Developing Scholars Program

The opportunity to conduct research is an invaluable tool to the Developing Scholar. Through DSP students are transformed as they slowly embark on a voyage towards higher learning. What will emerge are individuals, educated, and ready to face the world, knowing that they are capable and ready.

-Jaime A Tobon
Second-Year Scholar

10th Annual Research Poster Symposium

K-State Union Ballroom
Sunday, April 18, 2010
2:00 pm - 4:00 pm

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Note:
We wish to acknowledge the efforts of the many unnamed research team members who also contribute to the knowledge and mentoring of our undergraduate scholars. For the complete list of collaborators, please view the posters.

Emma Del Real
Senior, Psychology, Biology

A. Lorena Passarelli
Associate Professor, Biology

Role of Post-translational Modifications of a Viral Fibroblast Growth Factor on Virulence

Baculoviruses are enveloped viruses, containing a large, circular and double-stranded DNA genome. Most baculovirus genomes encode a viral fibroblast growth factor (vfgf) that is homologous to cellular fibroblast growth factors (fgfs) found in both invertebrate and vertebrate organisms. FGFs exhibit a wide range of functions that include a role as mitogens and motogens involved in neural cell differentiation, osteogenesis, angiogenesis, or limb formation. The vFGF of the Bombyx mori nucleopolyhedrovirus (BmNPV) is N-glycosylated and readily secreted. On the other hand, the vFGF of Autographa californica MNPV (AcMNPV) is not N-glycosylated. We have constructed recombinant viruses where the N-glycosylation sites of the BmNPV fgf are altered and N-glycosylation sites were introduced into the AcMNPV fgf to compare their infectivity. This will allow us to establish a relationship between N-glycosylation of vfgfs and viral infectivity.

Honors/Leadership: Multicultural Student Honor Society; Bridges to the Future; Cancer Research Awards (2008--2010); McNair Scholars; Sigma Lambda Beta Latino/a Immigrant Scholarship; McNair Heartland Research Conference; HALO; United Multicultural Women; BELLAS (Benefitting the Education of Latinas in Leadership and Service); LULAC (League of United Latin American Citizens); Bilingual: English/Spanish

Adam White
Freshman, Physics

Brett D. DePaola
Professor, Physics

Interaction between a Train of Femtosecond Pulses and an Atomic Ladder System

A single laser pulse is coherently shaped to supply a train of femtosecond laser pulses to a cloud of cold rubidium (Rb) atoms, which serves as a convenient test case for the coherent excitation of a three-level system (ground state, and two excitation states). By varying how the pulse is shaped, we can control the time between the pulses in the train, and the pulse-to-pulse phase jump in the train. We then measure the transfer of electron population between the three states, to see if it matches theoretical values, that we calculate beforehand. We show that shaping the pulse in regards to coherence heavily impacts the maximum electron populations in any of the orbital states at a given time. Such information is useful in experiments with artificial photosynthesis, and even has potential use in medical spectroscopy. Also, research such as this may become relevant in the future of computing (i.e. quantum computers).

Michelle Foster
Freshman, Political Science, Women's Studies, Minor: Leadership Studies

Tonya Gonzalez
Assistant Professor, English

Representation of Latino Masculinity in Popular Culture

We are examining contemporary media (particularly fiction and television comedies) to determine the variety of representations of Latino masculinity in the U.S. The purpose of this research is to see the different levels of Latino masculinty represented in contemporary media. In order to accomplish this, we collected data and analyzed the following texts: *The Buddha Book* by Abraham Rodriguez, *Ugly Betty*, *George Lopez Show*, and *Modern Family*. This information will allow us to formulate a more well- rounded conceptualization of masculinity, which will help challenge Latino stereotypes still prevalent in society.

