene expression for other genes identified, STAT5, AKT, TEP3, and HSP70.

Honors/Leadership: NIH Bridges to the Future; Ecological Genomics Undergraduate Research and Mentoring Internship; Psi Chi International Honor Society of Psychology; K-INBRE Symposium Conference 2011; LULAC; HALO; BESO; Cats for a Cure; Volunteer: St. Catherine's Hospice; Volunteer: Seven Dolors Catholic Church; Harvesters in Topeka; Bilingual: English/Spanish

A Longitudinal Study of University Student Dissertation Abstract Writing Competency

Denise Durham, Roger McHaney Department of Management College of Business Administration

The prevalence of the Internet and how much it may be helping us or hurting us is a highly debated subject. Some authors have gone so far as to suggest that people using the Internet are becoming increasingly dumber. In this project, we look at clues from dissertation abstracts of randomly selected students across U.S. universities for a time period of approximately twenty-five years. Through the use of various measures of writing quality and complexity, we investigate whether writing levels appear to be declining. With increasing levels of Internet and social media use, if students are becoming less sophisticated as some suggest, overall writing abilities should show signs of decline. The experiment began by extracting the abstracts of students in business fields using the keywords "business management" from the ProQuest Dissertations and Theses Database. All of the abstracts, as well as other important information including title, author, university, ProQuest number and classification were retrieved. Next, the abstracts were tested using readability index tools. This information was statistically analyzed for increasing or decreasing trends. Particular attention was paid to data pre- and post-Internet. Other factors, such as university rank, were also considered in the analysis. In general, the results indicate that writing complexity and other scores have improved over the past twenty-five years.

Honors/Leadership: James R. Coffman Award for Excellence; Undergraduate Research Forum, Kansas State University; Memorial Scholarship; Phi Sigma Pi; Rake 'N' Run; Martin Luther King-A Day On, Not a Day Off

A Trend Analysis of the Composition of Modern Film Trailers

Branford Harris, William J. Adams Department of Journalism and Mass Communication College of Arts and Sciences

The purpose of this research is to identify trends and factors in modern film trailers that contribute to opening weekend box office success. This project looks at 30 films released in the fourth quarter of 2013 (Oct. - Dec.). We analyze each film using a set of eleven factors in trailers found to be vital for determining a film's financial success. That information is then compared to each film's percentage of budget made back on its opening weekend. We are finding that there is a correlation between mentioning actors and opening weekend box office success. This research provides valuable information for the creation of effective film trailers and related marketing.

Honors/Leadership: Leadership Scholarship; Kansas Association of Broadcasters Scholarship; TakeFlight (KSU advertising agency); K-State Marching Band; NAACP Member; Travel: Canada

In Vitro Testing of K6L9 on Cancer and Normal Cell Lines

Miriam Macedo¹, Thilani Samarkoon², Stefan H. Bossmann², Matt Basel³, Deryl. L Troyer³ ¹Division of Biology ²Department of Chemistry College of Arts and Sciences ³Department of Anatomy and Physiology College of Veterinary Medicine

Treatments that can differentially affect tumor cells over normal cells are the gold standard of cancer treatment. Recently, many short peptides have shown potential for discriminating between tumor and regular tissue. In our studies we have tested the effects of the anti-cancer peptide K6L9 in vitro on various cancer and normal cell lines. Each cancer cell line was treated with varying concentrations of the agent and the toxicity of the cells was measured after 24 and 48 hours of exposure through an MTT assay to estimate an IC50 value. K6L9 was toxic to the cancer cells (B16F10, 4T1, Pan02, Panc1) with IC50 values in the low (2-5) uM range for most of them. K6L9 also showed little toxicity towards normal cells (STO,MS-1) with IC50 values increasing to nearly 100 uM. An increase in concentration and time exposure of the agent increased the toxicity rates on the cancer cell lines tested. Anti-cancer peptides seem to show a more promising future in treatments than anti-cancer drugs due to their cell targeting mechanism that locates metastatic cancer and destroys it before it can spread. Targeting cells allows for easier and faster cancer treatment while reducing negative side effects.

Honors/Leadership: NIH Bridges to the Future; Golden Key; Pre-Dental Club; Rake 'N' Run; Bilingual: English/Spanish

NET ZERO: ADVANCING IN BUILDING TECHNOLOGY AND EFFICIENCY *Eddv Gomez, Christopher Ahern*

Department of Architectural Engineering and Construction Science College of Engineering

With conventional energy prices on the rise, new, more efficient ways of energy production are sought. Net Zero construction is an alternative solution to increasing energy production. Net Zero Buildings are designed to sustain themselves by producing the energy they use, resulting in drastically decreased fossil fuel dependency. The wall structure of a building is an important area in which energy reduction can occur. With thermal comfort levels increasing, so are the prices. With that being said, this research focuses on Wall Design and applications, high R-Value content. R-Value is a measure of resistance to heat flow through a given thickness of material. Having a higher R-Value is also having a greater energy reduction and vice versa. A wall is usually made up of a double top plate, taped and painted 1/2 inch gypsum wallboard (interior), vapor control layer, fiberglass insulation, exterior sheathing and house wrap. A high R-Value wall will get most of its resistance from the insulation portion. The variance will depend on the product used, anywhere from a hardening foam to denim. There is a problem that has to be addressed: R-Values cannot be the only form in finding out overall effectiveness on a building. R-Value cannot measure or stop all four ways in which heat moves: conduction, convection, radiation and air infiltration. It can only measure conduction. This is where research and testing comes in to play. Though Net Zero construction has a price tag, the money spent up front will be made back through energy savings in the future. Since this is a recent, and still experimental, type of construction, the infrastructure system needs to be updated/improved and will vary from region to region. Net Zero construction is mainly used for large corporate buildings and schools, but it is hoped that it will make an impact on urban, residential homes. Since Net Zero buildings are a relatively new phenomenon, there is little historical data to document their feasibility.

Honors/Leadership: NACME Scholarship; Memorial Scholarship; National Society of Collegiate Scholars; Sigma Alpha Lambda; Rake 'N' Run

Monitoring Nighttime Well Being of Children with Disabilities at Heartspring

Austin White, Sergio Ortiz, Punit Prakash, Steve Warren Department of Electrical and Computer Engineering College of Engineering

Sleep is critical for the development and well-being of every person, and the effects of sleep quality can be even more pronounced in children with disabilities. The primary goal of this project is to track physiological parameters of children at Heartspring (Wichita, KS), a residential and educational facility for kids with special needs. The project team is initially developing a bed sensor suite to record a variety of parameters, including heart rate, respiration rate, position, enuresis (bed wetting), and room environmental factors such as loudness, temperature, and ambient light. This type of data collection is traditionally referred to as polysomnography. The current gold standard polysomnograph usually requires several overnight stays in a sleep laboratory, and anywhere from 12 to 50 electrodes are attached to the subject. For a disabled child, this type of traditional sleep study is not an option. This drives the need for non-traditional and non-obtrusive sensor and devices whose data must be compared to the gold standard PSG. The team is currently identifying the most sensible commercial system to serve as a comparison baseline, and early trials with Heartspring children are anticipated before summer 2014.

Honors/Leadership: Project IMPACT Scholarship; Choctaw Nation Scholarship; MAPS; Rake N' Run; Volunteer at homeless shelter

Characterization of T-DNA insertion mutants in pectate lyase gene of rice

Daniela Guereca¹, Frank White², Junli Zhang² ¹Department of Microbiology College of Arts and Sciences ²Department of Plant Pathology, Kansas State University College of Agriculture

Bacterial blight of rice is an economically important disease worldwide, caused by bacterium *Xanthomonas oryzae pv. oryzae*. During disease, the expression of a plant gene for pectate lyase is highly induced. To determine if expression of pectate lyase gene is important for disease development, the ability of bacteria to induce disease on plants harboring mutations in the gene for pectate lyase will be examined. However, prior to measuring the effect of pectate lyase expression on disease, rice lines with mutations in the gene for pectate lyase first need to be characterized. A variety of rice stock centers maintain large collections of mutant rice lines with random T-DNA and transposable elements. The main purpose of this project is to screen the genotypes and phenotypes of the gene were amplified by the polymerase chain reaction (PCR) from rice genomic DNA of the mutant and wild type rice lines. Two sets of primers were designed, one pair amplifies wild type gene, if present, while the other pair amplifies a fragment from within the insertion T-DNA and extending into the coding sequence of the gene for pectate lyase. The identities of the amplified fragments were determined by gel electrophoresis fractionation and DNA sequencing. Phenotypes of the pectate lyase mutants were assessed by measuring height and leaf production of the rice plants during growth. The results indicate phenotypic differences between wild type and pectate lyase mutant plants. Further functional analysis of pectate lyase on disease development is in progress.

Honors/Leadership: NIH Bridges to the Future; Golden Key International Honor Society; HALO; LULAC; Transfer Ambassadors; Travel: Mexico; Bilingual: English/Spanish

The Extraction of Forskolin To Increase Cost Efficiency

Jonathan Bernard¹, John M Tomich² ¹Division of Biology ²Department of Biochemistry and Molecular Biophysics College of Arts and Sciences

The purpose of my research on the drug Forskolin is to extract the molecule in an inexpensive and efficient manner. Forskolin, a diterpene of the labdane family, is the pharmacologically active compound extracted from the *Coleus forskohlii plant*. The plant is related to mint, historically grown in India, and has been used in traditional Indian medicine for hundreds of years and is still used in several medical applications today. The compound Forskolin is only medically known to exist in one plant; therefore Forskolin is quite rare and relatively expensive when purchased commercially. The Tomich Lab in the Biochemistry and Molecular Biophysics Department has the ability to perform a number of different natural product extraction methods including, liquid-liquid, critical CO₂, and organic solvent extractions. These methods will be employed to find a better and cheaper isolation method that is also environmentally safe. During the isolation process various fractions will be generated and tested using mass spectrometry (MS). In addition to identifying our target compound MS also has the ability to assess the purity of the different preparations. After we identify an optimized purification scheme, purified material will be tested against commercial material in an electrophysiological assay that can measure the effect of Forskolin on cells. Cultured epithelial cells are grown to confluence on small filters that can be placed inside an Ussing chamber. Placing Forskolin on the baso-lateral surface induces chloride transport from the apical surface, which can be measured electronically.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; Memorial Scholarship; Soaring Eagles Leadership Team; Mercy Regional Health Center ER, volunteer; Alternative Spring Break: Chicago, St. Jude's Hospital- Memphis, TN, Kansas City; Flint Hills Breadbasket; Martin Luther King-A Day On, Not a Day Off; Douglass Center Tutor; Lawrence Homeless Shelter Volunteer; Habitat for Humanity; Rake 'N' Run

Effect of Tamoxifen on Canine Mammary Cancer

Nallely Barron-Garcia¹, Jessica Chavara², T. A. Nguyen² ¹Department of Microbiology College of Arts and Sciences ²Department of Diagnostic Medicine/Pathology College of Veterinary Medicine

Canine mammary tumors are the most common in female dogs and are often diagnosed as malignant. After surgical removal of tumor, reoccurrence is frequent; therefore, a pre- and post- surgical treatment is needed. Characterization of a canine mammary carcinoma cell line such as CF41.Mg was evaluated for specific biomakers using protein analysis, immunofluorescence, and reverse transcriptase polymerase chain reaction (RT-PCR). The preliminary data showed that CF41.Mg cells express: estrogen receptor (ER), progesterone receptor (PR), human epithelial growth factor receptor 2 (HER2), connexin 43, and connexin 46. Established anticancer drugs such as tamoxifen, are used in humans for an ER-positive breast cancer treatment; therefore, tamoxifen was hypothesized to be a viable treatment for canine mammary cancer. Since tamoxifen inhibits cell growth via an ER-mediated pathway, the goal is to determine the effect of tamoxifen on canine mammary cancer cells. CF41.Mg cells were treated with tamoxifen for 24 hours. The results show that there was an increase of ER and HER2. Currently, the appropriate dosage of IC50 for tamoxifen is under investigation. Furthermore, treated cells will be analyzed for cell cycle arrest using flow cytometry and protein analysis. Overall, the findings indicate that tamoxifen inhibits cell proliferation in canine mammary cancer cells and a possible mode of action is through an ER-mediated pathway.

