13th Annual
Capitol Graduate
Research Summit

February 2, 2016

Featuring Graduate Student Research from:

Fort Hays State University
Kansas State University
Pittsburg State University
University of Kansas
University of Kansas Medical Center
Wichita State University

Presenters and Poster Titles

Kansas State University

Syeda Rubaiyat Aziz	HIGHWAY SAFETY MANUAL CALIBRATION AND CRASH PREDICTION FOR RURAL MULTILANE HIGHWAYS IN KANSAS
Nicole Delimont	PROTEIN QUALITY AND MICRONUTRIENT AVAILABILITY OF EXTRUDED CORN, SOY, SORGHUM, AND COWPEA FORTIFIED-BLENDED FOODS
Matthew Galliart	ADAPTIVE ECOTYPIC VARIATION AND GENETIC DIVERGENCE OF A WIDESPREAD GRASS, BIG BLUESTEM, ACROSS A GREAT PLAINS' CLIMATE GRADIENT
David Gomez	CONSUMER ACCEPTANCE OF DRY DOG FOOD VISUAL CHARACTERISTICS IN THE U.S
Bryant Miller	WHAT WE CAN LEARN ABOUT HEALTH FROM KANSAS TEENS: RESULTS OF THE KANSAS ADOLESCENT HEALTH NEEDS ASSESSMENT
Tuyen Duong Thanh Nguyen	ENGINEERING BIOMIMETIC NANOABSORBENT FOR DETOXIFICATION OF CHEMOTHERAPEUTICS
Olalere Olatoye	GENOMIC DISSECTION OF LEAF AND PANICLE ARCHITECTURE TRAITS IN SORGHUM USING NESTED ASSOCIATION MAPPING
Soma Sekhar Sriadibhatla	BISPHOSPHONATE FUNCTIONALIZED NANOMEDICINE FOR TARGETING BONE MICROENVIRONMENT
Dilooshi Weerasooriya	TRANSCRIPTIONAL PROFILING OF ALS HERBICIDE RESISTANT SORGHUMS WITH EARLY SEASON LEAF YELLOWING
Caroline Ylioja	SPINNING STRAW INTO MILK: CAN AN ALL-BYPRODUCT DIET SUPPORT MILK PRODUCTION?

University of Kansas

Emily Carlson   OVEREXPRESSION OF HSD10 INCREASES ADRENAL GLAND CANCER CELL GROWTH AND RESISTANCE TO CELL DEATH

Mackenzie Cremeans   USING POINT VELOCITY PROBES TO UNDERSTAND THE CONNECTION BETWEEN STREAM AND GROUNDWATER SYSTEMS

Jessica Juanico   AN EVALUATION OF THE EFFECTS OF STATE SEAT BELT AND CELL PHONE LAWS ON MOTOR VEHICLE COLLISIONS

Rouzbeh Khajehdehi   CONSTRUCTION OF CRACK-FREE BRIDGE DECKS

Michaela McNiff   THE *cla*MP TAG: TARGETED DELIVERY OF METALS TO TREAT CANCER

Venkat Motupalli   PREDICTING RISK FOR INCIDENCES OF HOMELESSNESS AMONG VETERANS OF IRAQ AND AFGHANISTAN

Brock Ternes   WELL OWNERSHIP AND SUSTAINABLE PRACTICES: AN EXAMINATION OF GROUNDWATER POLICIES, WATER CONSERVATION ROUTINES, AND GROUNDWATER RELIANCE IN KANSAS

Renae Waters   MESENCHYMAL STEM CELL SECRETOME-RICH HYDROGELS FOR CARDIOVASCULAR REGENERATION

Naomi E Butler Tjaden   VITAMIN A METABOLISM IS REQUIRED FOR VAGAL NEURAL CREST CELL COLONIZATION OF THE GASTROINTESTINAL TRACT IN THE PATHOGENESIS OF HIRSCHSPRUNG DISEASE

Aryn M. Kamerer   BEYOND THE AUDIOGRAM: LOCATING REGIONS OF OUTER HAIR CELL LOSS IN THE INNER EAR

Michelle M. McWilliams   A NOVEL CELLULAR PATHWAY IN THE PATHOGENESIS OF UTERINE FIBROIDS

Peter Taulbee   KNOWLEDGE AND PERCEPTIONS AMONG PSYCHIATRIC MENTAL HEALTH ADVANCED PRACTICE REGISTERED NURSES REGARDING THE USE OF OMEGA-3 FATTY ACIDS FOR MAJOR DEPRESSIVE DISORDER

Alex Wendling   UTILIZING MIX TECHNIQUE AND LOW FREQUENCY ULTRASOUND TO CONTROL THE ELUTION PROFILE OF VANCOMYCIN-LOADED ACRYLIC BONE CEMENT

Wichita State University

Morgan Colling	MOBILE TEXT INPUT ON A SMARTWATCH QWERTY KEYBOARD
Jacob Hadle	RESERVING GENETIC DIVERSITY IN DOMINANT GREAT PLAINS GRASSES: INVESTIGATING THE GEOGRAPHIC DISTRIBUTION OF BUFFALOGRASS CYTOTYPES
Christal Haskins	MAKING THE LEAP FROM TRADITIONAL INPUT DEVICES: AN EVALUATION OF LEAP MOTION
Sean Hess	AUTISM SPEAKS: GIVING A VOICE TO THE SOCIAL CONSTRUCTS OF ADOLESCENTS WITH ASD
Bethany Hildebrand	A YEAR OF PEDIATRIC PREVENTION
Lauren J. Johnson	EXPLORING ALLICIN FROM GARLIC AS A METHOD OF WOUND CONTROL IN SOFT TISSUE INFECTIONS
Eyyüb Y. Kıbış	COST-EFFECTIVE SURVEILLANCE AND CONTROL STRATEGIES AGAINST THE EMERALD ASH BORER THREAT IN NORTH AMERICA
Amy McAfee	PREVALENCE OF URINARY INCONTINENCE IN HIGH SCHOOL AND MIDDLE SCHOOL-AGED FEMALE ATHLETES
Telakapalli Abhignan	SkyNet: A SWARMING DRONE SYSTEM FOR SMART DISASTER MANAGEMENT

Fort Hays State University

Thomas Buskuskie   OSTEOHISTOLOGY OF *NIBRARASAURUS COLEII*

Andrew Christiano   A STRATIGRAPHIC DESCRIPTION OF CAMBRIAN-PENNSYLVANIAN DEPOSITS USING GEOPHYSICAL WELL LOGS – WELL CUTTING ANALYSIS

Cory Keehn   QUALITIES AND STRATEGIES OF FORT HAYS STATE UNIVERSITY PEER MENTORS

Brendon McCampbell   ORGANISMAL COMPOSITION AND PHOTOSYNTHETIC TRAITS OF BIOLOGICAL SOIL CRUSTS IN PRARIE ECOSYSTEMS OF THE GREAT PLAINS

Kaitlin Moore   ISOLATION OF SOIL *BACILLUS* (spp) WITH INHIBITORY EFFECTS ON METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Pittsburg State University

S Anandavalli MIND, BODY AND MINDFULNESS

Christian Bedore GORILLAS STAND UP FOR WORKING

Trudy Hansen CRITICAL THINKING ASSESSMENT OF PHYSICAL THERAPIST ASSISTANT STUDENTS IN KANSAS

Shoukath Sulthana NEW MULTI-FUNCTIONAL NANOCERIA FOR THE TREATMENT OF LUNG CANCER

Elizabeth Spencer A CROSS CULTURAL COMPARISON OF VISUAL IMAGES WITHIN ALZHEIMER'S CARE FACILITY WEBSITES

HIGHWAY SAFETY MANUAL CALIBRATION AND CRASH PREDICTION FOR RURAL MULTILANE HIGHWAYS IN KANSAS

Syeda Rubaiyat Aziz and Sunanda Dissanayake
Department of Civil Engineering, Kansas State University

Recently introduced Highway Safety Manual (HSM) provides models and methodologies for safety evaluation and prediction of safety performance of various types of roadways. Predictive methods in HSM are based on national trends using data from sample states throughout the United States. Therefore, these methodologies are of limited use if they are not calibrated for individual jurisdictions or local conditions. The objective of this study was to calibrate the rural multilane roadway segments in Kansas using methodologies given in HSM. The rural multilane segments consist of four-lane divided and undivided roadways. Crash data from 281 rural four-lane divided segments and 83 rural four-lane undivided segments from years 2011 through 2013 were used in the analysis. A numerical tool was developed to obtain number of crashes at any highway segment. Safety performance function (SPF) and crash modification factors given in the HSM were used to obtain the total predicted crashes. After performing the calibration using HSM methodology, calibration factors of 1.43 and 1.50 were obtained for total crashes and 0.52 and 0.36 for fatal and injury crashes occurring on divided and undivided segments, respectively. Results indicated that HSM overpredicts fatal and injury crashes and underpredicts total crashes on rural four-lane divided and undivided roadway segments in Kansas. As suggested by HSM, development of a jurisdiction-specific SPF is required in order to predict crashes with greater reliability than HSM-calibrated SPF.