Honors/Leadership: National Society of Collegiate Scholars; Phi Eta Sigma; Edgerley-Franklin Urban Leadership Scholars; Multicultural Harmony Week; Community Service Week; Rake N' Run; MLK Day of Service; Smurthwaite Leadership/ Scholarship House; Black Student Union; Hands-on Leaders Program; Union Program Council

L. Jeanette Aldana
Senior, Life Sciences, Pre-Medicine, Minor-Leadership Studies

Jeremy Marshall
Assistant Professor, Entomology

The genetics of egg-laying induction in a cricket

Chemosensory proteins (CSPs) are proteins that are involved in transporting signals from cell to cell or tissue to tissue within insects. The ability of males to induce females to lay eggs in the cricket Allonemobius socius is thought to involve one such CSP, called FSK. This protein is hypothesized to be a female- specific protein in the female reproductive tract that transports a signal from the male ejaculate to the female ovaries – thus initiating egg-laying. To evaluate this, mating trials were staged, females were allowed to lay eggs, female reproductive tracts were dissected out, protein gels were run, and the relationship between the abundance of FSK and egg-laying was evaluated. Results show that this particular CSP is part of the genetic pathway underlying successful egg-laying induction in the female cricket. Given this finding, this particular CSP could provide insights into better mechanisms for controlling insect populations.

Honors/Leadership: Bridges to the Future; Multicultural Student Honor Society, Hill's Pet Nutrition Scholar; HALO, United Multicultural Women

Eduardo Alvarado
Sophomore, Philosophy/Economics

Donald Saucier
Associate Professor, Psychology

Effects of Song Lyrics on Affect and Cognitions

Research has shown that different types of music elicit different cognitive and affective reactions. After a previous study found which attitudes and behaviors were generally associated with Christmas (religious and secular), Patriotic, and Children's songs, the current study sought to find which thoughts and feelings these songs elicited. Participants were primed by completing partial lyrics to three songs from only one category and afterwards they reported the extent to which they experienced thoughts or feelings from a list developed from an earlier pilot study we conducted. Results showed contrasting patterns of thoughts and feelings when comparing Christmas and Children's songs to Patriotic songs, the former being generally more about joy, caring and youth while the latter concerned sacrifice, boldness and pride. These findings may assist in finding the mechanisms through which attitudes and behaviors are affected by the songs.

Honors/Leadership: Phi Beta Kappa; Sigma Alpha Lambda Leadership and Honors; Kansas City Hispanic Scholarship; Rake N' Run; Multilingual: Spanish/Italian/English

Caroline Fulton
Freshman, Animal Science, Pre-Veterinary Medicine

Maria Soledad Ferrer
Clinical Assistant Professor, Clinical Sciences

Changes in Body Weight in Lactating Alpacas

Changes in body weight occur during lactation in all species as a result in changes in energy balance. However, body weight in lactating alpacas has not been described. The objective of this study was to characterize changes in body weight occurring in lactating alpacas. Our hypothesis was that alpacas loose body weight as lactation progresses due to an increase in energy demands to support lactation and the nursing cria. Five alpacas were used in this study. Alpacas were kept in groups in paddocks and fed hay ad libitum and grain. Alpacas were weighed using an electronic scale. Weight was evaluated weekly starting at birth for up to 242 days. Correlation between body weight (lb) and time (days post-partum) was evaluated using regression analysis. It was found that body weight was not correlated with time ($p = 0.0991$). Alpacas lost or gained weight as lactation progressed, but not in any distinct pattern. In conclusion, changes in body weight do not occur in lactating alpacas under the management conditions of this study.

Honors/Leadership:Hill's Pet Nutrition Scholars; Midwest Exchange Scholarship; Louis A. Ernst Scholarship; College of Agronomy Scholarship; Volunteer at Animal Shelter; Member of Students for Environmental Action

April Hostetler
Freshman, Milling Science & Management

Hulya Dogan
Assistant Professor, Grain Science & Industry

Phase/State Behavior of Wheat Kernels in Relation to Their Milling Performance

The suitability of wheat grains for milling varies widely depending on a number of factors such as kernel morphology, endosperm texture and composition. The purpose of this research is to study fracture behavior of different classes of wheat using uniaxial compression (texture analyzer). Six classes of wheat were used: Durum, Soft White Winter (SWW), Soft Red Winter (SRW), Hard Red Spring (HRS), Hard Red Winter (HRW) and Hard White Winter (HWW).