Honors/Leadership: Accepted to University of Kansas School of Medicine; Academic Honors (4.0), NIH Bridges to the Future; Bluemont Scholarship; Ellis Foundation; Phi Theta Kappa; Research Experience for Undergraduates (REU), K-State Biology; Summer Undergraduate Research Opportunity Program (SUROP); K-INBRE presentation; Presenter: Phi Zeta Research Day; Presenter: Ecological Genomics Research Forum; Phi Kappa Phi; LULAC; Travel: Mexico; Bilingual: English/Spanish



Pain Killers in Dogs

Izabella Carmona¹, Butch KuKanich², David Rankin², Christopher Norkus² ¹Department of Animal Science and Industry College of Agriculture ²Department of Anatomy and Physiology College of Veterinary Medicine

The current dosages of the analgesic drug amitriptyline may not have desired effects in clinical dogs. Three case reports have shown that dogs respond variably to the currently recommended dosages. The variable responses may be due to the lack of sufficient drug absorption or lack of metabolite (nortriptyline) formation that contribute to the desired analgesic effects. The metabolite is the product formed when amitriptyline is metabolized. The purpose of this study is to assess the plasma drug concentrations after amitriptyline administration. A dose higher than the currently recommended dose of oral amitriptyline was administered, which may increase the plasma drug concentrations to desired levels in dogs. Five healthy Greyhound dogs (male and female) were included in the study. Amitriptyline was administered IV and orally, blood was obtained at predetermined time points, and plasma concentrations of amitriptyline and nortriptyline were determined using liquid chromatography and mass spectrometry. The plasma concentrations of amitriptyline after IV administration were high, but plasma concentrations were low after oral administration. The plasma concentrations of nortriptyline were low after both IV and oral administration, suggesting that the dogs either produced low amounts of nortriptyline or they rapidly metabolized nortriptyline to another metabolite. The dogs were fed prior to drug administration, which may have decreased drug absorption. Therefore, further studies could assess the amount of drug absorbed in fasted dogs compared to fed; higher doses can also be assessed. Further research could use the information determined in these studies to assess effective analgesic doses in clinical patients.

Honors/Leadership: Pre-admission to the K-State College of Veterinary Medicine; Honors Scholarship; College of Agriculture Scholarship; Block and Bridle, member; Horseman's Association, member

The Ins and Outs of Back-Translating Borges's Short Stories Summaries

Mayra Perez-Fajardo, Laura Kanost Department of Grain Science and Industry College of Agriculture Department of Modern Languages College of Arts and Sciences

Argentine-born Jorge Luis Borges (1899-1986) was a writer of short stories and fictional essays who also gained international fame as a poet, critic, and translator. A controversial technique that some translators use to verify the faithfulness of their translation to the original work is back-translation or the act of taking a translated document and translating it back into its source language. The purpose of my study was to read twelve short stories by Borges in order to translate into Spanish the summaries created in English for the Painting Borges exhibition, showcasing paintings based on his work. Since the English summaries refer to Spanish stories, this process is similar to back-translation. The translated summaries were used by the Kansas State University Beach Museum in March when they displayed the Painting Borges exhibition. Reading the original stories before reading the original stories. Additionally, this helped to familiarize the translator with the vocabulary Borges liked to use. Occasionally, it was necessary to change verb tense and to reorder the sentence structure in order to flow better in Spanish. The main obstacle was remaining loyal to both the original stories and the summaries. One could not be favored over the other, and finding the balance between each of these layers was something that always had to be kept in mind.

Honors/Leadership: Academic Honors (4.0); Memorial Scholarship; Project IMPACT Scholarship; MAPS; MANRRS; Rake 'N' Run; Four Paws Bake Sale; Border Angels; Travel: Mexico; Bilingual: English/Spanish



Segregation of Self-Consolidating Concrete in Slanted, Reinforced Walls

Michael Cesena, Don Phillippi Department of Architectural Engineering and Construction Science College of Engineering

Self-consolidating concrete (SCC) is a highly fluid, yet strong form of concrete that can be used to fill tight or congested spaces that normal concrete could not fill. Unlike normal concrete, which requires vibration to compact it, self-consolidating concrete can spread into its form under its own weight. However, because SCC is still a developing form of technology, all of its flaws have not been fixed, the most important being its unpredictable segregation tendency, or tendency of the mixture to separate. In 2009, two identical bridge bents were constructed that included the placement of self-consolidating concrete to form slanted walls filled with steel reinforcement. The concrete was expected to perform without fault, however after the forms were removed, segregation had occurred. The authors will be performing an experiment similar to that performed in 2009 to determine if the problem still exists, and if so, the cause of the segregation and to determine if this is the case, a parametric experiment will be conducted that will construct walls set at an angle similar to the 2009 experiment, with control walls added that will be constructed vertically upright. Both types of walls will be constructed with three levels of steel reinforcement: full reinforcement, some reinforcement and without reinforcement. The authors have received funding for the project and are in the process of setting up the experiment.

Honors/Leadership: Missouri Reciprocal Scholarship; Architectural Engineering Institute, U.S. Green Building Council; Rake 'N' Run; Lacrosse Club

PHASES OF COPING FOR PARENTS OF A CHILD WITH A DEVELOPMENTAL DISABILITY: EXPLORING A NEW LIFESPAN MODEL

Natira Staats¹, Juliana Malone², Allison Hein³, Briana S. Nelson Goff³, Nicole Springer⁴,

J. Kale Monk⁵, Jill R. Bowers⁵ ¹Department of Psychological Sciences College of Arts and Sciences ²Department of Curriculum and Instruction College of Education ³School of Family Studies and Human Services College of Human Ecology Kansas State University ⁴Department of Community, Family, and Addiction Services Texas Tech University ⁵Department of Human and Community Development University of Illinois at Urbana-Champaign

Current literature primarily focuses on the initial reactions and adjustment process families go through when coping with a developmental disability diagnosis in a child, as opposed to encompassing the changes that occur across the full lifespan. The current study included a national sample of 643 participants who were parents of children diagnosed with Down syndrome. This study was part of a larger mixed-method research study of parents, which included quantitative measures of individual and relationship functioning and qualitative questions about their experiences in parenting a child with Down syndrome. ANOVA results indicated higher parental coping and hope scores during the middle childhood stage, with lower levels among parents of younger and older (adult) children, indicating an inverted U-shape in their levels of coping and hope across the lifespan. Qualitative analysis results support a similar pattern over the family life cycle. The current study provides a new model to further understand the unique needs of families with a child with a developmental disability diagnosis that may vary at different points across the lifecycle, providing important implications for further research and intervention programs.

Honors/Leadership: Accepted into K-State Marriage and Family Therapy Graduate Program; NIH Bridges to the Future; Memorial Scholarship; Phi Theta Kappa Transfer Academic Scholarship; Rake 'N' Run; Big Brothers and Big Sisters, volunteer; Breast Cancer Research Foundation, volunteer; Bilingual: English/Spanish

17

Educational Empowerment of African Americans

Erwin Mwangi Chege, Jaebeom Suh Department of Marketing College of Business Administration

African Americans account for 12.6 % (2013) of the population of North America, yet they are unfortunately performing very poorly compared to other students of different races. The nation-wide graduation rate for African American students is 42% (2013), which is staggeringly low compared to the average for Caucasian students, 62% (2013). The purpose of this research was to find the best ways to empower at-risk African American students to improve academically. In order to accomplish this goal, we needed to investigate current practices and ways to improve upon them. Empowerment is defined as a multi-dimensional social process that helps people gain control over their own lives. The results showed that two types of empowerment work best: Attentive Empowerment (hands-on mentoring) and Eudemonistic Empowerment (self-reliance). From the research, we contended that the best way to implement them is with an online-based mentorship program for high school and college-age students. The mentorship programs that are currently active, however, have several base problems: low expectations for students, social pressure, family and emotional support issues, hyper-parenting, and stereotyping. The difficulties facing the mentorship programs are: lack of funding, lack of public appreciation, and lack of advertisement for their deeds. These problems are solvable by adding online mentoring programs at the schools. The research shows that the support from both mentors and teachers can help alleviate some of the troubles that the students face, and the school integrated mentoring program can reduce the costs that mentoring programs might have.

Honors/Leadership: Cargill Scholar; ConocoPhillips Scholarship; Black Student Union; Rake 'N' Run

Visual Cueing and Feedback Influencing Undergraduate Students' Reasoning Resources on Conceptual Physics Problems

Jeffrey Murray¹, Amy Rouinfar¹, Élise Agra¹, Lester C. Loschky², N. Sanjay Rebello¹ ¹Department of Physics ²Department of Psychological Sciences College of Arts and Sciences

Research has demonstrated that attentional cues overlaid on diagrams and animations can help students attend to the pertinent areas of a diagram and to facilitate problem solving. In this study we investigate the influence of visual cues and correctness feedback on students' ability to activate and coordinate the cognitive resources that they currently possess. The participants (N=90) were enrolled in an algebra-based physics course and were individually interviewed. During each interview students solved four problem sets each containing an initial problem, six isomorphic training problems, and a transfer problem. The cued conditions were given visual cues on the training problems, and the feedback conditions were told whether their responses (answer and explanation) were correct or incorrect, but the interviewer did not distinguish whether the source of their incorrectness was because of their explanation, or their answer. We found that the combination of both correctness feedback and visual cueing, were the most effective means to assist participants in not only the activation of the proper reasoning resources to successfully solve the problems, but also in the coordination of those resources.

Honors/Leadership: McNair Scholars; Kansas Undergraduate Research Day at the Capitol, Topeka; Bluemont Scholarship; Research Experience for Undergraduates: Kansas State University; Physics Club; Rake 'N'Run; Mittens for Many

Exploring the Pervasiveness of Different Types of Cyberloafing in the Workplace

Dominic Deleon, Joseph Ugrin Department of Accounting College of Business Administration

The Internet has perhaps had the largest effect on business than any innovation in the past century and has improved the workplace in many ways by being a new platform for business to operate, for employees to communicate, and for customers to shop. In addition to those effects, the Internet also gives employees a new domain to misuse company time. Use of the Internet for non-work related activities in the workplace has become increasingly more common and businesses have expressed concerns about lost productivity due to personal Internet usage (cyberloafing). However, recent research has found that some types of cyberloafing can serve as a 'break' and can actually have a positive impact on employee job performance while other types of cyberloafing are purely detrimental. With that in mind it seems important to know how employees spend their time online, why they spend their time online in the way they do, the effects of that time online, and the usefulness of mechanisms that aim to influence online behavior in the workplace. The primary mechanism organizations use to manage cyberloafing is an Acceptable Internet Use Policy (AUP). Researchers have shown that AUPs can effectively deter cyberloafing and examined which facets of an AUP are most effective. However the literature has not examined the effects of differences in semantics within the AUP on cyberloafing, specifically, how AUPs are framed; either positive or negative. We intend to explore how differences in semantics influence the effectiveness of AUPs.