PROTEIN QUALITY AND MICRONUTRIENT AVAILABILITY OF EXTRUDED CORN, SOY, SORGHUM, AND COWPEA FORTIFIED-BLENDED FOODS

Nicole Delimont[1], Alexander B. Opoku-Achempong[1], Nicole Fiorentino[1], Sajid Alavi[2], and Brian L. Lindshield[1]
[1]Department of Human Nutrition, Kansas State University; [2]Department of Grain Science and Industry, Kansas State University

Corn and soybean micronutrient fortified-blended foods (FBFs) are commonly used for food aid. Sorghum may be a beneficial alternative to corn for food aid because of its global acceptability, drought-tolerance, local availability, and lack of genetic modification. Extrusion, which applies heat and pressure to precook commodities, may enhance nutritional quality of sorghum, and improve its utilization in FBFs. Our objective was to compare nutritional quality of new extruded FBFs with a current non-extruded USAID corn and soy blend FBF, CSB+. Two white and one red sorghum-cowpea, white sorghum-soy, corn-soy extruded FBFs, and CSB+ were fed ad libitum to 21-23 day old male weanling Sprague- Dawley rats (n=10) for 4 weeks. Anthropomorphic outcomes and iron status were analyzed post hoc. There were no significant differences in outcomes between extruded sorghum FBFs and extruded corn-soybean FBF consuming groups. CSB+ consumption resulted in significantly lower weight gain, caloric efficiency, protein efficiency, length, and food intake, compared to all groups. Compared with new FBFs, CSB+ intake resulted in growth suppression. Our findings suggest that newly formulated FBFs using extrusion processing are superior to CSB+, and that sorghum may have potential for use in FBFs.

ADAPTIVE ECOTYPIC VARIATION AND GENETIC DIVERGENCE OF A WIDESPREAD GRASS, BIG BLUESTEM, ACROSS A GREAT PLAINS' CLIMATE GRADIENT

Matthew Galliart[1], Paul St Amand[2], Jesse Poland[3], Nora M. Bello[4], Sofia Sabates[1], Theodore J. Morgan[1], Mary Knapp[5], Sara G. Baer[6], David Gibson[6], Brian R. Maricle[7], and Loretta Johnson[1]

[1]Division of Biology, Kansas State University (KSU); [2]USDA, Hard Winter Wheat Genetics Research Unit, KSU; [3]Department of Plant Pathology, KSU; [4]Department of Statistics, KSU; [5]Department of Agronomy, KSU; [6]Plant Biology and Center for Ecology, Southern Illinois University; [7]Department of Biological Sciences, Fort Hays State University

Local adaptation is fundamental to evolution, conservation, and climate change. *Andropogon gerardii* represents as much as 70% of prairie biomass and has a wide geographic distribution across a precipitation gradient (500-1200 mm/yr, western KS to IL), we expect variation in *A. gerardii* in response to climate. Objectives are to use reciprocal gardens to investigate ecotype differences in vegetative and reproductive traits and characterize genetic divergence among ecotypes. Ecotypes (CKS, EKS, and SIL) were reciprocally planted in Colby, Hays, and Manhattan, KS, and Carbondale, IL. We evaluated ecotypic differences in vegetative and reproductive traits and utilized Genotyping-by-Sequencing to investigate genetic divergence, predicting locally adapted ecotypes. Canopy area and height increased from west to east, with no evidence for ecotype differences in western KS. In Carbondale, SIL ecotype showed local adaptation. In Carbondale and Manhattan, CKS ecotype flowered 20 days earlier than other ecotypes with greater probability of seed in western sites relative to other ecotypes. Morphology was primarily correlated with seasonal mean temperature. Genotyping-by-Sequencing identified 4,641 Single Nucleotide Polymorphisms and showed evidence for three genetic groups. SIL ecotype existed as a distinct group. Outlier analysis identified 373 SNPs showing divergent selection. SNPs were primarily associated with seasonal diurnal temperature variation and seasonal precipitation. SNPs were mapped to *Sorghum bicolor* genome, the closest relative of bluestem. Selected genes identified in genotype-to-phenotype association include: nitrogen content-glutamate synthase (nitrogen assimilation), height-GA1 (internode length), and emergence-WUSCHEL transcription factor (development). Results provide insight into candidate genes responsible for adaptive divergence and inform restoration in future climates.

CONSUMER ACCEPTANCE OF DRY DOG FOOD VISUAL CHARACTERISTICS IN THE U.S.

David Gomez, Brizio Di Donfrancesco, Kadri Koppel, Delores Chambers, and Edgar Chambers IV
Department of Human Nutrition, Kansas State University

In the Pet Food Industry, the development of successful products depends on a wide variety of factors. From a sensory perspective, the products' success depends on the companion animal accepting the product as palatable. In addition, the owner's perception of the product is of great importance. The interaction that pet owners have with pet food is usually through the senses of olfaction and vision. In the case of dry dog food, previous research has shown that the visual aspect is more important than the olfactory one in driving the overall liking by consumers. The objective of this study is to determine if differences can be found in the consumers' acceptance of the appearance of dry dog food and which visual characteristics are preferred. One hundred and twenty-two dog owners evaluated the appearance of thirty dry dog food samples from commercially available products with varying visual characteristics in color, size, shape and variety of kibbles. Consumers rated the degree of liking of the samples' visual characteristics and selected appropriate descriptors they associated with each of the products. Significant differences where found between the thirty samples in terms of overall liking, size liking, shape liking and color liking by the consumers. In terms of kibbles, dog owners showed preference for medium sizes, symmetrical shapes, medium brown colors and single-kibble products. In contrast, consumers showed a low degree of liking for large and small sizes, flat and elongated shapes, and green colors.

WHAT WE CAN LEARN ABOUT HEALTH FROM KANSAS TEENS: RESULTS OF THE KANSAS ADOLESCENT HEALTH NEEDS ASSESSMENT

Elaine Johannes, **Bryant Miller,** and Michelle Washburn-Busk
School of Family Studies and Human Services, Kansas State University

The inclusion of adolescent health objectives in the national Healthy People 2020 plan is an acknowledgement that health issues impacting teens are unique from those affecting children or adults. Consequently, a three-pronged assessment process was initiated to identify key health issues among Kansas adolescents. Information obtained in the assessment informed the development of Kansas Department of Health and Environment's federal Title V funding application and recommendations for a Kansas adolescent health plan. The assessment process consisted of: a) review of existing population health data, b) online community input survey (854 responses), c) community focus groups (324 youth of 401 participants), and d) interviews with Kansas health leaders. The top health issues affecting adolescents identified after triangulation of data were mental health (including depression and self-injury), substance abuse, sexuality and reproductive health, nutrition and physical activity, and injury prevention. Top health-related barriers and challenges adolescents confront include lack of information and access to services, cost, lack of parental support/skills and awareness, embarrassment/shame, and lack of trusted adult mentors for youth to confide in. The results of the Kansas adolescent health needs assessment show that issues facing adolescents are unique and require systemic approaches that include prevention, early intervention, and treatment strategies delivered at community, school and family levels. Future research into the health experiences and health literacy of adolescents will strengthen adolescents' "voice" to inform health interventions, health delivery and health promotion to improve the health of all adolescents in Kansas.

ENGINEERING BIOMIMETIC NANOABSORBENT FOR DETOXIFICATION OF CHEMOTHERAPEUTICS

Tuyen Duong Thanh Nguyen [1,2], Arunkumar Pitchaimani[2,3], Mukund Bahadur Koirala[2,3], and Santosh Aryal[1,2]
[1]Department of Chemistry, Kansas State University; [2]Nanotechnology Innovation Center of Kansas State (NICKS); [3]Department of Anatomy and Physiology, Kansas State University

Detoxification is a pivotal treatment procedure for patients suffering from intoxication due to overdose and non-specificity of chemotherapeutics. Current methods of detoxification include administration of polymeric micelles, activated charcoal, gastric lavage, dialysis, and blood exchange transfusion, which are limited in their ability to remove excess drugs or toxic agents. Herein, we proposed an alternate strategy for reducing intoxications using injectable nanosized carriers called as nanoabsorbent that has an ability to soak-up toxin and selectively excrete from the circulatory system. Biomimetic nanoabsorbent proposed herein is made up of biodegradable and biocompatible poly-l-lactic-co-glycolic acid (PLGA) and red blood cell (RBC) membrane. For the purpose, calculated amount of RBCs were hypotonically busted and purified by dialysis to remove hemoglobin resulting in the formation of RBC vesicles called as RBC ghosts. These ghosts were further fused with PLGA nanoparticles resulting in the formation of nanoabsorbents. Detoxification ability of nanoabsorbent was performed using B-16 melanoma as a model cell and doxorubicin as a model chemotherapeutic. Nanoabsorbent showed the hydrodynamic diameter of 110 ± 15 nm with surface charge of -35 ± 2 mV. The retention of surface properties of RBC into the nanoabsorbent was further confirmed by SDS PAGE analysis, which confirms the presence of all major proteins in RBC. These nanoabsorbents were found to absorb doxorubicin within five minutes. When cells pretreated with nanoabsorbent were treated with doxorubicin, reduction of doxorubicin toxicity was observed. Results obtained pictures the detoxifying ability of nanoabsorbent and put it as a platform technology in the treatment for intoxication.