Texture measurements were performed with a TA.XT2i Texture analyzer (Texture Technologies Corp., Scarsdale, NY), equipped with 50 kg load cells and a 25 mm cylindrical probe. Uniaxial compression was applied at a test speed of 0.1 mm/sec and strain level of 50%. Data were collected at 100 points per second (pps) using the Texture Exceed Expert (TEE) software. Resulting force-distance curves were used for the evaluation of textural parameters.

The following parameters were analyzed from the obtained force-deformation curves: Gradient (g/mm) is the slope of the linear portion of the force-deformation curve, which is the measure of the elasticity of a material. Fracture force (g) corresponds to the maximum force attained just before the sudden catastrophic failure of the test sample. Fracture force is a measure of kernel hardness. Area (g.mm) is the total area under the force-distance curve and expresses the total energy required to compress a sample to the desired deformation level. This is a measure of sample thoroughness.

Honors/Leadership: Milling Club; Agri-Women; Veseky Scholarship

Elizabeth Trevino
Senior, Life Science/ Pre-Optometry

Mark Louis S. Weiss
Professor, Anatomy & Physiology

Characterization of Human Umbilical Cord Mesenchymal Stromal Cells

Since bone marrow was first described as a source for fibroblasts, it was noted that individual colonies, derived from the expansion of single cells, could be found when the cells were plated at low cell density. Thus, the frequency of colony- forming unit- fibroblast (CFU-F) have been thought to index the number of stem-like cells in a bone marrow aspirate. Our lab has been studying the properties of mesenchymal stromal cells derived from the Wharton's jelly of the umbilical cord (WJCs). Our lab and another lab in Canada reported that WJC isolates contain a higher frequency of CFU-Fs than other sources of stromal cells such as the bone marrow. I have been examining the variables of cell plating density, oxygen conditions in culture and other variables to determine how we can maintain or enrich WJCs for the stem-like cells. I also plan on establishing a standard operating procedure to evaluate proliferation rate to determine if there is any correlation between rapid proliferation and CFU-F frequency. Our hypothesis is that there would be a positive correlation such that a condition that produces faster proliferation would have higher CFU-F frequencies. The literature is sketchy in this area. Ultimately, our goal is to create conditions that promote high proliferation rate and maintain the stem –like cell population indicated by high CFU-F frequency. Through this work we made a couple of surprising findings. First, we found a difference between cryopreserved and fresh cells in terms of their growth rate in different oxygen concentrations. The cyropreserved cells, when thawed and grown, grew better under lower oxygen (5%), and the fresh cells grew faster in 21% oxygen (room air). We hope to determine the optimal expansion conditions for both fresh and cryopreserved WJCs since this basic information will enable the clinical translation of WJCs. Along with this we observed different densities (1000, 500, 100, passages and oxygen concentrations to determine which would give us the optimal CFU-F. In our findings we determined low oxygen levels, lower densities and lower passages produced higher CFU-F.

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Hill's Pet Nutrition Scholar; Kansas State University Research Forum presenter; American GI Forum National Youth Chair; National Council of La Raza presenter; Rake N' Run; Bilingual: Spanish/English

Caleb Wurth
Freshman, Milling Science & Management; Feed Science & Management

Adam Fahrenholz
Graduate Assistant: Grain Science & Industry

Leland McKinney
Assistant Professor, Grain Science & Industry

Method Matters

Ground grain particle size analysis is a key component to the feed industry that is commonly misunderstood. The analysis of particle size (dgw) and standard deviation (Sgw) is a principal component when determining ground grain contracts between feed mills and customers. However, a single method of particle size analysis is yet to be popularly accepted. There are many components that go into the procedure of particle size analysis including the use of flow agents, sieving time, the type of sieve shaker used, and the use of sieve agitators, such as brushes and balls, during the test. The procedure used by individual customers, laboratories, and mills throughout the country varies greatly due to lack of information on the effect sieving procedure has on Sgw and dgw results. The American Society of Agricultural and Biological Engineers (ASABE) has tested the use of synthetic amorphous precipitated silica (Sipernat® 22-S) and concluded that the use of this agent produces a mean particle size that is approximately 80 microns smaller than a test lacking this agent. With the exception of this aspect of the analysis process, there has been little work done evaluating the effect of procedural variances on the log-normal granule size distribution curve.