Honors/Leadership: Doll Scholarship; Cargill Scholarship; Dean's Scholarship; Alpha Kappa Psi, President; Project IMPACT Scholarship; West Hall Sustainability Chair

Recombinant Baculovirus Expression and Immunoreactivity of Schmallenberg Virus Nucelocapsid Protein

Maira Cotton-Caballero¹, Juergen A. Richt², Bonto Faburay² ¹Department of Animal Science and Industry College of Agriculture ²Department of Diagnostic Medicine/Pathobiology College of Veterinary Medicine

Schmallenberg virus (SBV) is an arthropod transmitted virus that belongs to the genus Orthobunyavirus of the family Bunyaviridae. The virus infects ruminants, notably cattle, sheep and goats, and causes fetal malformation. SBV has been mostly reported in Europe but there is potential risk for introduction into the US. The genome of the virus consists of 3 segments of negative sense single-stranded RNA: small (S), medium (M), and large (L). The S segment encodes the nucleocapsid (N) protein, which is the most abundant protein that makes up the basic structure of the virus. The primary objective of this study is to express the N protein using the recombinant baculovirus expression system and assess its use as a diagnostic antigen. The coding sequence of the N protein was initially amplified by PCR using a proof-reading DNA polymerase. The PCR product was cloned into pFastBac, to construct a donor plasmid, which was used, subsequently, to create a recombinant bacmid carrying the target N protein sequence. The purified recombinant bacmid was transfected into Spodoptera frugiperda, Sf9, insect cells to recover recombinant baculoviruses. The recombinant viruses were used to express the SBV N protein, which was purified by affinity chromatography. Western blot analysis using anti-histidine monoclonal antibody detected the expected size of 29 kDa recombinant protein; and specific immunoreactivity with polyclonal bovine sera, and a monoclonal antibody raised against SBV N protein confirmed antigenicity of the expressed protein. These results suggest the potential suitability of the recombinant N protein as a serodiagnostic antigen for detection of SBV infection in susceptible hosts.

Honors/Leadership: Agriculture Dean Discretionary Scholarship; Memorial Scholarship; Rake 'N' Run; Mittens for Many

Artificial Storage and Recharge at Hays in Northwestern Kansas

Mark A. Mathis II, David R. Steward Department of Civil Engineering College of Engineering

This project studies artificial storage and recharge in Northwestern Kansas. Water depletion is becoming an increasing concern due to the higher rate of municipal water consumption. Many cities now look for solutions to this problem through water conservation and re-use. This problem is particularly important for growing populations in Northwestern Kansas that face water shortages and the inability to sustain water needs. Hays, Kansas, the largest city in Northwestern Kansas, with a population of approximately 21,000 people and accounting for roughly 40% of Ellis County water usage, is facing this problem of water depletion. Growing community and agriculture-life in Hays accounts for 22% of water used for irrigation and 78% of water for municipal uses, totaling nearly 2100 acre feet of water usage per year. A survey was conducted of existing recharge projects as well as evaluating the potential for moving water from plentiful sources to important recharge regions. This is the first step in resolving the depletion of water in Hays. Next, ArcGIS was used to locate each point of diversion for Hays and record data for individual points of diversion. Discovering more efficient ways to store and recharge water in regions where water sources are limited, and reducing the percentage of water depletion is vital. After further research, the artificial storage and recharge method can be applied to dry regions of Kansas as well as regions around the world with increasing water depletion concerns, such as Hays, Kansas.

Honors/Leadership: Kansas Undergraduate Research Day at the Capitol, Topeka; American Society of Civil Engineering; Air Force ROTC; Rake 'N' Run

Isolation and characterization of mesenchymal stromal cells from dog adipose tissue

Delzeit J.L.¹, Klug J.², Pfeifer K²., Rajanahalli P.², Weiss M.L.² ¹Division of Biology College of Arts and Sciences ²Department of Anatomy and Physiology Kansas State University College of Veterinary Medicine

AdMSCs or Adipose Mesenchymal Stromal Cells are used as an autologous cell therapy for regenerative medicine. We are clinically testing their effects on osteoarthritis in a pilot study using canines with naturally occurring hip arthritis. My research involved AdMSCs from four canines in 2D culture in order to characterize them. To grow the AdMSCs, cell growth medium composed of a low glucose medium was supplemented with 20%-fetal bovine serum, 1% glutamax, and 1% antiseptic. AdMSCs in this solution grow robustly, and once the cells reach confluency, they are passed using a 0.05% Trypsin-EDTA solution to lift them. This allows us to move the cells into a new plate with more room to grow. Our goal is to determine the expansion capability of the AdMSCs for each dog. The cells will then be frozen and may be available for testing the effects that freezing has on the cells. AdMSCs will be characterized using flow cytometry for future experiments.

Honors/Leadership: Academic Honors (4.0); University Honors Program; Putnam Scholarship; Jayne Smith Scholarship; Violet Richardson Scholarship; Pre-Optometry Club

The Relationship between Theory of Mind and Social Reasoning

Monica Diaz-Serrano, Gary Brase Department of Psychological Sciences College of Arts and Sciences

Theory of mind is our ability to understand the thoughts, feelings, and intents of others. This ability normally develops in early childhood and previous research indicates that this ability is impaired or delayed in children with Autism Spectrum Disorders (ASD; Baron-Cohen, 1991). This study examines if levels of theory of mind ability in non-ASD adults is related to ability to reason about social situations which entail thinking about others' intentions. This work can provide a baseline for future research on the implications of theory of mind ability for effective social functioning. Theory of Mind abilities will be measured using the Revised Self-Monitoring scale, the Reading the Mind through the Eyes Test, and Happe's short stories. Social reasoning ability will be measured using several variations of the Wason's selection task, which have different types of social and non-social content. In the future we expect to collect data from subjects with ASD to determine if their theory of mind ability is either relatively intact but simply delayed or generally impaired, relative to people without an ASD.

Honors/Leadership: Foundation PLUS Scholarship; Best-Buy Scholarship; Parents as Teachers, Volunteer; Developing Scholars Talent Show, vocals

A new method for identifying porcine reproductive and respiratory syndrome virus surface proteins recognized by homologous or broadly neutralizing antibody serum samples

Micke Ramirez¹, Benjamin R. Trible², Raymond R.R. Rowland² ¹Department of Animal Science and Industry College of Agriculture ²Department of Diagnostic Medicine and Pathobiology College of Veterinary Medicine

Porcine reproductive and respiratory syndrome (PRRS) is the most economically important swine viral disease in the world. Neutralizing antibodies (nAb) are an important part of the host immune response to PRRSV. All surface proteins of PRRSV (glycoprotein (GP) 2, GP3, GP4, GP5, and matrix) are important for the production of nAb. The nAb response to infection is weak and delayed, and often directed toward only genetically related isolates, which we term homologous nAb (hnAb). Recently, we identified a small population of pigs that produce nAb to a broad range of genetically diverse PRRSV isolates, which we define as broadly neutralizing antibodies (bnAb). The objective of this study is to develop a method for identifying PRRSV surface proteins that are recognized by hnAb or bnAb. The approach involved absorbing out and testing for nAb in a three-step process. First, cells were not treated or infected with PRRSV, then fixed with acetone. Next, hnAb samples were incubated with non-infected cells, or PRRSV infected cells. Finally, the nAb titer of treated or non-treated hnAb samples were compared using a standard PRRSV nAb assay. Compared to the non-treated hnAb sample, incubation with PRRSV infected cells resulted in the complete loss of neutralizing activity, demonstrating the assay's capacity for removing nAb. Future work will involve removing one or more surface proteins from an infectious cDNA PRRSV clone, then transfecting cells and testing for nAb absorption. Overall, this assay will potentially identify individual PRRSV surface proteins that are targeted by hnAb or bnAb.

Honors/Leadership: Summer Internship at Oakland Zoo, Oakland, CA; Pre-Vet Club; Rake 'N' Run; Mittens for Many; Bilingual: English/Spanish



Developing Interaction Diagrams to Design Reinforced Concrete Rectangular Bridge Piers

Katherine Nguyen, Hayder A. Rasheed Department of Civil Engineering College of Engineering

The process of developing exact interaction diagrams to size and reinforce concrete bridge piers is mathematically involved. The section is divided into a finite number of layers having a constant strain in each. By setting the top layer strain to 0.003, the ultimate design case (failure) is admitted. By changing the value of strain at the bottom layer of the section, a linear distribution of strain is generated across the section which yields a point on the interaction diagram. By using different bottom strains, the full diagram is generated for a certain section and reinforcement. Using the software "KDOT Column Expert," the procedure of plotting the diagrams for two bridge piers is validated. Then the software is used to generate a group of parallel λ interaction curves. Based on the demand value of moment-axial force, the reinforcement arrangement is selected for a specific pier size. If the demand point falls outside of the available curves, the size of the column is enlarged and a new set of curves are generated to determine the reinforcement arrangements. Examples will be shown to illustrate the procedure.

Honors/Leadership: Kansas Honor Scholar; MAPS; Project IMPACT Scholarship; Engineers Without Borders; Steel Bridge Team; Kansas State Club Volleyball Player

Did You See That? Predicting Attributions to Prejudice

Navanté K. Peacock, Stuart S. Miller, Donald A. Saucier Department of Psychological Sciences College of Arts and Sciences

Expressions of racial prejudice have become increasingly subtle. In many situations people disagree about whether prejudice has been expressed. To understand why people disagree, we created the Propensity to Make Attributions to Prejudice Scale (PMAPS). Using the PMAPS, we investigated whether expectations and beliefs regarding prejudice will interact with levels of situational ambiguity to predict whether prejudice is perceived. Participants began by completing the PMAPS, a 15-item measure consisting of four dimensions: beliefs about the prevalence of racial prejudice, trivialization of targets' concerns, and vigilance and efficacy in spotting prejudice. Upon completion of the scale participants were randomly assigned to one of three conditions in which we manipulated situational ambiguity as non-prejudice, ambiguous prejudice, or clear prejudice. Each condition contained eight scenarios involving a White actor and a minority target. The amount of prejudice participants perceived for each scenario was measured using a 9 point Likert scale (1 = Definitely not prejudice, 9 = Definitely prejudice). We hypothesized that higher scores on PMAPS would be most predictive of higher perceived levels of prejudice when the cues were more ambiguous. Our results supported this hypothesis. Interestingly, we also found that the PMAPS was positively correlated with perceptions of prejudice when alternative, non-prejudice cues were present. In conclusion, the PMAPS may be useful for understanding the complexities of how individual differences interact with social context to affect attributions to prejudice.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; Alternative Spring Break, Kansas City; Martin Luther King- A Day On, Not a Day Off

Effect of Antisperm Antibodies on Viability of Frozen Bovine Semen

Sofia Sabates¹, Simone Holliday², Maria Ferrer³¹Division of BiologyCollege of Arts and Sciences²Department of Animal Science and IndustryCollege of Agriculture³Department of Clinical SciencesCollege of Veterinary Medicine

We evaluated the effect of antisperm antibodies (ASAs) on viability of frozen bull semen and compared viability assays. The hypotheses were that ASAs lower sperm viability and fluorescent stains have better sensitivity. Three ejaculates from four bulls were frozen (ASA negative). Bulls were immunized with autologous sperm. and three more ejaculates were frozen (ASA positive). Thawed semen was divided into four aliquots: 1. Computer-assisted semen evaluation of progressive and total sperm motility, 2. Eosin-Nigrosin stain and light microscopy, 3. propidium iodide (PI) and fluorescence microscopy, 4. Yo-Pro1 and fluorescence microscopy. One hundred sperm were counted, non-stained sperm were considered viable. The percentage of viable and motile sperm was compared within methods between ASA-negative and ASA-positive ejaculates using a T test. Correlation between percentage of viable sperm was evaluated among methods with sperm motility. ASAs did not affect sperm motility and viability (Table 1) (P > 0.05). There was a positive correlation only between total motility, and progressive motility, viable sperm on eosin-nigrosin and PI stains(Table 2).