GENOMIC DISSECTION OF LEAF AND PANICLE ARCHITECTURE TRAITS IN SORGHUM USING NESTED ASSOCIATION MAPPING

Olalere Olatoye, Sophie Bouchet, Ram Perumal, Tesfaye Tesso, and Geoffrey Morris
Department of Agronomy, Kansas State University

Sorghum is an important crop in many agroclimatic regions worldwide, and has adapted to a wide range of conditions. Accordingly, global sorghum germplasm exhibits substantial variation in agroclimatic traits—traits that differ in germplasm from different agroclimatic zones—including many aspects of leaf and panicle architecture. Currently, our ability to improve sorghum adaptation and transfer useful alleles across different genetic backgrounds is constrained by our limited knowledge of the genomic regions that underlie agroclimatic traits. Nested Association Mapping (NAM), which uses multiple biparental families linked by a common parent, can improve dissection of agroclimatic traits by reducing the confounding effects of population structure and increasing the frequency of rare alleles. A sorghum NAM population comprised of 10 families and almost 2,500 recombinant inbred lines (RILs) has been developed and genotyped at approximately 100,000 SNPs with Genotyping-by-Sequencing (GBS). The population was phenotyped for leaf angle, leaf width, panicle compactness and primary rachis branch length in two contrasting environments (locations) in Kansas, semi arid (Hays) and humid continental (Manhattan). Significant genotypic variation for these traits was observed. Association mapping confirmed several previously identified quantitative trait loci (QTL) and revealed many new QTL for leaf and panicle architecture. QTLs were found for leaf angle around the *Dw3* region in chromosome 7. Likewise, for lower rachis branch length, we identified Sb07g023640 a flavin monooxygenase gene close to the *Dw3* region on chromosome 7. The QTL identified will be helpful in marker-assisted selection for better adaptation and yield.

BISPHOSPHONATE FUNCTIONALIZED NANOMEDICINE FOR TARGETING BONE MICROENVIRONMENT

Soma Sekhar Sriadibhatla[1,2], Tuyen Duong Thanh Nguyen [1,2], Arunkumar Pitchaimani[2,3], Mukund Bahadur Koirala[2,3], and Santosh Aryal[1,2]
[1]Department of Chemistry, Kansas State University; [2]Nanotechnology Innovation Center of Kansas State (NICKS); [3]Department of Anatomy and Physiology, Kansas State University

Every year thousands of bone cancer cases are diagnosed in United States. Moreover, development of bone metastasis occurs in over 80% to 90% of various cancers that metastasize and signals the entry of the disease into an incurable phase. Cancer in bones can cause pain, fractures, hypercalcaemia, and tumor compression of the spinal cord, due to cancer deposits that can erode into bone using bone-absorbing cells. Bisphosphonates are drugs that reduce the activity of bone-absorbing cells and target over expressed calcium. Herein, we engineered bone-homing polymeric nanomedicine for controlled delivery of therapeutics to bone. In order to achieve our goal, a ring opening living polymerization of cyclic L-lactide initiated by alendronic acid, member of bisphosphonate, in presence of catalytic amount of stannousoctoate was adapted. Resulting polymers contains end functional hydrophilic alendronic acid, which self-assemble to form sub 100 nm sized nanoparticle in an aqueous solution. Thus, formed polymer and nanoparticles were characterized for their chemistry and physiochemical properties using various analytical tools. Alendronic acid functionalized poly-l-lactide (Ale-PLA) was characterized by nuclear magnetic resonance (NMR) and Fourier Transfer Infrared Spectrometer (FTIR), which exhibits characteristics monomer conversion and the presence of amide and phosphate moiety in the polymer. These polymer self-assembled to form nanoparticle and in in-vitro results shows that it has an ability to accumulate and internalized into the bone cancer cells and delivery drugs. The results obtained from the nanoformulation and targeting efficiency of these nanoparticles demonstrates the tremendous potential for targeting bone microenvironment.

RNA-SEQ ELUCIDATES THE MOLECULAR BASIS OF CHARCOAL ROT RESISTANCE IN GRAIN SORGHUM

Ananda Y. Bandara[1], Dilooshi K. Weerasooriya[2], Sanzhen Liu[1], and Christopher R. Little[1]
[1]Department of Plant Pathology, Kansas State University; [2]Department of Agronomy, Kansas State University

Charcoal rot caused by *Macrophomina phaseolina* (MP) is one of the most destructive fungal diseases in sorghum. Although host resistance is the key management strategy, field screening for resistance is tedious. The objectives of this study were to: i) discover differentially expressed genes (DEG) between resistant and susceptible genotypes in response to MP inoculation and ii) understand their contribution to resistance, in order to select potential DEG to be deployed as molecular tags in resistance screening. SC599 (resistant) and TX7000 (susceptible) sorghum genotypes were grown in the greenhouse and inoculated with MP. Control plants were mock-inoculated with phosphate buffered saline. RNA was extracted from 3 biological replicates at 2, 7, and 30d (3 stages) post-inoculation (d.p.i.) from stem tissues and subjected to RNA-Seq. Analysis for DEG was performed with DESeq2 and pathway analysis was performed to explore DEG. 8530 annotated genes were identified across 3 stages as significantly differentially expressed between 2 genotypes, out of which 2053 were components of 197 known metabolic pathways. 1722 DEGs were observed at 7 dpi, indicating the importance of MP-mediated host expression profile changes as early as 7 dpi. Of those, 945 genes were constituents of 21 pathways involved in stress responses, nitrous oxide-mediate oxidative burst, basal immunity, hormonal regulation, and nutrition. Most metabolic pathways including nitrate reduction, ethylene, jasmonic acid, and trehalose biosynthesis and homogalacturonan, triacylglycerol and glycerol degradation were significantly upregulated in TX7000, while those of SC599 were non-significantly changed. Results revealed the involvement of non-upregulated susceptibility genes for manifestation of the resistant phenotype.

SPINNING STRAW INTO MILK: CAN AN ALL-BYPRODUCT DIET SUPPORT MILK PRODUCTION?

Maggie Hulett[1], **Caroline Ylioja**[1], Tryon Wickersham[2], and Barry Bradford[1]
[1]Department of Animal Sciences and Industry, Kansas State University; [2]Department of Animal Science, Texas A&M University

The resource efficiency of animal agriculture can be improved by better harnessing the ability of ruminants to turn waste products into nutrient-dense foods for human consumption. Dairy rations typically contain 20 – 30% byproducts, and we are unaware of lactation diets that have used more than 80% byproducts. Our objective was to compare milk production of cows fed a traditional diet with that of cows fed a diet comprised of byproducts of human food/fuel/fiber production, and not grown on arable land that could be used for human food production. We predicted that such a diet could support 35 kg/day of milk production. Twelve dairy cows from the KSU Dairy herd were individually fed 2 different diets in a crossover design: a conventional lactation diet and a diet comprised entirely of byproduct feeds. Milk yield, milk composition, and feed intake were measured. Feed intake did not differ by treatment, but milk production averaged 2 kg/d less for the byproduct diet than for the control diet ($P = 0.04$). Milk fat content also decreased with the byproduct diet ($P = 0.002$). Although the byproduct diet decreased milk production, it nevertheless supported production of 39 ± 1.6 kg milk/day. It is possible to support a high level of milk production on a diet largely composed of unconventional feeds that do not compete with production of other human foodstuffs. Although it is unlikely that commercial farms will adopt such an unusual diet, these findings will encourage more creative solutions to dairy cattle diet formulation.

OVEREXPRESSION OF HSD10 INCREASES ADRENAL GLAND CANCER CELL GROWTH AND RESISTANCE TO CELL DEATH

Emily A. Carlson[1], Rebecca T. Marquez[2], Fang Du[1], Liang Xu[2], and Shirley ShiDu Yan[1]

[1]Department of Pharmacology and Toxicology, University of Kansas; [2]Department of Molecular Biosciences, University of Kansas

Despite early detection methods and improved anti-cancer treatments, cancer remains the second leading cause of deaths in the USA. On a more local scale, Kansas was listed on the 2012 CDC map as one of fourteen states that had the highest level of cancer incidence. Cancer greatly impacts the healthcare world as it is an aggressive disease that can increase cellular resistance to current therapies. Therefore, it is crucial that new treatments are found. 17β-hydroxysteroid dehydrogenase type 10 (HSD10) is protective in cells undergoing stress. Across diseases, increased HSD10 has a varied effect, such as beneficial in Parkinson's disease and harmful in Alzheimer's disease. Recently, HSD10 overexpression was observed in some prostate and bone cancers. Additionally, our preliminary data revealed increased HSD10 in tumor tissue of breast cancer patients. We propose that cancer cells exploit the protective role of HSD10 to promote tumor growth and enhance cellular resistance. The main goals of our study were to determine the effect of increased HSD10 expression on adrenal gland cancer (PC-12) cell growth and cell death. Our data show that HSD10-overexpressing PC-12 cells grow faster and form larger tumors. Under death-inducing conditions, cellular functions remain high in HSD10-overexpressing PC-12 cells. Furthermore, HSD10-overexpressing PC-12 cells are more resilient against cell death. Overall, our results indicate that HSD10 overexpression promotes PC-12 cell growth and is involved in cell death resistance. This suggests that inhibiting HSD10 may have potential for reducing tumor growth, which could be important for cancer patients in Kansas and around the world.