For the experiment, a singular sample of ground corn was randomly split into equal 100g samples and analyzed using differing methods within the accepted Standard Methods of particle size analysis (ASAE S319.4). The variables compared were: ten minute sieve time vs. fifteen minute sieve time, using brushes on all sieves vs. using no brushes, and using the Tyler Ro-Tap sieving machine vs. the Retsch Vibratory Shaker. The data collected appears to demonstrate that sieving method is the greatest variant in particle size analysis, and that using different methods within the accepted standard yield drastically different results. By manipulating the method, one can adjust dgw by up to 196 microns, a large amount in consideration of grain flow ability and nutritional value. This data supports the need for the standardization of a single method of particle size analysis. Standardizing the method will stabilize the ground grain contracting industry, and help level the field between small and large-scale production facilities.

Honors/Leadership: Midwest Student Exchange Scholarship, Memorial Scholarship; Cargill Project IMPACT Scholarship; Grain Science Discretionary Fund Scholarship; Hills Pet Nutrition Scholar; Cargill Horizon Milling Scholarship; Internship- Paragon Investments Inc., Cargill Horizon Milling; Pi Kappa Alpha Interfraternity Council; Feed Science Club; Ag Council; MANRRS; "The Importance of Defining the Methods Used to Determine and Express Fineness of Feed Materials by Sieving," *Feed Management Magazine* January 2010

Dalila Del Real
Junior, Life Sciences

Lei Wang
Research Assistant Professor, Anatomy & Physiology

A New Therapeutic Target for Malignant Gliomas

Gliomas are the most common primary cancer tumors in adults. Their invasive growth patterns have been resistant to treatments such as surgery, radiation and chemotherapy. Gliomas are comprised of cells exhibiting uncontrollable growth in the brain. The ineffectiveness of modern treatments is due to glioma stem cells (GSC's). Unlike glioma cells, GSC's have the ability to self-renew and are responsible for reoccurrence. Interleukin (IL) -1, IL-6, IL-8 are proinflammatory cytokines that are produced in excess by gliomas as well in other tumors and stimulate tumor growth through tumor invasion, angiogenesis and anti-apoptosis properties. Our hypothesis is GSC's attain resistance to treatments and invasion by excess generation of cytokines. To test we compared gene expression of human glioma cells in serum containing medium (SCM) to GSC's in serum free medium (SFM). Gene expression of cytokines IL-1β, IL-6, IL-8 and invasive protein, smad interacting protein 1 (SIP1) are all upregulated in SFM as well as increased expression of Nestin, a neural stem cell marker. The concordance between IL-1β, IL-6, IL8 and SIP1 is being studied. Results suggest that IL-1B, IL-6, IL-8 have an important role in glioma stem cell growth and they could be therapeutic targets for gliomas.

Honors/Leadership: Bridges to the Future awardee; Bilingual: Spanish/English

Dakota Chambers
Sophomore, Biology

Laura Armbrust
Associate Professor, Clinical Sciences

Radiographic Abnormalities in Geriatric Screening of Dogs and Cats Introduction/Purpose