Ta	bl	e	1
	_	_	_

Group	Total motility (%)	Progressive motility (%)	Eosin (%)	PI (%)	<u>Yo</u> -Pro (%)
ASA- negative	31.5±23.2	22.3±16.1	32.9±7.2	27.6±9.6	36.4±8.8
ASA-Positive	42.7±28.2	26.9±17.4	34.7±11.9	29.8±6.6	35.6±8.6

Table 2

Total motility	Progressive motility	Eosin	PI	Yo-pro1
Progressive	0.9575	0.4672	0.43734	0.31477
motility	< 0.0001	0.0327	.0474	0.1646
Eosin	0.4672		0.23943	0.27380
	0.0327		0.2959	0.2297
PI	0.43734	0.23943		0.17541
	0.0474	0.2959		0.4469

Contrary to my hypothesis, ASAs did not lower sperm viability or motility. Fluorescent stains did not improve sensitivity of viability assays.

Honors/Leadership: Academic Honors (4.0); Phi Beta Kappa; Honors Program; Memorial Scholarship; Medallion Scholarship; National Honor Society Scholarship; Sertoma Scholarship; Soaring Eagles Leadership Team; Golden Key; National Society of Collegiate Scholars; Rake 'N' Run; Flint Hills Breadbasket; Little Hands, Big Difference; Elementary Tutoring; Mittens for Many; Travel: 20 countries; Bilingual: English/Spanish

A Longitudinal Study of Electronic and Mobile Technology Device Attitudes and Internet Services and Applications Usage Phillip Hill, Esther Swilley Department of Marketing

College of Business Administration

Consumers can connect to the Internet on many technology devices. Not only are consumers using their desktop computers for Internet services, but these same services can be found on laptops, cell phones and other hi-tech devices. The aim of this study is to understand what services are used on which devices. With the changes in the types of technologies that consumers are purchasing, there are also changes in how consumers use these technologies. What electronic devices garner the greatest return for marketers in terms of communication, promotion, services, and selling? This study conducts a comparison of Internet devices to understand how the use of these devices has changed. Three studies were conducted over the past seven years to understand the evolvement of Internet service usage for both electronic and mobile devices. The findings should aid marketers in the development of strategies by identifying behavioral trends in the use of technology devices for Internet services. This research will allow for more specific and less generalized assumptions of electronic commerce versus mobile commerce usage in order to develop these channels more efficiently for marketing activities.

Honors/Leadership: Society of Marketing Advances Conference; Leadership Scholarship; Multicultural Business Student Association, Vice President; Floor President, Goodnow Hall; Residence Hall Assistant; Fort Riley USO Volunteer; Rake 'N' Run

Role of a Gene Homologous to Intron-encoded Endonucleases on Baculovirus Replication

German Cuevas, Wenbi Wu, A. Lorena Passarelli Division of Biology College of Arts and Sciences

The Autographa californica M nucleopolyhedrovirus (AcMNPV) orf79 (ac79) is a gene conserved in most baculoviruses. It has homology to genes encoded by bacteria, ascoviruses, and iridoviruses. The predicted ac79 product has a conserved domain that is homologous to UvrC or intron-encoded endonucleases; these gene products hydrolyze DNA and, upon DNA repair, the gene is copied at that site. Characterization of a recombinant virus lacking ac79 showed that knocking out ac79 results in a decrease of infectious progeny virus suggesting that ac79 is necessary for efficient virus replication. We have constructed viruses with site-directed mutations within the UvrC domain. We will investigate the effects of these mutations on budded virus production and nucleocapsid formation by carrying out virus growth curves, viral DNA replication assays, and gene expression analysis. Virus growth curves involves infecting Sf9 cells with the mutant and control viruses at a low and a high multiplicity of infection, obtaining progeny virus at different times post infection, and titering virus outputs. DNA replication assays involve Q-PCR analysis to assess if the virus is replicating its DNA genome. Gene expression analysis will be evaluated by looking at protein production by immunoblotting. In all cases, the mutant viruses will be compared to the parental control virus. These results will help us define strategies used for virus multiplication.

Honors/Leadership: Cancer Research Award; Opportunity Scholarship; Denison Scholarship; Topeka Dia de los Muertos, Poetry Presentation; Developing Scholars Talent Show; Travel: Mexico; Bilingual: English/Spanish



The chemistry of sex games: why do male crickets transfer large amounts of dopamine to females during copulation?

Larry Rodriguez¹, Jeremy L. Marshall² ¹Department of Biochemisry College of Arts and Sciences ²Department of Entomology College of Agriculture

Dopamine is an important biological molecule that plays a critical role in how behaviors are "punished" or "rewarded." While dopamine has been studied with regard to a wide range of behaviors, including memory, diet and addiction, it has previously not been found to be transferred from one individual to another during copulation. However, the ejaculates of male ground crickets (Allonemobius socius) can contain up to 100pg of dopamine, which is roughly 10X the normal physiological dose required to modify behavior in insects. So, the question is, why are male crickets transferring so much dopamine to females during sex? There are several alternative hypotheses, derived from sexual selection and sexual conflict theory, which may explain the function of dopamine as an agent of sexual reward or punishment, respectively. Our preliminary data suggest that dopamine acts as a punishment, whereby the greater the amount of dopamine transferred to the female, the longer it takes for the female to remate. As a consequence, females receiving larger doses of dopamine are likely forced to store and utilize more of that male's sperm relative to a female who receives smaller amounts of dopamine. This "punishment" effect is particularly strong when a female re-mates with a different male. While further experiments are needed to clarify the role of dopamine in the chemistry of cricket sex, our data suggest that sexual conflict over mating rates may be driving the evolution of dopamine usage as a sexual punishment in this system.

Honors/Leadership: Academic Honors (4.0); NIH Bridges to the Future; Honors Program; Ecological Genomics Undergraduate Research and Mentoring Internship; Internship: KU Department of Pharmaceutical Chemistry Summer Research Program; DSP Talent Show, 1st Place; Bilingual: English/Spanish

The effect of type of collection medium and freezing extender on rat sperm cryosurvival rate Quach T¹, Fox K², Weiss M.L.² ¹Department of Biochemistry and Molecular Biophysics College of Arts and Sciences ²Department of Anatomy and Physiology College of Veterinary Medicine

Cryopreservation of rat sperm is very challenging due to its sensitivity to different collection media and freezing extenders. The objective of this study was to determine the optimal medium and freezing extender for sperm cryopreservation of outbred Sprague Dawley (SD) rats. Epididymal sperm samples were collected from 18 to 47 weeks old SD rats (n=10). Sperm solution from one epididymis was collected and frozen by following the Yamashiro's protocol (Yamashiro H, et al., Cryobiology, 2007). Meanwhile, the other epididymis was processed as per Nakatsukasa's protocol (Nakatsukasa E, et al., Reproduction, 2001). After seven days of storage in liquid nitrogen, the cryopreserved sperm was divided into three thawing groups. The first group was thawed in modified Kreb's Ringer bicarbonate (mKRB) freezing extender. The second group was in modified Rat 1-cell embryo culture medium (mR1ECM) freezing extender. The third group was thawed without the presence of any freezing extender. Post-thawed sperm cryosurvival rate was evaluated via manual counting of moving sperm in video obtained at 10x magnification.

Honors/Leadership: NIH Bridges to the Future; Quadrilingual: English/Cantonese/Mandarin/Vietnamese

Wildcat Wellness Coaching Trial: Preliminary evaluation of a home-based, wellness coaching intervention on diet and body composition

Emmanuel Garcia¹, Richard R. Rosenkranz², Brooke J. Cull², Sara K. Rosenkranz², Matt Powell², David A. Dzewaltowski¹ ¹Department of Kinesiology ²Department of Human Nutrition College of Human Ecology

There has been an increase in childhood obesity intervention programs across the United States in response to high childhood obesity rates. One of the most promising intervention programs has been wellness coaching for improving healthful behaviors; however, there are currently no studies assessing wellness coaching in the home environment. This study evaluated the effectiveness of wellness coaching in the home environment for girls (mean age = 11.1 ± 1.3 yrs, body mass index \geq 85th percentile). The girls (n=21) were randomized to receive either healthful eating and physical activity skills (HEPA skills) or standard-care health education; wellness coaching for both groups lasted 60 minutes per week for 12 weeks. College-aged female coaches were trained on how to administer the sessions. The HEPA group sessions were focused on enjoyable physical activity, healthful snack recipes, goal setting, self-monitoring, role modeling and social support. Body fat and diet were measured using DEXA and the Children's Dietary Questionnaire. Paired samples t-tests and univariate ANOVA were used to examine the differences between the pre-intervention and post-intervention measurements. Both intervention groups showed small decreases (-1.02 \pm 2.03%, p = 0.032) in body fat percentage; small increases in self-reported fruit consumption $(0.95 \pm 1.61 \text{ days/week}; 0.85 \pm 1.04 \text{ times/week } p = 0.016)$; and increases in parental fruit and vegetable requests (0.40 ± 0.75 parental requests/week, p = 0.028) from pre- to post-intervention, but there were no differences between conditions (F1.19 = 3.10, p = 0.094). Further comparison of these interventions to a notreatment control group is warranted.