USING POINT VELOCITY PROBES TO UNDERSTAND THE CONNECTION BETWEEN STREAM AND GROUNDWATER SYSTEMS

Mackenzie Cremeans[1], J.F. Devlin[1], Trevor Osorno[1], Ursula S. McKnight[2], Vinni Rønde[2], and Poul Bjerg[2]

[1]Department of Geology, University of Kansas; [2]Department of Environmental Engineering, Technical University of Denmark

As water use in Kansas increases, our understanding of hydrologic interactions gains importance. From a water resource perspective, falling groundwater levels are linked to notable declines in stream flow. From a contaminant perspective, rates of contaminant exchanges between surface and groundwater are a human and ecological risk. Point velocity probes (PVPs) measure groundwater velocities by performing a mini-tracer test on the probe surface. They measure groundwater speed and direction without reference to hydraulic conductivities or gradients, increasing measurement accuracy. Prior research demonstrated the viability of PVPs in sand aquifers, glacial outwash aquifers, and along stream banks. In this work, the PVP design was modified for use in streambeds to provide direct measurements of groundwater flow into the stream and streamwater flow into the ground. The new instrument was laboratory tested with promising results, and field tested in the bed of the *Grindsted Å* (stream) in Jutland, Denmark, where a plume of chlorinated solvents in the groundwater discharges to the surface water. To assess the performance of the streambed PVP, comparisons with concurrently gathered data from conventional methods, such as Darcy's Law calculations, temperature gradients, and seepage meters, were performed. Analysis of the data suggests good consistency in the observed spatial trend in discharge through the streambed between the methods. However, only the streambed PVPs measured absolute discharges sufficient to explain measureable concentrations of the contaminant vinyl chloride in the streamwater. This made-in-Kansas technology is therefore relevant to both surface water and groundwater resources, from both contaminant and water supply standpoints.

AN EVALUATION OF THE EFFECTS OF STATE SEAT BELT AND CELL PHONE LAWS ON MOTOR VEHICLE COLLISIONS

Jessica F. Juanico, Claudia L. Dozier, Rachel L. Jess, Derek D. Reed, Aubrie N. Bauer, Rachel E. Jackson, Katie G. Griffith, Paige M. Ryan, and Jacob L. Schooler
Department of Applied Behavioral Science, University of Kansas

Motor vehicle collisions are the leading cause of death for people ages 3-34 and result in an economic cost of approximately $230 billion each year. Of these collisions, the main contributing circumstance was driver inattention (e.g., cell phone use). Since 1980, states have passed seat belt legislation to attempt to reduce the fatalities related to motor vehicle collisions. Recently, states have moved to increase enforcement of seat belt legislation, as well as pass cell phone legislation that prohibits or limits the use of cell phones while driving (NCSL, 2013). The purpose of this study was to examine the effects of seat belt and cell phone legislation on motor vehicle collisions across a large number of states from 1980-2012 using single-subject-design methodology (i.e., interrupted time-series design) across the total population and young drivers, ages 15-24. Additionally, we evaluated the effects of federally mandated safety features in cars (e.g., airbags) and technology advances (e.g., iPhone) on the number of motor vehicle collisions. Results thus far have demonstrated that seat belt and cellphone legislation, some federally mandated safety features (i.e., child restraint system, passive restraint system, front air bags, side impact protection), and hands-free technology have been associated with decreases in the number of motor vehicle collisions for both the total population and young drivers. This study demonstrates the importance of pursuing legislation that will reduce the number of motor vehicle collisions and increase the safety of the roadways.

CONSTRUCTION OF CRACK-FREE BRIDGE DECKS

Rouzbeh Khajehdehi and David Darwin
Department of Civil, Environmental & Architectural Engineering, University of Kansas

Cracks in concrete bridge decks provide easy access for water and deicing chemicals that shorten the life of the deck. Both materials increase the effects of freeze-thaw damage, while the deicing chemicals lead to higher concentrations of chlorides, and subsequently, corrosion of reinforcing steel leading to structural deficiencies in bridges. According to FHWA's statistics released in 2012, the cost to rehabilitate, and replace structurally deficient bridges in state of Kansas is estimated to be $70 and $100 million respectively. The University of Kansas (KU) has been conducting research starting in 1990s to address this issue directly which has resulted in development of specifications that are a combination of ideas from research and practice to build crack free bridges. The implementation of these specifications in construction of 14 highway bridges in Kansas and 4 in other states has led to a clear success evidenced by over almost a decade of annual inspections. KU continues to improve these specifications through the lessons learned from the previous work and its new laboratory experiments that involves development of new innovative crack reduction technologies. As a result, these new findings will be implemented in construction of 12 more concrete bridge decks in Kansas and Minnesota within a year. The lessons learned from this successful study and its real life experimental results will help the states to save a considerable amount of tax payer's money by building more durable bridges that otherwise were destined to be spent on bridge repair, rehabilitations, and associated traffic costs.

THE *cla*MP TAG: TARGETED DELIVERY OF METALS TO TREAT CANCER

Michaela L. McNiff and Jennifer S. Laurence

Department of Pharmaceutical Chemistry, University of Kansas

Approximately 40% of Americans will be diagnosed with cancer in their lifetime. In Kansas, earlier this year, it was predicted there would be 14,400 new cases of cancer and 5,600 of the diagnosed patients would have a poor outcome in 2015. Cancer diagnosis and treatment is centered around the delivery of metals. Metal ions are delivered to the tumor and images are taken for visualization and determination of the diagnosis and treatment for the patient. To treat cancer, most often chemotherapeutic platinum derivatives are administered to interrupt cell replication and inhibit cancer cell growth. The metals currently employed are toxic because they are either released from the metal carrier before reaching the tumor or are not specifically delivered to the tumor, causing off-target toxicity. At the University of Kansas, the Laurence lab discovered a new way to improve patient care and our research consists of investigation of a metal-binding tripeptide, known as the *cla*MP Tag. The Laurence lab aims to specifically deliver metals for either treatment or diagnosis of tumors using our new technology to greatly reduce the side-effects associated with chemotherapy treatment and to allow more effective visualization of the tumor. The *cla*MP Tag can be incorporated into a larger protein that will be recognized by the surface of cancer cells. Metal can then be bound to the *cla*MP Tag, and targeted delivery of the metal to the cancer cell can be accomplished. Our goal is to further characterize the *cla*MP Tag for various applications to improve patient care.

PREDICTING RISK FOR INCIDENCES OF HOMELESSNESS AMONG VETERANS OF IRAQ AND AFGHANISTAN

Venkat Motupalli[1] and Jasmine Motupalli[2]

[1]Engineering Management Program, University of Kansas
[2]Department of Systems Engineering, United States Military Academy

As communities report significant decreases in Veteran homelessness from 2010 – 2015, mitigation efforts have turned from reactive care and rehabilitation to prevention. With significant populations of contemporary Veterans transitioning to civilian life from operations in Iraq and Afghanistan, there is an opportunity to adapt transition and integration processes to preclude the risk of homelessness. Significant data is collected from Soldiers and Veterans at the point of military transition and intake to Veterans Administration care. This administrative data can inform Veterans and caregivers of the risk for multiple undesirable outcomes of military transition, including incidences of homelessness. With effective decision support tools based on this data, transition commanders and clinicians can better prioritize care, and possibly preempt incidences of homelessness. This project curates priority intelligence requirements (PIR) aimed at identifying Veterans of Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn (OEF/OIF/OND) who are at risk of experiencing incidences of homelessness after ending service in the United States Army. Having developed effective PIR, this project delivers an immediate decision support tool for commanders, transition supervisors, and VA intake providers, as well as the framework to automate that information collection and risk analysis in the future. Thousands of Veterans of deployed service to Iraq and Afghanistan will transition home to the state of Kansas in this decade. This research supports efforts to enable successful transitions for Kansas Veterans, and effectively direct care to those Veterans who need support.

WELL OWNERSHIP AND SUSTAINABLE PRACTICES: AN EXAMINATION OF GROUNDWATER POLICIES, WATER CONSERVATION ROUTINES, AND GROUNDWATER RELIANCE IN KANSAS
Brock Ternes
Department of Sociology, University of Kansas

Extreme droughts and heat waves have stressed water supplies in Kansas, making the state increasingly reliant on its large underground reserves of freshwater. As precipitation and the availability of surface water become less reliable, aquifers—reservoirs of groundwater—remain one of the only sources of water in the High Plains. Growing demands for water are tapping aquifers beyond their natural rates of replenishment, which has profound implications for sustaining communities in a region prone to drought. This dissertation investigates the water conservation behaviors and environmental beliefs of Kansas well owners, a key social group whose actual and potential water usage is pivotal to understanding and prolonging groundwater formations. Private well owners, who are responsible for managing their own water supply, need to be investigated in order to extend the useable lifetime of aquifers. I explore how well owners' attitudes about water influence their decision-making, and how their practices are contoured by groundwater management policies. To investigate this issue, I surveyed over 850 well owners and non-well owners throughout Kansas and interviewed groundwater experts. My findings reveal that well owners are more aware of the state's water supplies than the general population, and they practice water conservation more often than non-well owners. Researchers and policymakers interested in the welfare of aquifers need to examine how people reliant on groundwater adopt water-saving routines. Water conservation will be essential for long-term adaptation in a dryer climate, and investigating how Kansans react to groundwater management policies will facilitate groundwater regulation.