Introduction/Purpose : In dogs, the term senior or geriatric typically refers to those animals that are 7-10 years of age and older, although this varies somewhat with size/breed. In cats, the terms are used for animals 11-15 years of age or older. Geriatric screening tests provide a means of early treatment in the hopes of curing or slowing the progression of disease. The veterinary literature is devoid of information regarding thoracic radiographs as a screening method. The main goal of this study was to determine the incidence of disease detected on thoracic radiographs in dogs and cats undergoing geriatric screening.
Methods: Review of medical records of all dogs and cats undergoing geriatric screening from May 2005-September 2009. Data entry into a spreadsheet included: Case History/Physical exam abnormalities by species/breed, age/sex, and results of screening tests: Radiograph, CBC, serum chemistry, T4, and UA results. Thoracic radiographs were reviewed as well as literature searches and pertinent readings.
Results: The results of the typical geriatric patient physical exam included incidental findings of dental disease, skin masses, iris atrophy, osteoarthritis, and occasional heart murmurs. Seventy-six dogs ranging in age from 6-16 years and 27 cats ranging in age from 7-20 were included. Significant abnormalities were identified on thoracic radiographs in 5 out of 76 dogs and 3 out of 27 cats. In dogs, thoracic abnormalities included collapsing trachea (1), cardiomegaly (2), bronchitis/chronic airway disease (2). In cats, abnormalities included cardiomegaly (3).
Conclusion: By evaluating medical records and reviewing thoracic radiographs it was concluded that approximately 7% of senior/geriatric dogs and 11% of senior/geriatric cats had significant abnormalities on thoracic radiographs. This provided information that was useful in the management of these cases.

Honors/Leadership: Women's Studies Presentation; Sociology Presentation; Mittens for Many

Perla Salazar
Senior, Mathematics

Marianne Korten
Professor, Mathematics

Charles N. Moore
Professor, Mathematics

Similarity Solutions to a Degenerate Parabolic Equation used in Image Restoration

We are working with explicit similarity solutions of the degenerate parabolic equation used in image restoration as well as in several physical situations, such as turbulent infiltration in porous media and glaciology. More specifically we have focused on the special case where M=0 and N=0. Our explicit similarity solutions are of the form $u(|x|,t)=\frac{1}{|x|}(p-qt)$ and $u(|x|,t)=\frac{1}{|x|}(a\,t-b)$. We are focused on looking for explicit solutions because they are computable, they can be graphed, and can be used, via comparison theorems, to estimate the behavior of solutions which may not be explicitly computable.

Honors/Leadership: Bridges to the Future; Bilingual: Spanish/English

Nidia Ortega
Senior, Life Sciences, Psychology, Pre-Medicine

Max Lu
Associate Professor, Geography

Correlation of Cancer Incidences and Presence of Pollution in Proximal Regions

Statistical data will be collected and analyzed to compare the frequency of cancer incidences in Southwest Kansas regions proximal to areas with high pollution rates. Pollution rates will be determined using the EPA government database, and this will be compared to cancer incidence rates in that area. The health effects of each specific pollutant will be taken into consideration. Data will be used to determine whether the presence of high emissions of pollutants is positively correlated to cancer incidences in proximal areas.

Honors/Leadership:Bridges to the Future; Phi Kappa Phi Honor Society; Golden Key Honor Society; Multicultural Student Honor Society; Red Cross Club; Licensed Practical Nurse; Bilingual: English/Spanish

David Villanueva
Junior, Biology, Pre-Medicine

Stefan H. Bossmann
Professor, Chemistry

A New Approach to Photodynamic Therapy

The second leading cause of death in the United States, after heart disease, is cancer in general. Over 500,000 cancer-related deaths occur per year according to the Centers for Disease Control and Prevention (1). Photodynamic therapy of cancer involves using a drug called a photosensitizer and light of particular wavelengths. When exposed to the specific light, photosensitizers produce a form of reactive oxygen that kills nearby cells (2). Protoporphyrin IX is a widely used photosensitizer for photodynamic therapy. Aminolevulinc (ALA) acid is readily taken up by the mitochondria, which converts it to protoporphyrin IX (3). The major problem of this approach is that ALA is not readily taken up by cancer cells . Fortunately, ALA can be modified to be taken up selectively by cancer cells by synthesizing D-glucose esters of ALA (4). The uptake of 2- or 6-glucose ester significantly increases the uptake of ALA by cancer cells. I am working on this eight-step synthesis starting from ALA and glucose. Our goal is to monitor the uptake of glucosylated ALA in B16F10 melanoma cell cultures and mixed cultures of B16F10 melanoma cells and murine epithelial cells and its conversion to protoporphyrin IX via fluorescence microscopy using the emission from protoporpyrin IX. Our new approach to photodynamic therapy will allow the treatment of deep tumors, which cannot be reached using classic light sources.