Honors/Leadership: NIH Bridges to the Future; Golden Key; Memorial Scholarship; Rake 'N' Run; LULAC; Bilingual: English/ Spanish

Evaluation of a home-based, wellness coaching intervention to prevent childhood obesity in the community

Daniel Perez¹, Richard R. Rosenkranz², Brooke J. Cull², Sara K. Rosenkranz², Matt Powell², Natalie Updyke², Natasha Rodicheva², Colby Teeman², David A. Dzewaltowski¹ ¹Department of Kinesiology

²Department of Human Nutrition College of Human Ecology

Wellness coaching has shown promise for improving health behaviors related to chronic disease, but no extant study has assessed a home-based wellness coaching model for childhood obesity prevention. This study determined the feasibility and initial effectiveness of a home-based health behavior coaching delivery model as an obesity prevention intervention strategy. Healthy girls (n = 21, aged 8 to 13 yrs) with body mass index over the 85th percentile were recruited through parent-aimed advertisements. Participants were randomized to receive one of two wellness coaching interventions (60 min weekly for 12 wks) delivered in homes by trained coaches. 1) Healthful eating and physical activity skills (HEPA) focused on enjoyable physical activity, healthful snack recipes, goal setting, self-monitoring, role modeling and providing social support; or 2) general health education. Girls wore wrist-placed monitors for 7 days, used to assess daily step count and percentage of time in sedentary, moderate, and vigorous physical activity. Both interventions showed small increases in levels of physical activity (e.g., mean increase = 1816 + 5,333 steps/day, p > 0.05) from baseline to post-intervention, and HEPA showed significantly greater increases for vigorous physical activity, compared to health education (F 1,19 = 4.97, p = 0.038). This home-based wellness coaching model was successful in participant recruitment and retention, coaching session delivery, and parent satisfaction. Girls in the HEPA group were more vigorously active after the intervention in comparison to girls in the health education group. Further evaluation of this model via fully powered randomized controlled trial is warranted.

Honors/Leadership: NIH Bridges to the Future

Differences in qualitative instrumental flavor profile of regular and diet cola drinks

Breyana Ramsey¹, Koushik Adhikari² ¹Arts and Sciences Open Option College of Arts and Sciences ²Department of Human Nutrition College of Human Ecology

Many factors influence a consumer's decision to purchase a product. Product taste and cost are two major factors that drive consumers' purchasing decisions. There is a lot of impact of major brand names on how consumers choose products for their consumption. The aim of this project was to determine the qualitative differences in various cola drinks, both regular and diet. Two major name brands and three generic brands were studied for instrumental flavor differences using Gas Chromatography-Mass Spectrometry (GC-MS). A total of 10 samples were analyzed. The flavor compounds were extracted using Solid-Phase Microextraction (SPME) technique and injected in the GC for separation of the flavor volatiles. The separated volatiles were then analyzed by the MS for tentative identification of the flavor compounds. Twenty-nine volatiles were tentatively identified in the drinks. It was observed that the diet colas had more volatiles (27 compounds) that were detected compared to the regular colas (18). One of the major compounds, furfural, was not detected in the diet colas, while benzaldehyde was detected in the diet drinks and not in the regular drinks. Both furfural and benzaldehyde are associated with caramel flavor and are present in products that undergo caramelization and Maillard browning reactions, for example baked products. In general, a lot of terpenes and related-compounds were also detected in both types of colas. The differences found might have been because of the different sweeteners. Sugar and high-fructose corn syrups in regular colas might have some masking effects on flavor compounds such as furfural.

Honors/Leadership: Academic Honors (4.0); Memorial Scholarship; Fairchild Scholarship

Deep Soil Carbon Sequestration: Microbial Community Structure and Carbon Stability in a Maize Agroecosystem

Delia Hernandez¹, Stuart M. Watts², Charles W. Rice² ¹Department of Microbiology College of Arts and Sciences ²Department of Agronomy College of Agriculture

Soil is one of the largest terrestrial carbon reservoirs on Earth. Soil microbes play a critical role in the carbon cycle. Recent studies show that deep soil carbon can be more responsive in regard to changes in land management. The objective of this study was to determine the availability of the carbon in the profile. Our experiment focused on carbon dynamics and microbial community structure in a maize (Zea maize I.) agroecosystem. The experiment was established in 1990 at the KSU Agronomy North Farm. It was a randomized split-plot design with the main treatments of conventional till (CT) and no-till (NT). Subtreatments included mineral fertilizer (MF) and organic fertilizer (OF). Availability of carbon was assessed by measuring Dissolved Organic Carbon (DOC). Microbial community structure was assessed by measuring the phospholipid fatty acid (PLFA) profiles of the microbial community. DOC and PLFA results will be reported.

Honors/Leadership: NIH Bridges to the Future; Rake 'N' Run; Bilingual: English/ Spanish

Combating Actor's Emotional Hangover Daijah Porchia, Sally Bailey School of Music, Theatre and Dance College of Arts and Sciences

Much damage can be done to an actor's psyche when fully immersing him or herself in the artistic process. This procedure of fully becoming one's character comes from Method Acting, which was derived from Constantin Stanislavski's System of Acting (1936, 1949, 1961). The process requires the player to not just "pretend" to be his character, but to live, feel, be him. In order to identify and fully connect with a character, many professionals draw on their own life experiences in order to empathize with the emotions, situations, and motives of the character. When the line between "self" and "character" becomes blurred, this may lead to mood swings, depression, and other forms of mental and emotional trauma, even a loss of the sense of self. This research consists of interviews with 6 of 8 of the cast members in the 2013 Kansas State production of *Columbinus* about how they dealt with the emotional strain of playing intense character roles. This project asks the following questions: What are ways to deal with any residual thoughts and feelings left over after a rehearsal or performance? What can be done to prevent actors from taking on and not letting go of the feelings of their characters?

Honors/Leadership: Academic Honors (4.0); Presidential Scholarship; HLS Housing Leadership Scholar; DSP Talent Show

Development of Immunologic Assay to Determine Serum and Nasal IgG and IgA Production in Response to *Streptococcus equi* vaccination

Walker FR¹, Davis EG², Delph K², Ewen C³, Wilkerson MJ³ Department of Animal Science and Industry College of Agriculture ²Department of Clinical Sciences ³Department of Diagnostic Medicine/ Pathobiology College of Veterinary Medicine

Streptococcus equi, the etiologic agent for strangles, is a highly contagious bacterial pathogen that causes upper respiratory tract disease in horses. Streptococcus equi infection most commonly manifests as fever, lymph node abscess formation and purulent nasal discharge that can infect large groups of naïve horses. Bacterial spread occurs secondary to direct contact with infected individuals or via contamination of the environment with contaminated purulent secretions. The USDA approved, modified live intranasal vaccine (Pinnacle®) is indicated for the prevention of disease using a 2-dose protocol with vaccine administration through the nasal passages. Due to frequent adverse behavioral reaction (e.g. head tossing) from horses at the time of vaccination as well as the potential for bacterial transmission to the administering veterinarian, potential alternate routes of administration are under consideration. The aim of this investigation was to determine if immune activation could be detected following transmucosal vaccination. Eleven healthy horses were used in a randomized block design. An initial 2 dose series was administered at 3 week intervals. Serum and nasal secretions were collected at baseline, 2 and 4 weeks following booster vaccination. IgG and IgA antibody production was determined at each time point. A novel method of antibody assessment utilized the microsphere bead assay platform. Streptococcus equi M protein coated microspheres were incubated with serum and nasal secretion samples and subsequently analyzed using Luminex Magpix instrument. This flow cytometric based charge-coupled imager detects microsphere fluorescence which corresponds with isotype specific antibody concentrations. This assay provided a novel and accurate method of antibody measurement in a variety of biologic samples.

Honors/Leadership: Chester E. Peters Student Development Award; KARA Conference (2013); Resident Assistant for Boyd Hall

War, What Is It Good for? Masculine Honor Beliefs, Belief in Pure Good and Evil as Predictors of Attitudes about Intergroup Aggression.

Savannah F. Hoang, Amanda L. Martens, Donald A. Saucier Department of Psychological Sciences College of Arts and Sciences

All over the world people disagree about when war is justifiable. This study examined variables related to individual perceptions of the acceptability of war and intergroup aggression. These variables include support/opposition to war, peace, torture, and aggressive military policies. We hypothesized masculine honor beliefs, or how individuals perceive what it means to be a man (Saucier & McManus, 2014), and beliefs in pure good (the belief that people are inherently pure and good natured) and pure evil (the belief that people are inherently evil and ill natured; Webster & Saucier, 2013) will predict these perceptions. Our participants completed self-report measures of masculine honor beliefs, beliefs in pure good and pure evil, and support/opposition to intergroup aggression. Consistent with our hypotheses, results indicate adherence to masculine honor beliefs is positively correlated with beliefs in pure evil, support for aggressive military tactics, and negatively correlated with support for peace. Similarly, beliefs in pure evil are positively correlated with support for aggressive military tactics. Further, belief in pure good is positively correlated with support for peace. These results are crucial for understanding how individual attitudes about intergroup aggression can be indicated by masculine honor, and beliefs in pure good and pure evil.

Honors/Leadership: Rake 'N' Run

Gun Control or Gun Proliferation? State Response to Mass Shootings in Newtown and Aurora

Samantha Knese, John Fliter Arts and Sciences Open Option Department of Political Science College of Arts and Sciences

This research project examines state and federal gun legislation that resulted from the shootings in Newtown, Connecticut, and Aurora, Colorado. The Newtown shooting happened at an elementary school where Adam Lanza shot 20 first-grade students and six adults. The Aurora shooting happened in a theater where The Dark Knight Rises premiered. James Holmes shot and killed 12 people and injured 58 moviegoers. The purpose is to identify and classify gun legislation after these mass shootings and evaluate the state and federal response. Data was collected from government websites and interest groups on both sides of the gun control debate. Based on content analysis, legislation was classified as strict or loose. My hypothesis is that more states will pass tighter gun control laws in the aftermath of a shooting. The results revealed the opposite of the hypothesis. Thirteen states weakened their gun control laws and six states passed stricter gun control. This is illustrated on my poster map with red states representing loose legislation, which involves laws that make carrying or obtaining weapons easier, and blue states representing strict gun control, which involves laws that limit or ban magazines and place more restrictions on obtaining guns. States with greater populations, however, like New York and California, passed tighter gun control that equals the states that weakened their gun legislation or the legislation could not be found.

Honors/Leadership: Freshman Scholarship; Phi Beta Phi

STRESS, SOCIAL CAPITAL, AND WELL-BEING: THE CASE OF GULF OIL DISASTER

Antonio Rodriguez¹, Be Etta L. Stoney², Farrell J. Webb³ ¹Department of Mechanical Engineering College of Engineering ²Department of Curriculum and Instruction College of Education ³College of Health and Human Services California State University—Los Angeles

Theories of Social Capital and Conservation of Resources Model of Stress (COR) both predict that resource loss or the perception of resource loss can serve as a primary ingredient in the stress process (Hobfoll, 2001, 2002; Freedy, Shaw, Jarrell & Masters, 1992; Ritchie, 2012). We used these perspectives to understand well-being among people who have been directly affected by a non-natural disaster, in this case the Gulf Oil Disaster caused by the British Petroleum (BP) Deepwater Horizon oil rig explosion. The BP disaster, although not directly seen by most, caused considerable economic loss and reduced the quality of life for human, animal, and plant life throughout the Gulf of Mexico region. In fact, at least four states and their ecosystems were directly affected by the oil disaster. This study uses data from the Gulf Oil Disaster Survey to explore how the COR and Social Capital perspectives explain well-being and offer verification of the idea of recovery—an issue that is often not considered. We examined how resource availability and access coupled with social positioning after a disaster help formulate the coordinated human psychological response we termed as well-being. Overall the study found support for the underlying premise that well-being after a disaster can be explained primarily by elements of both the COR and social capital perspectives. In fact series of structural equation models controlling for residence (near the gulf or not near the gulf), race, family type, and economic status, where direct and proxy measures were used, found approximately 83% (R2 = .826) of the variance in Well-Being could be explained by these factors alone.