MESENCHYMAL STEM CELL SECRETOME-RICH HYDROGELS FOR CARDIOVASCULAR REGENERATION
Renae Waters[1], Settimio Pacelli[1], Ryan Maloney[1], Rafeeq P.H. Ahmed[2], and Arghya Paul*[1]
[1]Department of Chemical and Petroleum Engineering, University of Kansas; [2]Department of Pathology, University of Cincinnati

Ischemic heart disease is the leading cause of death in the world totaling an estimated 7 million deaths worldwide in 2010. Currently, heart transplantation is the only treatment for end-stage patients, however, donor shortages demand alternative options. Stem cell therapy provides a promising alternative due to its potential to regenerate damaged myocardium. In fact, this is one of the focuses of clinical trials at the Midwest Stem Cell Therapy Center in Kansas City. One of the key mechanisms behind this regeneration is the formation of new blood vessel networks called angiogenesis. Recent evidence indicates that the driving force behind the promotion of angiogenesis is the secretion of angiogenic paracrine factors (growth factors, chemokines, and exosomes) by cells, known as stem cell secretome. However, the therapeutic efficacy of stem cell secretome has been hindered by the lack of retention in the site of injection. My research focuses on developing a therapeutic hydrogel-based delivery system to efficiently deliver the stem cell secretome to the damaged myocardium as an alternative to traditional stem cell therapy. Results from this work have shown that a nanocomposite hydrogel can modulate the controlled release of key growth factors present in stem cell secretome derived from human mesenchymal stem cell aggregates. In addition, this secretome loaded nanocomposite hydrogel provides a dual action therapeutic system through its proangiogenic and cardioprotective ability. The results of this study indicate that the encapsulation of stem cell-derived secretome in a nanocomposite hydrogel provides a promising alternative to stem cell therapy for myocardial regeneration.

VITAMIN A METABOLISM IS REQUIRED FOR VAGAL NEURAL CREST CELL COLONIZATION OF THE GASTROINTESTINAL TRACT IN THE PATHOGENESIS OF HIRSCHSPRUNG DISEASE

Naomi E Butler Tjaden[1,2], Lisa L Sandell[3], Kazushi Aoto[4], and Paul A Trainor[1,2]
[1]Stowers Institute for Medical Research, Kansas City, Missouri; [2]University of Kansas Medical Center; [3]School of Dentistry, University of Louisville; [4]School of Medicine, Hamamatsu University Shizuoka, Japan

Retinol dehydrogenase 10 (RDH10) oxidizes vitamin A to its active metabolite, retinoic acid (RA). Insufficient or excess RA can result in congenital abnormalities, such as Hirschsprung disease (HSCR). In HSCR, neurons are absent from variable lengths of the gastrointestinal tract leading to megacolon and/or the failure to pass meconium. HSCR occurs in 1/5000 live births, and typically requires surgical resection of the aganglionic bowel. Enteric neurons are derived from neural crest cells (NCC); hence HSCR is associated with incomplete NCC development or colonization of the gastrointestinal tract. *Rdh10[trex]* mutant mouse embryos exhibit colonic aganglionosis in association with decreased retinoid signaling. We hypothesize that RDH10 is necessary for vagal NCC migration and enteric nervous system (ENS) formation. Organ explant culture and *in utero* retinal supplementation define a temporal requirement for RA in ENS development between E7.5-E9.5. Tamoxifen-inducible deletion of Rdh10 at E6.5-E7.5 confirms this early retinal role, while later Rdh10 deletion suggests retinal independence for continued enteric NCC colonization. Furthermore, removing Rdh10 from NCCs shows no gross or ENS-specific neuronal defects, suggesting RDH10 is not intrinsically required in enteric NCCs for proper colonization of the gut, but rather is necessary as a paracrine signal in the vagal NCC microenvironment. These novel models of HSCR will improve our understanding of RA contribution to intestinal development and may lead to innovative non-surgical treatment approaches to reduce the morbidity and mortality of this congenital disease.

BEYOND THE AUDIOGRAM:
LOCATING REGIONS OF OUTER HAIR CELL LOSS IN THE INNER EAR

Aryn M. Kamerer
Hearing and Speech, University of Kansas Medical Center

Clinical audiometry is limited in its ability to diagnose the site-of-lesion underlying sensorineural hearing loss in a given patient. A more determinate measure of the location of damage and the health of structures in the inner ear would provide a target for the appropriate treatment of different types of sensorineural hearing loss. We propose that the electrical potential recorded in the inner ear at the round window of the cochlea –the cochlear response (CR) –has the capacity to reveal regions of outer hair cell damage, a common cause of hearing loss. We devised a method for predicting regions of outer hair cell loss using the CR which predicted the anatomic location of outer hair cell loss in gerbils; however, the CR contains activity from other cochlear structures including the auditory nerve which could contaminate our assessment of outer hair cell health. In this study, we derived a stimulus that reduced the auditory nerve response in order to optimize our diagnostic method of targeting outer hair cell health. Gerbils were assigned to either an experimental group, whose cochleae were treated with 1 mM of a neurotoxin, ouabain, or a control group treated with artificial perilymph. The CR from specific regions of the cochlea was recorded to 45 and 85 Hz tone bursts. This study shows that the low-frequency (45 & 85 Hz) CR does not contain neural responses. Therefore, low-frequency tones may be appropriate stimuli to ensure a sensitive measure of outer hair cell function.

A NOVEL CELLULAR PATHWAY IN THE PATHOGENESIS OF UTERINE FIBROIDS

Michelle M. McWilliams and Vargheese Chennathukuzhi
Department of Molecular and Integrative Physiology, University of Kansas Medical Center

Uterine fibroids are the most common female reproductive tumor, with lifetime incidence in approximately 77% of women. In a third of the women with fibroids, symptoms of pain, excessive bleeding, abdominal pressure and fertility complications are severe, requiring clinical management. However, there is no long-term, cost-effective, fibroid treatment that preserves fertility. Standard treatment for fibroids is hysterectomy, removal of the uterus. In the United States an estimated 200,000 hysterectomies and $34.6 billion are spent on fibroids. Development of a much-needed drug treatment for fibroids is severely impeded by lack of understanding about fibroid pathogenesis. It is known that exposure to estrogenic chemicals in our environment predisposes women to develop fibroids. It is also established that the PI3K/AKT-mTOR pathway is activated in fibroid cells, promoting tumor development. However, the molecular pathway, connecting estrogen exposure and activation of the PI3K/AKT-mTOR pathway is poorly understood. Our lab has discovered, for the first time, a cascade of proteins linking these two events in fibroids. We found that a receptor protein, GPR10, normally only found in the brain, is highly expressed in fibroids activating the PI3K/AKT-mTOR pathway. Next, we discovered the tumor suppressor protein, REST, normally present in the uterus to keep GPR10 silenced, is missing in fibroids. Further, we found that PRICKLE-1, a protein required for REST function, is also missing in fibroids, resulting in REST degradation. Finally, we connect PRICKLE-1 to estrogen, showing PRICKLE-1 expression is down-regulated by environmental estrogens. This novel pathway provides promising drug targets for development of better fibroid treatments.

KNOWLEDGE AND PERCEPTIONS AMONG PSYCHIATRIC MENTAL HEALTH ADVANCED PRACTICE REGISTERED NURSES REGARDING THE USE OF OMEGA-3 FATTY ACIDS FOR MAJOR DEPRESSIVE DISORDER

Peter Taulbee, Martha Baird, and Janet Pierce
School of Nursing, University of Kansas

Clinical depression affects 15% of the population of Kansas and costs $59 million per year. Eicosapentaenoic acid (EPA) and docosahexanoic acid (DHA) are two omega-3 fatty acids found in over-the-counter, non-prescription fish oil that have shown positive effects on clinical depression. Advanced Practice Psychiatric Mental Health Registered Nurses (PMH-APRNs) assess the use of dietary supplements as part of routine treatment. However, little is known in their understanding of omega-3 fatty acids as an integrative treatment for depression. The aim of this project was to determine PMH-APRNs' understanding of the use of omega-3 fatty acids for the treatment of clinical depression. Sample was PMH-APRNs who were members of the American Psychiatric Nurses Association (APNA). Eligible participants answered 19 multiple choice questions assessing their knowledge and perceptions of omega-3 fatty acids. Questions were posted via Survey Monkey onto the APNA's discussion board for one month. 117 APRNs participated in the survey. An average of 81% of APRNs reported knowing about the relationship between omega-3 fatty acids and depression. However, 74.4% of participants answered questions correctly. Although there are no current guidelines on using fish oil supplements, additional research on what APRNs know about fish oil is needed to implement evidence-based algorithms in the state of Kansas. Omega-3 fatty acids (fish oil) may be one mechanism nurses and other health providers can recommend to prevent and treat clinical depression. Recommending two servings of fatty fish per week or an average of 2,400 mg of fish oil per day may help reduce the effects of clinical depression in Kansas.

UTILIZING MIX TECHNIQUE AND LOW FREQUENCY ULTRASOUND TO CONTROL THE ELUTION PROFILE OF VANCOMYCIN-LOADED ACRYLIC BONE CEMENT

Alex Wendling, Terence McIff, Damon Mar, and David Anderson
Department of Orthopedics, University of Kansas Medical Center

Antibiotic-impregnated polymethyl methacrylate (PMMA) bone cement is commonly used to help eradicate infection due to the presence of a prosthesis after total joint arthroplasty. The loaded antibiotic elutes from the cement over a period of time which clears the infection. Elution occurs at a high rate initially (Phase I) and then falls to lower levels for a period of weeks or even months (Phase II). This low level of elution during Phase II allows infections to persist in 5.5% of patients who undergo two-stage revision arthroplasty. Many studies have unsuccessfully tried to increase Phase II elution. The only successful studies have used methods that are difficult to execute clinically or decrease the structural integrity of the bone cement. In our study a combination of methods were used in hopes of increasing elution from PMMA pellets: vancomycin addition to the bone cement was delayed during the mixing process and the pellets were subjected to low frequency ultrasound (LFUS) during Phase II. This combination resulted in cement that eluted more antibiotic than cement that was only subjected to LFUS and cement in which antibiotic addition was delayed during the mixing process ($p<0.01$). Cement which was only subjected to LFUS eluted more than cement in which antibiotic addition was delayed ($p<0.01$). Cement stiffness from each treatment group was not significantly different from the control group ($p>0.05$). These results suggest the use of LFUS and delayed mix technique is a viable method to increase vancomycin elution without decreasing its structural integrity.