References

(1) http://www.cdc.gov/cancer/

(2) http://www.cancer.gov/cancertopics/factsheet/Therapy/photodynamic

(3) Qian Peng, Trond Warloe, Kristian Berg, Johan Moan, Magne Kongshaug, Karl-Erik Giercksky, Jahn M. Nesland, 5-Aminolevulinic acid-based photodynamic therapy
Clinical research and future, Cancer, 2000, 70 (12), 2282-2308.

(4) Ramakrishnan Vallinayagam, Frédéric Schmitt, Jérome Barge, Georges Wagnieres, Virginie Wenger, Reinhard Neier and Lucienne Juillerat-Jeanneret, Glycoside Esters of 5-Aminolevulinic Acid for Photodynamic Therapy of Cancer, Bioconjugate Chemistry, 2008, 19 (4), 821-839.

Honors/Leadership: Golden Key International Honor Society; LULAC Scholarship: Internships: Organic Synthesis of Photosensitizers; Rake N' Run; LULAC; HALO: Bilingual: Spanish/English

Alejandro De Luna
Junior, Pre-Construction Science & Management

Alberto J. Ribas
Instructor, Architectural Engineering & Construction Science

Cost Effectiveness of Leadership in Energy and Environmental Design (LEED) Certification

Abstract: Concerns exist on whether pursuing LEED certification is a cost effective method of design and construction. In order to explore this issue, we will gather information from past studies and compare it to our estimate of the Varney Mills Rogers Burnett project. We will compare these results to the sought Gold LEED Certification of the School of Leadership Studies and present ideas on how the project could have been cost effective.

Honors/Leadership: Joey Lee Garmon Social Justice Scholarship; Memorial Scholarship; AFROTC Scholarship; LEED- ASC Region IV Competition; Latino Immigrant Scholarship; Sigma Lambda Beta President; Associated General Contractors, Co-Webmaster; HALO; MEP; AFROTC Commendation Award; Wonder Workshop, Bilingual: Spanish/English

Blake Franklin
Freshman, Business Administration

Esther Swilley
Assistant Professor, Marketing

3-D Websites

Three-dimensional website technology is now available for retailers to use. Our research seeks to understand if consumers will accept this new technology. We are testing the usefulness and acceptance of a 3-D website. By using the Technology Acceptance Model, we hope to understand the relationship between the usefulness, the ease of use, aesthetics, fun/enjoyment, attitudes and the intention to use a 3-D retail website. An online survey is being conducted to explain these relationships.

Honors/Leadership: Housing Leadership Scholarship; Opportunity Scholarship; Memorial Scholarship

Jasmine Taylor
Freshman, Animal Science & Industry, Pre -Veterinary Medicine

Karie A. Vander Werf
Graduate Masters Medical Science, Medical Resident Year 2, Veterinary Medicine Teaching Hospital

Elizabeth Davis
Associate Professor and Section Head, Equine Medicine & Surgery

Does cryotherapy, used as a preventative strategy for equine laminitis, cause pain?

Cryotherapy is the use of low temperatures for medical therapy and is commonly used in humans for the treatment of soft tissue injuries. Equine laminitis is a painful inflammatory disease that affects the sensitive laminar tissue in the equine hoof capsule.

Conditions that can lead to the development of laminitis include endotoxemia associated with bacterial challenge, grain overload or exposure to toxic compounds in black walnut shavings. Support limb laminitis can occur following serious injury to the opposite limb. Although the exact pathogenesis of laminitis remains to be fully elucidated, a currently accepted method of prophylactic therapy involves lower limb cryotherapy. The purpose of this investigation was to determine if lower limb cryotherapy causes pain in horses.