Honors/Leadership: Foundation Scholarship; Project IMPACT Scholarship; MAPS; AIAA Engineering Design Team Participant; SHPE; Developing Scholars Food Drive; Mittens for Many; Bilingual: Spanish/English

What happens when people disagree? A case study of citizen deliberation on high-speed internet access in rural communities

Samantha Pratt, Soo-Hye-Han Department of Communication Studies College of Arts and Sciences

Democracy rests on citizens' ability to exchange opinions freely and reflect on different opinions than their own. Thus, it is essential to understand how disagreements are expressed and managed during deliberation. To date, however, few have examined what happens when disagreements arise in citizen deliberations. This project focuses on the gender differences and investigates how men and women handle arguments and disagreements during deliberation. Based on transcripts of 23 small group discussions on broadband access in rural communities in Kansas, I found that men tended to start arguments more frequently than women. I also found that men tended to argue most with both sexes. Women often hesitated to argue with men but would easily argue with women. Furthermore, if either sex was over-powered by a group, they would back down from the argument. In group deliberation it is important that everyone has an equal opportunity to voice their opinion. However, if these themes are occurring in serious debates, the decision is not equal and that could hurt the decision-making process.

Honors/Leadership: Memorial Scholarship; Transfer Achievement Award; Phi Theta Kappa Honor Society; Transfer Ambassadors Program (TAP); Rake 'N' Run

An intervention to reduce sitting time at work: Effects on metabolic health and inactivity

K. Matthew Castinado, Sara K Rosenkranz, Emily Mailey Department of Kinesiology College of Human Ecology

PURPOSE: Recent research has shown that prolonged sitting is associated with an increased risk of obesity, diabetes, cardiovascular disease and some cancers. Breaking up this sitting time has become an important goal, but there are currently no recommendations for how individuals should go about incorporating activity throughout the day. The purpose of the study is to compare the effects of short, frequent breaks in sitting versus longer, planned breaks in sitting on metabolic health and accumulation of light/moderate physical activity among female sedentary employees. METHODS: Participants (N=50) will be sedentary, full-time female employees in Manhattan or an adjacent community. All participants will be advised to accumulate 30 minutes of activity during each workday across the course of an 8-week intervention. Half will be instructed to take small, frequent breaks (i.e., 1-2 minutes every half hour) and half will be instructed to take longer, planned breaks (i.e., two 15-minute walks). A variety of behavioral strategies will be used to promote adherence to the recommended protocols. At baseline and post-intervention, participants will undergo a battery of tests to assess blood glucose, blood lipids, blood pressure, and body composition. Additionally, physical activity and diet will be assessed using accelerometers and food diaries, respectively, at baseline, week 4, and week 8. ANTICIPATED RESULTS/CONCLUSION: We anticipate the results of this study will inform the design of future interventions to reduce sitting time and optimize health by identifying key behavioral approaches that are both effective and feasible.

Honors/Leadership: Academic Honors (4.0); Foundation Scholarship; Kinesiology Telefund Scholarship; Soaring Eagles Leadership Team; Chimes Junior Honorary; Alpha Epsilon Delta Pre-Medical Honor Society, Associate Member; Kinesiology Student Association; College of Arts and Sciences Ambassador; Flint Hills Breadbasket; Travel: Haiti for missions work

Effects of NSAIDs on Kv1.3 Expression in Rat Small Intestine

A. Littlejohn¹, E. Marsh², L. Thomas², K. Silver², J.D. Lillich² ¹Department of Animal Science and Industry College of Agriculture ²Department of Anatomy and Physiology College of Veterinary Medicine

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used drugs worldwide for the alleviation of pain and inflammation in both animals and humans. Chronic use of NSAIDs, however, is associated with adverse side-effects, particularly in the gastrointestinal (GI) tract. It has been suggested that the toxic effects of NSAIDS are related to their ability to block cyclo-oxygenase (COX) isoforms, but this has not been definitively proven. Efforts to determine the mechanism(s) through which NSAIDs cause GI toxicity have demonstrated that NSAIDs cause depolarization of membrane potential and reductions in cell migration in cultured intestinal epithelial cells. Previous studies have shown that expression of Kv1.3, a potassium channel subunit that plays an important role in cell migration and maintaining membrane potential in white blood cells, is sensitive to treatment with NSAIDs. The objective of this study was to determine the effects of NSAID treatment on Kv1.3 expression in rat small intestine. RNA and protein were harvested from small intestinal tissue (duodenum, jejunum, and ileum) of rats treated with indomethacin or NS-398 for 72 h, and real time PCR and Western blotting techniques were used to measure gene and protein expression. Our results show that both indomethacin and NS-398 alter gene expression and decrease protein expression in small intestinal epithelia. Given the important role Kv1.3 plays in cell migration, our results suggest that inhibition of Kv1.3 expression by indomethacin and NS-398 may contribute to inhibition of cell migration and NSAID-induced toxicity in rat small intestine.

Honors/Leadership: Academic Honors (4.0); Pre-admission to the K-State College of Veterinary Medicine; Project IMPACT Scholarship; Multicultural Student Honor Society; MAPS

The Segbot (Two Wheel Balancing Robot)

Alan Ramirez¹, Warren White⁷, Erin Black¹, Kristine Larson¹, Joseph Valdes¹, Lucas Gorentz¹, Brian Blankenau¹, Jacob Wagner¹, Alexander Van Dyke¹, Faryad Sahneh² ¹Department of Mechanical and Nuclear Engineering ²Department of Electrical and Computer Engineering College of Engineering

The Segbot is a Segway-style robot balancing on two wheels. The core of this robot is the National Instruments myRIO microcontroller needed to perform the necessary positioning and balancing algorithms. This battery powered robot uses the core along with an Inertial Measurement Units (IMU) which is based on Microelectromechanical Systems (MEMS) to determine its angular orientation and angular orientation rate of change. These components together with the sonar range finder allow the robot to process in real time where the robot is located and allow it to orient itself in order to balance. The host computer will communicate over a wireless communication link which is embedded into the myRIO. The purpose of building the device was to use the new updated microcontroller used for engineering student applications and for laboratory applications in some mechanical engineering classes. Three main components were needed for the design of this project: CAD drawings, programming and electronics. The LabVIEW program is still being developed for this project, as are the SolidWorks CAD drawings. The CAD drawings of a different Segbot built elsewhere had to be modified in order to make room for the myRIO microcontroller and other components. The electronics portion is progressing towards a smaller, more efficient way of housing all of the necessary electrical components. As the project continues, the center of mass will be calculated from the CAD drawings so the center of mass is directly over the wheel axels allowing it to stand vertically as the computer controls the Segbot's balance.

Honors/Leadership: Project IMPACT Scholarship; SHPE; Bilingual: English/Spanish

The Effects of Green Initiatives on Initial Public Offerings Cipriana Sapien, Ansley Chua Department of Finance

College of Business Administration

Investing in an environmentally friendly or green firm is a hard decision to make. Bauer, Koedijk, and Otten's (2005) study states that there is no investor benefit when investing in a green firm whereas Kempf and Osthoff (2007) state that there is an investor benefit when investing in a green firm. We will discover if investing in a green firm is the right decision by looking at the initial public offerings (IPOs), figuring out the first day return rate, and if it is the right decision when looking at finances. Looking into the first day return rate of an IPO is the most efficient way to find out if a green firm is worth investing in. We will use a variation of methods and models to figure out the defined IPO return rate.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; MAPS; Martin Luther King- A Day On, Not a Day Off; Rake 'N' Run

Co-loading Nanoparticles and Chemotherapy into Tumor Homing Cells

Alejandro Marquez¹, Matt Basel³, Hongwang Wang³, Marla Pyle³, Stefan H. Bossmann², Deryl L. Troyer³ ¹Division of Biology ²Department of Chemistry College of Arts and Sciences ³Department of Anatomy and Physiology College of Veterinary Medicine

Magnetic hyperthermia (MHT) is an experimental cancer treatment that has progressed to clinical trials. MHT uses magnetic nanoparticles (MNP) to generate localized heat by exposing the MNP to an alternating magnetic field (AMF). Pairing hyperthermia with chemotherapy often provides significant benefits in treating cancer. Therefore, cyclodextrin-coated MNP, designed to carry a chemotherapy drug in the cylcodexterin moiety to be released on heating, were tested for their ability to load into delivery cells. Cylodextrin-coated MNP were synthesized by the Bossmann lab and were suspended in RPMI for studies. MNP were loaded on Raw264.7 cells (monocyte/macrophage-like cells, Mo/Ma). After 24 hours, cells were washed and the loading and toxicity were measured. Ferrozine was used to quantify the amount of iron loaded. MTT and cell counts were used to determine MNP toxicity. Cyclo-dextran labeled MNP show similar solubility properties to other MNP tested and load into cells moderately well, but are often toxic to the cells. Loading with the drug DP44MT and then loading on the cells is always toxic to the delivery cells. This indicates that cyclodextran is not a secure enough container for delivering the highly toxic DP44MT, although less toxic drugs that bind more tightly might be viable. Future work can focus on these drugs.

Honors/Leadership: NIH Bridges to the Future; Golden Key International Honor Society; Rake'N' Run; Bilingual: English/Spanish

Evolution of multicellularity by co-opting cell-cell adhesion genes

Halle Sparks, Bradley J.S.C. Olson Division of Biology College of Arts and Sciences

Multicellular evolution is a major transition that has occurred for more than twenty-five times in many eukaryotic taxa. However, the genetic basis of the transition to multicellularity is unknown in any of these taxa due to high divergence between unicellular and multicellular relatives. The Volvocine algae, however, are a group that have recently transitioned to multicellularity about 200 million years ago that have species ranging from unicelllar (e.g. *Chlamydomonas reinhardtii*), to colonial groups of like cells (e.g. *Gonium pectorale*), to those with differentiated tissues (e.g. *Volvox carteri*). Since these organisms recently evolved in multicellularity and have not diverged significantly, their genomes are surprisingly similar. In an effort to identify genes that may be important for multicellularity, we hypothesize that cell wall genes in unicellular *Chlamydomonas* were co-opted to promote cell-cell adhesion in colonial organisms such as *Gonium*, and *Volvox* to identify genes whose evolutionary signature suggested co-option. From this analysis, I identified five candidate genes that may be important for cell-cell adhesion. I am currently functionally testing these genes for importance in cell-cell adhesion by expression orthologs from *Gonium* and *Volvox* in unicellular *Chlamydomonas* to see if it causes a multicellular phenotype.

Honors/Leadership: Denison Scholarship; Rake 'N' Run; Pre-Med Club

Wildcat Wind Power Team

William Duren¹, Armando Marquez¹, Ruth Douglas Miller¹, Greg Spaulding², Youqi Wang², Kim Fowler¹, Warren White², Joe Kuhn², Stuart Disberger², Aaron Thomsen², Bret Gross², Jordan Robl², Cody Yost², Lane Yoder², Aaron Akin³, Martin Mixon¹, Alex Wurtz¹, Matt Clark¹, Hussam Alghamdi¹, Ying Huang¹, Kaifu Wang¹, Tanzila Ahmed¹ ¹Department of Electrical Engineering ²Department of Mechanical and Nuclear Engineering ³Department of Biological and Agricultural Engineering College of Engineering

Small wind turbines have the potential to make an impact on the energy market; however, they need more research and exposure. This year the Department of Energy is sponsoring the Inaugural Collegiate Wind Competition, which is offering research and exposure to small wind turbines. Kansas State University is one of ten universities that are competing. The goal of the competition is to construct a lightweight, portable wind turbine that can be used to power small electronic devices. The competition is comprised of a design component, a business plan, and a presentation over a market issue. Our team is in the process of designing a turbine that could be used to power street lights and act as a charging station for cell phones in areas that are prone to power outages.