MOBILE TEXT INPUT ON A SMARTWATCH QWERTY KEYBOARD

Colton Turner,[1] **Morgan Colling,[2]** Barbara Chaparro,[1] and Jeremy Patterson[2]
[1]Department of Psychology, Wichita State University; [2]Department of Human Performance Studies, Wichita State University

As smartwatches continue to grow in popularity the demand for a smartwatch with efficient texting capabilities continues to increase. Conventional opinion states texting on a smartwatch is too difficult and inefficient due to the limited screen size. However, recent research done at Wichita State University shows smartwatch users can achieve typing speeds of up to 30 AdjWPM using a trace-based typing method and 26 AdjWPM using a tap-based typing method while seated at a desk. These speeds are comparable, if not better, than typing speeds achieved on smartphones using the same input methods. In addition, these speeds are better than any other keyboard for small screen devices listed in the literature. Given the mobile nature of smartwatch usage, a second study is being conducted to examine typing speeds using the same techniques while walking and standing. Results from both studies will be discussed along with smartwatch design implications.

RESERVING GENETIC DIVERSITY IN DOMINANT GREAT PLAINS GRASSES: INVESTIGATING THE GEOGRAPHIC DISTRIBUTION OF BUFFALOGRASS CYTOTYPES

Jacob Hadle[1] and James Beck[1,2]
[1]Department of Biological Sciences, Wichita State University; [2]Botanical Research Institute of Texas

Buchloë dactyloides (Nutt.) Engelm. (buffalograss) is a major component of mixed- and shortgrass prairies of Kansas and the Great Plains, and is of economic importance both as a forage grass and as a native turf grass alternative for lawns and golf courses. Like many critical Great Plains grasses, buffalograss includes a series of cytotypes (genotypes differing in the number of sets of chromosomes per cell), including diploids (2 sets), tetraploids (4 sets), pentaploids (5 sets), and hexaploids (6 sets). This is important, as cytotypes often vary with regards to economically important ecological traits, and since the diploid cytotype is sought after for plant breeding and crop improvement. Preliminary studies suggest that buffalograss diploids are rare, and the overall picture of cytotype distribution within buffalograss is essentially unknown. This is important since rapid range shifts due to climate change could potentially eliminate certain cytotypes if they are non-randomly distributed geographically. The aim of this study is to use genetic tools to establish the geographic distribution of buffalograss cytotypes, and we have observed the number of alleles (versions of a gene) at 14 genetic loci in 437 individuals. Using this approach we infer that diploids are indeed rare, with only three individuals identified. Tetraploids and hexaploids are both quite common, and each of these polyploids is clearly non-randomly distributed geographically. Clarifying the distribution of buffalograss cytotypes will therefore identify important seed stock locations for turf grass and conservation breeding programs.

MAKING THE LEAP FROM TRADITIONAL INPUT DEVICES:
AN EVALUATION OF LEAP MOTION
Christal Haskins and Barbara Chaparro
Department of Psychology, Wichita State University

The Leap Motion is a recently developed, touch-free gesture device that allows for natural interaction between a computer and a user. Currently, many research projects have explored the usability of Leap Motion compared to traditional-style mice (among other devices) using a standard Fitts' tapping test. However, these studies only offer a basic Fitts' analysis on throughput, movement time, and errors. The purpose of the current study was to conduct an exhaustive usability assessment of the Leap Motion, compared to a baseline traditional mouse, for point-and-click tasks using a basic Fitts' analysis, as well as the MacKenzie, Kauppinen, and Silfverberg's (2001) seven movement accuracy measures. Results suggest that Leap Motion is a viable device for point-and-click tasks, but generally inferior to the more familiar baseline device on standard Fitts' assessment measures. However, for specific cursor events, users with Leap Motion reentered targets less often and the two devices showed no differences on continuous navigation paths between on-screen targets. Based on the results, this study suggests that the Leap Motion is best used with targets in the upper 2/3 of a computer screen and with target sizes larger than typical computer icons. Since this study was conducted with a highly controlled and basic point-and-click task, further research must be conducted to better understand the advantages and limitations of this device.

AUTISM SPEAKS: GIVING A VOICE TO THE SOCIAL CONSTRUCTS OF
ADOLESCENTS WITH ASD
Sean Hess,[1] Trisha Self,[1] Anthony DiLollo,[1] Kathy Strattman,[1] Kathy Coufal,[1] and
Louis Medvene[2]
[1]Department of Communication Sciences and Disorders, Wichita State University;
[2]Department of Psychology, Wichita State University

Many protocols used for assessing social skills of individuals with Autism Spectrum Disorder (ASD) are based on behavioral observations. It has been suggested, however, that social cognition encompasses processes underlying observable behaviors. Such processes include personal constructs and cognitive complexity, which are associated with successful interpersonal communication skills used in social interactions. Personal constructs can be assessed using repertory grids (Kelly, 1955), and cognitive complexity can be assessed using the Role Category Questionnaire (RCQ; Crockett, 1965). Personal constructs and cognitive complexities of high-functioning teenagers with ASD were explored using repertory grids and the Role Category Questionnaire. Five high-functioning adolescents diagnosed with ASD participated in the study. All participants completed the RCQ. Results appeared to be more reflective of interpersonal communication ability rather than overall social cognition. With visual structure and verbal scaffolding, all participants successfully engaged in the repertory grid process. It appears that high-functioning adolescents with ASD have well organized, complex construct systems related to social relationships. Data suggests they have a significant understanding of social roles and are interested in social interactions. Repertory grids and the RCQ offer a person-centered view of social cognitive processes, which may provide a starting point for intervention.

A YEAR OF PEDIATRIC PREVENTION

Bethany Hildebrand, Jordan Day, Ronnie West, and Michelle Wallace
Department of Physician Assistant, Wichita State University

Unintentional injury remains the leading cause of death in children under 18 years of age in the United States. From 2003 to 2013, 93,941 unintentional deaths occurred in the pediatric population, not including the additional morbidity in survivors. This project aims to educate parents and providers about the most common unintentional pediatric injuries by composing a list of evidence-based strategies to reduce injury and mortality. After reviewing the National Vitals Statistic System from the CDC website, a list of common pediatric unintentional injuries was compiled. This list was narrowed to encompass 12 topics based on their burden of injury, cost to society, and feasibility of recommended actions. Each of these topics was studied further to produce evidence-based strategies for prevention. The clinical review article will be converted into a safety-themed calendar for parents and healthcare providers that raises awareness and provides information to prevent 12 common unintentional injuries in children.

EXPLORING ALLICIN FROM GARLIC AS A METHOD OF WOUND CONTROL IN SOFT TISSUE INFECTIONS

Lauren J. Johnson, Fawn Beckman, and J. David McDonald
Department of Biological Sciences, Wichita State University

The antimicrobial properties of allicin, while long known, require further investigation in order to evaluate this garlic-derived chemical as an anti-infective agent against *Staphylococcus aureus* wound infection. *S. aureus* is well adapted to live on skin as either normal flora or as a pathogen. Indeed, it is carried as normal flora by approximately one-third of all people. Thus, there is an important ongoing clinical problem with wound infection by this pathogen along with the fact that antibiotics continue to lose their effectiveness against strains. This has motivated us to explore alternative methods to deal with this common clinical problem and allicin quickly emerged as an agent worthy of testing in a standardized wound infection model. Using a mouse model, we followed wound progression in the presence of different levels of allicin applied at the wound site, and compare that to uninfected and untreated controls. We followed the progression of this infection in a number of ways: visually (by periodic photography of the wound site), through the quantitative determination of inflammatory cytokine gene expression by the mouse host, through the quantitative determination of virulence factor gene expression by the pathogen, and histologic staining and microscopic analysis of wound tissue. These forms of analysis will serve as the basis for determining whether allicin is effective at controlling wound infection and, if so, to perhaps yield important clues about the mechanism by which it operates. These clues may be useful in designing more effective control on wound infection in the future.

COST-EFFECTIVE SURVEILLANCE AND CONTROL STRATEGIES AGAINST THE EMERALD ASH BORER THREAT IN NORTH AMERICA
Eyyüb Y. Kıbış and İ. Esra Büyüktahtakın
Department of Industrial and Manufacturing Engineering, Wichita State University

The emerald ash borer (EAB), a pest of ash trees native to Asia, has been a threat to North America. More than 20 million ash trees have been killed since the beginning of the infestation, and thousands of them have been removed to slow down its impact. According to the USDA, EAB infestation represents a potential $60 billion loss to the U.S. economy. It is forecasted that the infestation has the potential to spread over all of North America by 2030, which can result in killing hundreds of millions of ash trees. Considering the fact that the Greater Kansas City area has more than 4.5 million ash trees and has been a confirmed EAB infestation area since 2012, further spread of the EAB may have a huge impact on the Kansas economy and environment. In this study, our objective is to maximize the net benefits of the ash trees on a given landscape by applying surveillance to the ash population, followed by treatment or removal of trees based on their infestation level. Specifically, we propose a new multistage stochastic programming model, which will allow us to consider all possible scenarios for surveillance, treatment, and removal decisions over a planning horizon to control the EAB invasion. Due to the model's complexity and state-of-the-art nature, we use a special-scenario reduction algorithm to reduce the size of the model. Results provide insights into surveillance and control policies, and provide an optimal strategy to minimize EAB infestation with a limited budget allocation.