Honors/Leadership: Academic Honors (4.0); Power and Energy IEEE Scholar; Memorial Scholarship; Foundation Scholarship; Eta Kappa Nu; Cargill Scholar; Internship: Burns and McDonnell; MAPS; Rake 'N' Run

WIND FOR THE FUTURE

Armando Marquez¹, William Duren¹, Ruth Douglas Miller¹, Greg Spaulding², Youqi Wang², Kim Fowler¹, Warren White², Joe Kuhn², Stuart Disberger², Aaron Thomsen², Bret Gross², Jordan Robl², Cody Yost², Lane Yoder², Aaron Akin³, Martin Mixon¹, Alex Wurtz¹, Matt Clark¹, Hussam Alghamdi¹, Ying Huang¹, Kaifu Wang¹, Tanzila Ahmed¹ ¹Department of Electrical Engineering ²Department of Mechanical and Nuclear Engineering ³Department of Biological and Agricultural Engineering College of Engineering

The amount of energy needed daily to sustain our power demand is always increasing. To reduce our carbon footprint, renewable energy sources are becoming more prevalent. The Department of Energy (DOE) has created the collegiate wind competition, which will be held in Las Vegas at the beginning of May. The competition consists of three areas of challenge. First is the design and testing of a small functional turbine to supply constant power to small electronic devices. Next is a proposed business plan as to what type of market your turbine would be sold in. Finally there is a presentation over market issues specific to the team's home region. My work has focused mainly on the market opportunity section of the business plan. For this we are looking for prospective markets to sell a self-sustaining street light that is fixed or portable. This light pole could also be used as a charging station for small electronics. Possible markets of interest are emergency relief organizations, such as the Federal Emergency Management Agency (FEMA), or smaller local agencies. These marketable areas came up due to the problems that occur in disaster areas once power is lost. Though tragic these events may open up a market for small deployable turbines to be brought into the area and provide the basic necessity of power.

Honors/Leadership: Academic Honors (4.0); NIH Bridges to the Future; Rake 'N' Run; Bilingual: English/Spanish

Investigating the effects of elevated temperature on Tomato spotted wilt virus accumulation and expression of putative heat-shock protein genes in the insect vector, *Frankliniella occidentalis*

Obdulia Covarrubias Zambrano¹, Anna E. Whitfield², Dorith Rotenberg² Department of Biochemistry and Molecular Biophysics College of Arts and Sciences ²Department of Plant Pathology College of Agriculture

Scientists estimate that global climate change will expand the geographical limits of arthropod vector-borne pathogens. One sign of climate change is elevated temperatures in terrestrial ecosystems. We study the virus-vector relationship of *Tomato spotted wilt virus* (TSWV), a plant-pathogenic bunyavirus, and *Frankliniella occidentalis*, the western flower thrips (WFT) vector that transmits the virus to a variety of plants. Others demonstrated that TSWV-infected WFT develop faster and transmit the virus more efficiently at elevated temperatures. Heat-shock proteins (HSPs) have been shown to interact with viral proteins to affect replication of plant and animal viruses. In addition, HSPs are responsive to thermal stress, and one report documented enhanced expression of HSP 90/70 organizing protein in WFT exposed to high temperatures. We hypothesize that the enhanced efficiency of transmission at higher temperatures is explained, in part, by increased accumulation of TSWV in the vector, which may be associated with enhanced expression of HSPs. To investigate the effects of temperature on virus accumulation and expression of HSPs in WFT, we designed an experiment to quantify the effect of temperature (24oC and 29oC) on TSWV titer during vector development and transmission efficiency as adults; and to determine the relationship(s) between TSWV titer and transcript abundance of six major putative HSPs at the three different temperatures. We report on the effect of temperature on virus accumulation and transmission, and the identification of putative HSP sequences from our WFT transcriptome database that will serve as candidates for gene expression analyses using quantitative real-time reverse-transcriptase PCR.

Honors/Leadership: BS/MS Program in Biochemistry; NIH Bridges to the Future; McNair Scholars; Ecological Genomics Undergraduate Research and Mentoring Internship; Mortar Board; Golden Key International Honor Society; Transfer Ambassador Program/Phi Theta Kappa; Research Forum, 1st Place Poster

Identification and biochemical characterization of a Kunitz-type serine protease inhibitor from an insect, *Manduca sexta*

Jamilah B. Watkins, Daisuke Takahashi, Yasuaki Hiromasa, Michael R. Kanost Department of Biochemistry and Molecular Biophysics College of Arts and Sciences

Hemolymph (blood) of insects contains serine proteases and serine protease inhibitors that function in innate immune responses. The objective for this research was to investigate low molecular weight protease inhibitors from hemolymph of a lepidopteran insect, Manduca sexta. We identified serine protease inhibitor activity against trypsin, chymotrypsin, and elastase in plasma from naïve larvae and in plasma from larvae that were previously injected with Micrococcus luteus. We separated hemolymph plasma proteins using size exclusion chromatography, and the fractions with protease inhibitor activity were analyzed by SDS-PAGE and liquid chromatographyelectrospray ionization tandem mass spectrometry. A serine protease inhibitor belonging to the Kunitz family was identified, and using primers based on the sequence encoding this protein found in the M. sexta genome sequence, we cloned its cDNA from larval fat body RNA. The cDNA encodes a protein with a secretion signal sequence followed by the mature secreted inhibitor protein of 56 amino acid residues. This sequence is highly similar to a Kunitz inhibitor previously purified from M. sexta (Ramesh, N., Sugumaran, M., Mole, J.E. 1988. J Biol Chem. 263:11523-7). Using a synthesized and codon-optimized DNA encoding the protease inhibitor, we are currently producing the recombinant inhibitor in E. coli for further biochemical characterization. We will study its inhibitory activity as a potential regulator of proteases in hemolymph that function in the innate immune system of *M. sexta*. The genome of *M. sexta* contains nine genes for single-domain Kunitz proteins closely spaced on a single scaffold. The ultimate goal of this project is to understand the biological functions of these Kunitz protease inhibitors in innate immunity.

Honors/Leadership: Cancer Research Award; Multicultural Student Honor Society; Internship: KUMC Health Sciences Enrichment Institute Program; Minorities in Agriculture Natural Resources and Related Sciences National Training Conference, Presenter; International Leadership Association Conference; Kansas-IDeA Network of Biomedical Research Excellence (K-INBRE) Symposium; Housing Leadership Award; K-State Student Advisory Council; Black Student Union; Minorities in Agriculture Natural Resources and Related Sciences (MANRRS), Vice President; Captain Housing and Leadership Scholars; Rake 'N' Run

From Courting to Dating: The Transformation of Courting Rituals in the Last 100 Years

Rebecca Renteria¹, April Bojorquez² ¹Department of Secondary Education College of Education ²Department of Sociology, Anthropology, and Social Work College of Arts and Sciences

Courting practices have experienced great changes since their beginnings in the colonial United States. This research specifically examines the courting practices of a middle-class Caucasian American couple in the early 20th Century. Qualitative analysis of their correspondence, through hand-written letters, reveal an in-depth exploration of courtship rituals from January 1917 to February 1918. Images and artifacts identified from the archival collection were reviewed to support a comparative analysis between early 20th century courting practices and contemporary digital dating culture. Emergent themes abstracted from the research include concepts of modesty, gender roles/dynamics, class, cultural heritage, and more. Findings further reveal how courting practices have become increasingly public and how middle-class women have adopted aspects of courting practices from their early 20th century male counterparts. The collection of letters yielded rich insights into the history and transformation of courting practices and norms in the United States within the last 100 years.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; International Buddies; K-State Women's Rowing; Kindergarten Soccer Coach; Martin Luther King- A Day On, Not a Day Off; Travel: Paris and London

Social Media Role on College Choice for Multicultural Students

Sterling A. Muse, Dawne Martin Department of Marketing College of Business Administration

College choice decisions are important to institutions of higher education and potential students. Development of David Chapman's model of college choice (1981) included addition of self-efficacy (Bandura 1996), locus of control (Chapman and Boersman, 1979), parental and family influence (Epstein, 1992; Haveman & Wolfe, 1995) and a variety of other social, personal and college variables. Use of social media in college recruiting was recently addressed in a report outlining differences in use and importance of on- and off-line recruiting techniques across races and ethnicities. (Noel-Levitz, 2012). This presentation will include the outline of a complete model of college choice, a survey of social media used by Big XII universities, and proposed research regarding role of social media in college choice. The proposed research will use the mall intercept technique to survey the Kansas State freshman students in order to assess student exposure and response to various on- and off-line recruiting tools. Questions will focus on relative use and impact of various recruiting techniques, including social media, on the college choice decisions based on difference in race, ethnicity and first generation status. Information gained in this study will assist marketers and institutions of higher education to understand how students with different characteristics respond to various recruiting approaches and the role of social media in their college choice decisions.

Honors/Leadership: Project IMPACT Scholarship; MAPS

Synthesizing Magnetic Nanoparticles for Hyperthermia Treatment of Cancer

Yubisela Toledo¹, Dinusha Udukala¹, Hongwang Wang¹ Deryl L. Troyer², Stefan H. Bossmann¹ ¹Department of Chemistry College of Arts and Science ¹Department of Anatomy and Physiology College of Veterinary Medicine

The scientific community has cultivated various ideas for the detection and treatment of cancer. The latter is often described as the overproduction of abnormal cells, but cancer biology is much more complex. The best model is to understand tumors in analogy to sophisticated organs. Various methods, such as surgery and chemotherapy have been utilized to eliminate tumors, but have been often ineffective due to the high resistance of the cancer. A/C magnetic hyperthermia mediated with magnetic nanoparticles (MNP) has the ability to precisely deliver prodrugs, such as Fe/Fe3O4 MNP bound SN38 to the cancer site. Therefore, the union of chemotherapy with A/C magnetic hyperthermia (AMF), called thermochemotherapy, is a novel and promising treatment approach. Enhanced delivery of chemotherapeutic drugs to the tumor site decreases the amount of drug required. Hyperthermia is able to activate the immune system against cancer. I have studied the SAR capacities of cubical and spherical nanoparticles. The different morphological nanoparticles exhibited different heating capacities as indicated by their Specific Absorption Rates (SAR, measured in J g(Fe)-1. We are aiming at SAR > 500 J g-1, which will permit short heating cycles (10 min). Furthermore, enhanced delivery of chemotherapeutic drugs to the tumor site decreases the amount of nanoparticles required for treating a patient can be reduced to < 5g per cancer treatment.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Garmon Scholarship for Social Justice; Alternative Spring Break, Kansas City; Martin Luther King- A Day On, Not a Day Off; Bilingual: English/Spanish

International Financial Reporting Standards VS US Generally Accepted Accounting Principles

Shaquan White, Richard Ott Department of Accounting College of Business Administration

The purpose of this research is to discuss the possibility of converging the International Financial Reporting Standards (IFRS) and the US Generally Accepted Accounting Standards (GAAP) by discussing the similarities and differences of IFRS and GAAP. We hope this research will tell us the pros and cons of converging these two standards. We started by understanding why the international accounting standards are important. We concluded that the international standards are needed for global trading, non-US stakeholders, etc. We also researched why the United States has yet to adopt the standards, and we found that it was mainly because of the difference in policies, but it also had to do with the United States budget. We then looked at the similarities and differences with IFRS and GAAP. IFRS is principle based while GAAP is rule based, which are two different structures. IFRS focuses on transparency and GAAP focuses on uniformity. Thus we discovered that an issue with converging IFRS and GAAP would be combining the two structures and also maintaining uniformity and transparency. At that time, we looked at which countries that had already adopted IFRS. Now we are researching the effects IFRS has had on the income and economy of the countries that have adopted the standards. Progress is being made to converge the IFRS and GAAP standards. There is still a lot off work to be done with our research, but change is coming in the accounting profession.

Honors/Leadership: Cargill Scholarship; MAPS

Examining the requirement for bacteria in the fungal disease sheath blight of rice

Yojana Mendoza¹, Frank White², Kehinde Obasa² ¹Department of Microbiology College of Arts and Sciences ²Department of Plant Pathology College of Agriculture

We are interested in the role played by bacteria that are associated with soil dwelling plant pathogenic fungi. *Rhizoctonia* species are ecologically diversified fungal pathogens of many plant species that also occur as soil saprophytes, or mycorrhizae of several orchards. We are examining the behavior of the fungal pathogen Rhizoctonia solani and the associated species of Enterobacter. We have hypothesized that the bacterium affects the manner of growth of the fungus on the host plants and the bacterium can gain access to the plant in association with the fungus. In the current study, the requirement of representatives of the rice-infecting R. solani AG 1-IC for associated bacteria in disease was evaluated. Three rice varieties that are susceptible to sheath blight were inoculated with bacteria-associated fungus or the fungus alone and maintained at high relative humidity under growth chamber conditions. At 15 days post-inoculation, all rice varieties inoculated with the bacteria-associated fungal isolate showed sheath blight symptoms of the plant stem. However, plants inoculated with the fungus alone lacked disease symptoms. Microscopy imaging of cross sections of the inoculated plant stems at 5, 10, and 15 cm above the inoculation points revealed the presence of infection hyphae within all of the examined plant tissue. The results suggest that host tissue infection, but not penetration and colonization by the fungus, require some yetto-be elucidated contribution from the bacteria. We are currently conducting investigations into the localization of the fungus and GFP-labelled bacteria within the tissue of inoculated rice plants relative to plant cells showing symptoms of sheath blight. Results from this study will help to elucidate the involvement and requirement for the fungus and/or bacteria in the induction of the sheath blight disease symptoms on rice plants.

Honors/Leadership: NIH Bridges to the Future; Golden Key International Honor Society; LULAC; Transfer Ambassadors; Martin Luther King- A Day On, Not a Day Off; Bilingual: English/Spanish

Using Recommender Systems for Social Network Applications

Geordy Williams, Doina Caragea Department of Computer Science College of Engineering

With the growing amount of new content on the Internet, users often find themselves overwhelmed when faced with a multitude of options regarding items that they might be interested in, for example, movies to watch, books to read, or products to buy. Many web sites and services, such as Amazon or Netflix, rely on recommender systems to suggest items to a user based on other items previously rated by the user, his or her browsing history, or items that other similar users might have liked in the past. Recommender systems can be broadly categorized as collaborative filtering and content-based. The goals of this project are twofold: to gain knowledge about the depth and significance of recommender systems, and also to learn about some basic approaches to recommender systems, including collaborative filtering and content-based systems. To achieve these goals, in the first part of the project, we conducted a literature review on recommender systems and their applications. In the second part, we are using the knowledge gained to experiment with a recommender system implemented in Java. Specifically, we are applying a recommender system that is part of a machine learning, open-source library, called Mahout, to recommend movies to users. The understanding of the Mahout software will help expand my programming knowledge, while the experimentation with the recommender system in the movie domain will help me come up with solutions for other problems where recommendations may help users deal with the information overload, for example, problems in social network applications.

Honors/Leadership: Academic Honors (4.0); Edgerley-Franklin Urban Leadership Scholar; Alternative Spring Break, Kansas City; Martin Luther King- A Day On, Not a Day Off

Fusobacterium necrophorum isolated from cattle and humans produce biofilms in-vitro

Arisa Yamashita-Taylor¹, Sailesh Menon², Sanjeev Narayanan² ¹Department of Animal Science and Industry College of Agriculture ²Department of Diagnostic Medicine/Pathobiology College of Veterinary Medicine

Biofilm is defined grouping of microorganisms to form a multilayered film on living and non-living surfaces. Biofilms because of their structural complexity, are inherently harder to control using disinfectants, antibiotics or physical methods. *Fusobacterium necrophorum* is a Gram-negative bacterium that causes pharyngitis, tonsillitis and Lemierre's syndrome in humans, and liver abscesses and foot rot in cattle. The specific objective of our current study was to evaluate if *Fusobacterium necrophorum* and an *E. coli* clone that expresses fusobacterial outer membrane proteins produce biofilms under laboratory conditions. Pure cultures were grown in plastic microwell plates in conditions that varied in temperatures, culture media, and oxygen tension. Our studies demonstrate that some strains of *Fusobacterium necrophorum* form biofilms, and adding fermentable carbohydrates like glucose to the media enhance biofilm formation in some strains. These results help us further understand a pathogenic mechanism of *F. necrophorum* and how this bacterium is capable of causing steadfast, persistent and recurrent infections in animals and humans.

Honors/Leadership: Project IMPACT Scholar; Memorial Scholarship; Agriculture Scholarship; MAPS; Bilingual: English/ Japanese

Biomarkers and Anti-cancer Drugs in Spontaneous Mammary Tumors

Hannah Gray, Annelise Nguyen Department of Pre-Health- Clinical Laboratory Science College of Arts and Sciences Department of Diagnostic Medicine/Pathobiology College of Veterinary Medicine

Mammary carcinoma commonly referred to as breast cancer has impacted over 1.5 million people worldwide. In the effort to increase anti-cancer drugs for treatment, animal model mimicking human mammary carcinoma is needed. Genetically modified mice, transgenic mice, of MMTV-PyVT have been generated with distinct three stages of cancer formation: pre-tumor, early-tumor, and late-tumor stages. The goal of this project is to identify the biomarkers and targeted anti-cancer drugs for the treatment of mammary carcinoma. Immunohistochemistry (IHC) was used to evaluate the biomarkers as well as histological profiles. The results show that a decrease in a biomarker, Cx43, was observed as the tumors develop during the stages (Pre, Early, and Late-tumor stages). However, in the treatment of anti-cancer drugs targeting Cx43, an increase of Cx43 was observed in the late stage of tumor formation. Furthermore, mammary carcinoma has the ability to metastasize in these mice. We also examined other vital organs for changes in biomarkers. Overall, the changes in Cx43 show a promising target for breast cancer, in addition, the anti-cancer drugs, PQs, can increase Cx43 in the late stage of tumor formation.

Honors/Leadership: Multicultural Ambassador; Zeta Phi Beta Sorority; United Black Voices



The Hatch Project Sonjay Baker, Lauri Baker Department of Agricultural Communications College of Agriculture

The field of agriculture is heavily influenced by climate change, and the status of land that is arable. However, there is currently a disconnect between agricultural producers that use this land and information regarding climate change and the environment. The objectives of this project are to delve into the topic of farmers and the environment in order to gain a better understanding of where this disconnect may have originated and to gauge the extent of said disconnect. Overall, the information found on this precise topic is scarce, qualitative, and mostly found in the form of small scale interviews and surveys, with little statistical data collected thus far. In order to gain a broader perspective on the topic, we plan to send our survey instrument to a large audience to obtain a sufficient sample size and range of opinions from Kansas farmers. From this point, ample steps will need to be taken in order to synthesize the data from the survey and form an appropriate plan to help bridge the gap of knowledge regarding the environment, farmers in Kansas, and eventually farmers nationwide.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Memorial Scholarship; Project IMPACT Scholarship; Housing Leadership Award; Opportunity Scholarship; Flint Hills Breadbasket, volunteer; Breakfast Coordinator, St. Paul's Episcipal Church, volunteer; Alternative Spring Break, Denver, CO, Kansas City; Martin Luther King- A Day On, Not a Day Off

Changing Work, Lives, and Communities: Hispanics in Garden City, KS

*Eduardo Solorzano-Torres¹, Spencer Wood*² ¹Department of Psychological Sciences ²Department of Sociology, Anthropology, and Social Work College of Arts and Sciences

In the late 1970s and early 1980s, Garden City, KS was like many other rural communities. It was a city in decline. In 2012, they opened their brand new one billion dollar high school. In the thirty years between, Latino immigrants, primarily from Mexico but also Central America, accepted factory positions at area meat packing plants. The stability these jobs provided yielded, in turn, impressive changes for the community. Many of the changes were mutually beneficial as previously insecure, seasonal, and unstable jobs in agriculture were abandoned in favor of more stable work in the plants. Area tax revenues increased and the community population grew. In this study, we interview Garden City residents about their experiences during this transformation. This is the beginning of a longer research project so we present only preliminary material below. Although it is too early to determine any conclusive data, early findings show a large increase in the minority populations of the area in the past thirty years. Early analysis also shows trends in the type of work performed by the immigrant population prior to immigrating to the United States. More data is necessary in order to find more common themes among the population but preliminary work is already starting to show many similarities.

Honors/Leadership: NIH Bridges to the Future; Rake 'N' Run; Travel: Mexico; Bilingual: English/Spanish

Effect of Antisperm Antibodies on Post-Thaw Motility of Bovine Spermatozoa

S. Holliday¹, S. Sabates², M. Ferrer³ ¹Department of Animal Science and Industry College of Agriculture ²Division of Biology College of Arts and Sciences ³Department of Clinical Sciences College of Veterinary Medicine

Antisperm antibodies (ASAs) decrease post-thaw motility in human spermatozoa [1,2]. Our hypothesis was that ASAs decrease post-thaw in bovine sperm motility. Four 1 to 2 year-old bulls were used here. Three initial ejaculates were frozen (ASA negative). The bulls were then immunized with autologous spermatozoa three times 21 days apart. After the last immunization, three more ejaculates were frozen (ASA positive). At the time of the experiment, the straws were thawed at 38° C for 30 seconds. Six parameters of sperm motility were evaluated: total motility, progressive motility, path velocity, progressive velocity, track velocity, and elongation. The parameters were evaluated at 0, 10, 30, and 60 min post-thaw while the samples were kept in an incubator at 37° C. Evaluations were done using computer assisted semen analyzer (Hamilton-Thorne IVOS). Motility parameters were compared between ASA-negative and ASA-positive samples at each time using a T test.



There were no differences in motility parameters between ASA-negative and ASA-positive samples at any time (P>0.05). However, track velocity was lower in ASA-positive samples at time 0 (P = 0.0057). Nevertheless, track velocity did not differ significantly between ejaculate groups at later times. Overall, ASAs did not affect sperm motility. With this data, we rejected my previous hypothesis.

Honors/Leadership: John Deere Multicultural Scholarship, Robinson Diversity Scholarship, Project IMPACT Scholarship; Phi Eta Sigma; MANRRS, President; Border Angels; KSU Blood Drive