PREVALENCE OF URINARY INCONTINENCE IN HIGH SCHOOL AND MIDDLE SCHOOL-AGED FEMALE ATHLETES
Amy McAfee, Cortni Smith, Ashley Kelsey, Maggie Pihl, Elissa Westbrooke, and Jennifer Celso
Department of Physical Therapy, Wichita State University

The purpose of this study was to determine the prevalence of urinary incontinence (UI) in middle school and high school female athletes in order to investigate the need for preventative education in the future. Additional topics of study were whether or not these athletes have ever received training in pelvic floor strengthening exercises and the impact of this issue on quality of life. Data was collected from 49 subjects via surveys including the ICIQ-FLUTS questionnaire and one created by investigators. Among 49 athletes, 27 young women (55.1%) reported urinary leakage. The mean age was 15.6 ($\pm$ 1.3) years of the total participants and 15.6 ($\pm$ 1.1) years for those that reported leakage. Of the 49 participants, Out of those reporting leakage (27), 17 (63.0 %) reported feeling embarrassed, 4 (14.8%) reported feeling afraid, and 5 (18.5%) reported feeling bad about themselves. Among the young athletes that reported UI, 55.6% reported no previous education on the performance of pelvic floor exercises (Kegels) in order to prevent the occurrence of UI. The results of this study indicate a prevalence of UI in middle school and high school female athletes, and that this has a negative effect on their quality of life causing them to feel embarrassed, afraid, and bad about themselves. Due to the young age of these athletes and the lack of education on pelvic floor exercises (i.e Kegels), a preventative education program should be developed in order to enhance the quality of life of this population.

SkyNet: A SWARMING DRONE SYSTEM FOR SMART DISASTER MANAGEMENT

Telakapalli Abhignan and Pu Wang

Department of Electrical Engineering and Computer Science, Wichita State University

Communication technologies play an important role in the case of disaster management to propagate and convey information to the concerned authorities. In October 2015, Southern Kansas suffered **forty two** earthquakes of magnitude 2.5 M_L, representing 17% of earthquakes world-wide in that month. With this, we need accelerated efforts to develop a robust and well-defined disaster management communication system to avoid loss of life in Kansans. In addition to educating the populous in general, we must take advantage of modern technologies to create an emergency communications framework to alert people of potential risks and hazards and to help first responders initiate fast and efficient search and rescue efforts. More specifically, in the case of a disaster, mobile communications may not function due to potential damage to the provider infrastructure. However, people in the disaster areas still need to use internet based applications such as WhatsApp, Facebook, Internet Explorer, etc. to receive the latest information and contact friends and family members. Moreover, the first responders need to exploit Cloud Computing applications, e.g., facial recognition, google map, and infrastructure health assessment, to perform efficient and effective rescue operations. Networks for these applications can be easily established with mobile hotspots because of their flexible and minimal infrastructure. In our project we will design and develop an intelligent swarming drone system to provide mobile Wi-Fi hotspots to critical places where rescue is most needed. These drone swarms will automatically form an aerial wireless mesh network and provide high-speed Wi-Fi networking services over a large geographic area to provide the best information needed in an emergency.

OSTEOHISTOLOGY OF *NIBRARASAURUS COLEII*
Thomas Buskuskie and Laura Wilson
Department of Geosciences, Fort Hays State University

Osteohistology has become a powerful tool in determining the metabolism and life histories of many extinct species. However, few studies have investigated the osteohistology and ontogeny of nodosaurids due to the fragmentary, isolated nature of many nodosaur fossils. This study presents new research into the bone histology and ontogeny of nodosaurids by examining two specimens of *Niobrarasaurus coleii* (Dinosauria: Nodosauridae) from the Late Cretaceous Smoky Hill Chalk of Kansas. The holotype, FHSM VP-14855, is represented by four nearly complete limbs, most of the pelvic girdle, and numerous associated osteoderms. The second specimen, FHSM VP-13985, consists of only the right radius and ulna of an individual half the size of the type. Previous studies consider FHSM VP-13985 a juvenile *N. coleii* based solely on size and overall similarity to the holotype. The right radius and ulna from both specimens were selected for this study. All the elements possess longitudinal vascular canals except for the FHSM VP-13985 ulna, which also has radial canals in the cortex. The FHSM VP-14855 radius and ulna possess primary osteons as well as secondary osteons and a highly cancellous medullary region. The FHSM VP-13985 elements do not have any secondary osteons, but also have a cancellous medullary region. None of the sectioned elements display any evidence of an external fundamental system (EFS), indicating they were not skeletally mature individuals. Comparison of the two specimens' osteohistology supports previous claims that FHSM VP-13985 is a juvenile with FHSM VP-14855 being a more skeletally mature individual.

A STRATIGRAPHIC DESCRIPTION OF CAMBRIAN-PENNSYLVANIAN DEPOSITS USING GEOPHYSICAL WELL LOGS – WELL CUTTING ANALYSIS
Andrew Christiano and Hendratta Ali
Department of Geosciences, Fort Hays State University

Drill cuttings were obtained from an oil producing well logged between the depths of 3150' MD to 3875' MD. The well was drilled as a Wildcat well in Section 28, Township 12S, Range 19W, in Ellis County, near the city of Hays, KS. The targeted producing unit was the Lansing Kansas City Group, mostly composed of carbonates and interbedded shales and silts. 725 feet of cuttings and associated well logs were analyzed for this well in this study, to characterize the lithologic and porosity characteristics of the interval. Total porosity was computed from the density and neutron porosity logs, and porosity types were determined from well cutting analysis. Results were used to interpret the environment of deposition and the paleo environmental conditions for the stratigraphic sequence. A disconformity identified between the Marmaton Group and underlying Arbuckle Group suggest sub-aerial erosion of absent rock layers. The highest porosity values correlate with intervals with shaly silt units. These are interpreted to be due to shale effects as high shale or gas content mimics high porosity values. Fracturing is likely the cause of the high porosity and may have resulted from tectonic forces during the Central Kansas Uplift. High gamma ray readings are associated with relatively thin intervals, including the Heebner Shale unit. XRD and XRF analysis was done to confirm mineralogical and elemental composition. Limestones and carbonate units mostly show secondary porosity from fracturing, dissolution, and intercrystalline porosity. Cutting observations show high amounts of pyritic and magnetic minerals associated with hydrocarbon zones.

QUALITIES AND STRATEGIES OF FORT HAYS STATE UNIVERSITY PEER MENTORS
Cory Keehn and Brent Goertzen
Department of Leadership Studies, Fort Hays State University

Peer mentoring is a multifaceted role with intricate relationships with mentees. Fort Hays State University learning communities provided a unique case study about the strategies and behaviors of peer mentors in a formal role. This study was designed to help peer mentors shift from informal peers to collegial peers. Throughout the interview process, many themes emerged that provide helpful glimpses into the complexity of a mentor and a mentee's relationship. Some of those themes were: the significance of a peer mentor's transparency with the mentees, the amount of time spent with learning community students, how that time was spent (informally or formally) and how the title "peer mentor" creates a barrier between mentors and mentees. This study also provides suggestions for improving peer mentoring relationships within learning communities. The peer mentoring relationship is tremendously complex. This case study is a useful informational and educational tool for future peer mentors and learning community coordinators. It will help bridge the gap between being an informational peer to being a collegial peer. In turn, the richness of the relationship between peer mentor and mentee will increase drastically.

ORGANISMAL COMPOSITION AND PHOTOSYNTHETIC TRAITS OF BIOLOGICAL SOIL CRUSTS IN PRARIE ECOSYSTEMS OF THE GREAT PLAINS
Brendon McCampbell and Brian Maricle
Department of Biological Sciences, Fort Hays State University

Biological soil crusts (BSCs) are soil-surface microecosystems composed of a close association of algae, cyanobacteria, fungi, lichens, and non-vascular plants with soil particles. BSCs have several ecological functions including carbon fixation, nitrogen fixation, nutrient relations, soil stabilization, water relations, and floral community development, which make them extremely important in the dryland ecosystems where they occur. While BSCs have been studied throughout the American West, little work has been done in the Great Plains region where they are less prominent among the dominant vascular plant communities. This novel study examined organismal and photosynthetic traits of BSCs in four ecosystems within the Great Plains—sand sage, short grass, mixed grass, and tall grass prairies. To document the BSCs, seasonal photosynthesis measurements were performed in the field and samples were collected for lab analysis. The BSCs primarily consisted of lichens, bryophytes, and cyanobacteria with lichens being dominant in all ecosystems and an increasing bryophyte presence in the wetter and cooler ecosystems. Heterocystic (nitrogen-fixing) and non-heterocystic cyanobacteria were present in lichens at all sites, which contribute to soil nitrogen content. Photosynthesis rates varied between sites and seasons, ranging from 1.08 to 3.31 μmol CO_2 m^{-2} s^{-1}, that were generally correlated with precipitation and temperature. Not only does this research provide more knowledge about BSCs, especially those in prairie ecosystems, but it could lead to the use of BSCs in ecological restoration and rangeland management practices for their roles in nutrient addition, water relations, and soil stabilization.

ISOLATION OF SOIL *BACILLUS* (spp) WITH INHIBITORY EFFECTS ON METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Kaitlin Moore and Eric Gillock
Department of Biological Sciences, Fort Hays State University

The overuse of antibiotics in both human medicine and agriculture has contributed greatly to the crisis we experience today. In the United States alone, at least 2 million people acquire resistant infections with approximately 23,000 of these cases resulting in death each year. MRSA infection, in otherwise healthy individuals, affects the superficial skin and soft tissues, though more serious infections can arise, affecting the deep soft tissues, blood and bone. MRSA is able to avoid the body's immune system through production of biofilm as well as certain toxins. These virulence factors, in combination with multidrug resistance, result in high morbidity and mortality rates. One of the first studies, published in 1904, to detail the effect of soil organisms on pathogens reported the inhibition and death of pathogens as a result of saprophytes. Several soil organisms found to have inhibitory effects on a range of pathogens have since been reported. The most common antagonistic soil organisms can be divided into four major genera, including the spore-forming genus, *Bacillus.* A protocol for the isolation of soil *Bacillus* spp was followed after which the samples were screened against a nonpathogenic control strain of *S. aureus*. Those isolates producing zones of inhibition were selected for purification. These pure cultures were then tested against two MRSA strains. Determinative bacteriology techniques were employed to further characterize those isolates with significant inhibitory activity against *S. aureus*. The most promising isolates were identified by 16S rRNA sequencing. Spent media analysis is currently in progress.

MIND, BODY AND MINDFULNESS
S Anandavalli
Department of Psychology and Counseling, Pittsburg State University

Modern lifestyle has condemned many of us to lead stressful lives, contributing to significant rise in chronic fatigue, hypertension, coronary heart disease and other debilitating conditions. In this context, it is imperative that we identify and practice strategies that aid us to become more aware of our physiological and emotional responses to stress and the damage it does to our mind and body. Mindfulness is an increasingly popular strategy that guide us to stay more focused in the present moment and pay careful attention to what happens in and around us. This strategy, evidenced by neuroimaging techniques and significant behavior improvement in U.S veterans with posttraumatic stress disorder, children with attention deficit hyperactivity disorder, adults with personality disorders and others with maladaptive behaviors, helps individuals manage their stress responses better and heals already incurred damage to our brain and body. My poster presents research supporting mindfulness and simple strategies that can be integrated into our busy lives to make giant leaps in our overall well-being.

GORILLAS STAND UP FOR WORKING
Christian Bedore and Cheryl Giefer
School of Nursing, Pittsburg State University

This project involved the introduction of the workplace trend, ergonomically-designed sit-stand desks (SSDs). Research in this area has concluded that for optimal health people should sit less and move more. Studies indicate the negative effects of prolonged sitting cannot be negated even by an hour of physical activity each day. Prolonged sitting time has been identified as a health risk factor and musculoskeletal discomforts (MSDs) are report by 60% of office workers. SSDs allow office workers to alternate between sitting and standing throughout the working day. Therefore, the intention of this study was to indirectly affect the health and wellbeing of participants through quantitatively evaluating the before and after musculoskeletal discomforts in the neck, shoulder, back, arms, and legs in those using. The project began through distribution of 16 SSDs around the campus of Pittsburg State University. A MSD pre-survey was completed with a post-survey to be completed after an 8-week trial. SSDs will then be redistributed to another 16 participants; the data acquisition will be repeated. The study was guided by a research team consisting of two graduate students in nursing and three undergraduate students from nursing, biology, and accounting. Preliminary results from the pilot study *Gorillas Stand Up for Working* are favorable to the subjects' perceived sense of wellness as well as a decrease in MSDs.

CRITICAL THINKING ASSESSMENT OF PHYSICAL THERAPIST ASSISTANT STUDENTS IN KANSAS

Trudy Hansen and Jeanea Lambeth
Department of Technology and Workforce Learning, Pittsburg State University

Critical thinking is at the core of the Kansas Career Fields Cluster Model, "Foundation Knowledge and Skills." Business and industry within health science fields desire to have employees with critical thinking skills and knowledge, the educational system is currently tasked with equipping health science students with critical thinking skills within a Career and Technical Education (CTE) program. This study examined the validity and reliability of the PTA-CPI (Clinical Performance Instrument) when measuring a Physical Therapist Assistant (PTA) student's critical thinking skills. This study also focused upon critical thinking skills assessment for PTA students within the state of Kansas. In this study, PTA students are evaluated by the Clinical Instructor (CI) who uses a subjective tool called the Clinical Performance Instrument (CPI). Within this evaluation tool, criteria #7 titled Problem Solving rates the student's critical thinking skills while the CI rates the student's performance during a clinical rotation. The PTA-CPI is the available tool used to assess a students' clinical problem solving abilities. This is a unified instrument and the validity is based on how an individual CI subjectively rates a PTA student following a descriptive outline of essential skills. This qualitative study obtained a collection of data from local Cis through interviews and open ended questioning. Based upon the data collected, the researcher concluded that there is a need for PTA students' critical thinking to be assessed in a defined, systematic, and concise manner for the state of Kansas.

NEW MULTI-FUNCTIONAL NANOCERIA FOR THE TREATMENT OF LUNG CANCER

Shoukath Sulthana[1], Tuhina Banerjee[1], Jyothi Kallu[1], and Santimukul Santra[1,2]
[1]Department of Chemistry, Pittsburg State University; [2]Kansas Polymer Research Center, Pittsburg State University

Cancer continues to be one of the leading cause of the death worldwide. Among all other lung cancers, Non-Small-Cell Lung Cancer (NSCLC) is a major cause of death amongst smokers. According to NIH, all together 1,665,540 new cases of cancer and 585,720 deaths were reported in the year 2015. By 2016, further increase in new cancer cases and deaths are estimated in the US. Statistics itself reflects the inadequacy of the current treatment options. However, absence of specificity, multidrug resistance and severe side effect often impose serious limitations to the existing therapies. Therefore, development of new and more effective therapies remains essential and challenging. Recently nanotechnology has introduced novel avenues for the diagnosis and personalized treatment options for cancer. Among many nanomaterials, cerium oxide nanoparticles (nanoceria, NC) are excellent material due to unique antioxidant property and showed promising anti-tumor activity when incubated with cancer cells. This presentation would discuss the synthesis of novel polyacrylic acid-coated functional NC for the targeted diagnosis and treatment of lung cancers. Our tiny nanoceria (D = 57 nm) plays an important role for the successful internalization into cancer cells. In this project, we introduced a new combination therapy for the timely diagnosis and simultaneous delivery of two therapeutic drugs, doxorubicin and Hsp90 inhibitor ganetespib, for the effective treatment of NSCLC. Nanoceria surface was decorated with folic acid to target folate-receptor over-expressing A549 lung cancer cells. Drugs-encapsulating NC-based nanotheranostics have showed more than 80% cell death within 24 h of incubation. Detailed experimental results including cytotoxicity, controlled drug release, fluorescence microscopy, ROS and apoptosis will be discussed in this presentation.

A CROSS CULTURAL COMPARISON OF VISUAL IMAGES WITHIN ALZHEIMER'S CARE FACILITY WEBSITES

Elizabeth A. Spencer and Alicia Mason

Department of Communication, Pittsburg State University

Currently an estimated 44 million people are living with dementia worldwide. The World Health Organization reports the 60+ years of age worldwide population will more than triple between 2000 and 2050 to 2 billion. This study sought to examine the visual images within Alzheimer's care facility websites and used a cross cultural comparison to contrast differences in patient representations and treatment options. The goal of this study was to analyze differences in representations of Alzheimer's patients, their caregivers, and the visual representations of their abilities and physical surroundings. Website images were coded by the researchers, assessing sex, ethnicity, depiction of care for patient and/or physician and surrounding environment. A series of tests were computed on the variables of WHO (World Health Organization) geographic region and patient sex, care provider sex, care provider professional role and patient representations (receiving care/treatment, interacting with other patients, with family, alone/isolated). Analysis indicated Alzheimer's centers in the Southeast Asia and Western Pacific regions significantly varied their patient representations as they more frequently provide a variety of multicultural patients' imagery. These areas were also more likely to use visual imagery that show patients interacting with others around them, opposed to being alone and isolated which was more characteristic of facility representations in African and Eastern Mediterranean regions. Over 30 percent of the websites in American and European regions utilized external pictures of the buildings and facilities as the dominant image to attract clients. An emerging phenomenon is Western patients receiving long-term dementia care in foreign countries.

NOTES:

Index of Presenters

For more information, please contact:

Fort Hays State University
Tim Crowley, Fort Hays State University, 600 Park Street, Hays, KS 67601.
http://www.fhsu.edu/gradschl/

Kansas State University
Carol Shanklin, Kansas State University, 103 Fairchild Hall, Manhattan, KS,
(785) 532-6191. www.ksu.edu/grad

Pittsburg State University
Pawan Kahol, 112 Russ Hall, 1701 South Broadway, Pittsburg, KS 66762.
http://www.pittstate.edu/office/graduate/

University of Kansas
Michael Roberts, The University of Kansas, 213 Strong Hall, 1450 Jayhawk
Blvd., Lawrence, KS 66045-7535, (785) 864-8040. www.graduate.ku.edu

University of Kansas Medical Center
Michael J. Werle, The University of Kansas Medical Center, MSN 1040, 3901
Rainbow Blvd, Kansas City, KS 66160, (913) 588-7491.
http://www.kumc.edu/academic-affairs/graduate-studies.html

Wichita State University
Kerry Wilks, Wichita State University, 107 Jardine Hall, 1845 Fairmount,
Wichita, KS 67260-0004, (316) 978-3095. www.wichita.edu/gradschool

Or visit: http://webs.wichita.edu/cgrs/