Treatments included empty boots, paper or ice fill. A randomized cross-over design was utilized. Scoring was performed to assess attitude, appetite, and physical well being. Hoof capsule temperature measurement was performed while in and out of boots. Assessment of the influence of therapy was performed using an approved scoring system, serum cortisol and plasma substance P measurements.

Horses tolerated ice boot application regardless of fill material, including cryotherapy. Limb temperature was reduced following ice application. Elevated substance P values were observed following ice application. Cryotherapy should be reserved for high risk individuals, based on the potential for discomfort associated with therapy.

Honors/Leadership: Hill's Pet Nutrition Scholar; UPC Executive Board; Black Student Union; Volunteer at the Animal Shelter; Blood Drive; Rake N' Run; POIZE.; Bilingual: English / Spanish

Jimmie Stewart
Junior, Biology, Pre-Medicine

Bruce Schultz
Professor, Anatomy & Physiology

Fernando P Alves
Senior Scientist, Anatomy & Physiology

CFTR Expression is Required for Maintenance of Male Reproductive Duct Structures

Cystic fibrosis, a genetic disorder caused by mutations in an anion channel, CFTR, is associated with absence of the vas deferens in virtually all patients. However, mice that are genetically altered with the same CFTR mutations retain normal reproductive duct structure and are fertile. The purpose of this project was to determine whether pigs harboring CFTR mutations exhibited reproductive duct anomalies. Data were collected by obtaining and sectioning whole reproductive ducts from CFTR affected piglets and their non-affected litter mates. Sections were stained and photographed to examine and measure the reproductive duct architecture in each of the genotypes. Ducts from some pigs harboring mutant CFTR displayed blind ends, thin epithelial layers and absence of the vas deferens. Typical architecture was observed in all specimens acquired from unaffected littermates. Results indicate that the reproductive pathology in pigs expressing mutant CFTR is consistent with outcomes observed in cystic fibrosis patients.

[Supported by the National Institutes of Health R01 HD058398]

Honors/Leadership: Cancer Research Award; Phi Theta Kappa Honor Society; Bridges to the Future; K-State Memorial Scholarship; Sigma Lambda Beta Community Service Chair; Wonder Workshop

Kale Lothamer
Freshman, Animal Science & Industry , Pre-Veterinary Studies

Katherine Stenske
Clinical Assistant Professor, Clinical Sciences

Ludek Zurek
Associate Professor, Entomology

Surveillance of Enterococcus Contamination in Small Animal Hospital Environments in Kansas

Proper cleaning of surfaces and equipment in veterinary hospitals is important to minimize the spread of infection between patients. This study was designed to estimate the prevalence of bacterial contamination on 4 surfaces from 10 small animal veterinary hospitals in Kansas. This surveillance program included 3 announced visits at each hospital, 4 months apart, spanning the summer, fall, and spring. Swabs of each, a cage door, stethoscope, thermometer, and mouth gag were collected in phosphate buffered saline, and dilutions plated onto non-selective and selective media for enterics and enterococci. Species-specific PCR and sodA gene sequencing were used to identify enterococci. Antibiotic susceptibility was assessed using the disc diffusion method.

Enterococci were isolated from cage doors (7/10 hospitals), stethoscopes (7/10 hospitals), thermometers (4/10 hospitals), and mouth gags (1/10 hospitals), while enterics were rare. Enterococcal contamination was not consistent; only one hospital had substantial contamination at all three visits. Enterococcal isolates selected for further analysis (n=192) were mainly represented by E. faecium (40%), E. hirae (33%), and E. faecalis (23%). Enterococcus faecium were frequently resistant to enrofloxacin (79%), erythromycin (78%), ampicillin (77%), doxycycline (22%), nitrofurantoin (21%), and gentamicin (12%), while other enterococcal species were mostly susceptible to all nine antibiotics.

Contamination with multi-drug resistant enterococci is a concern and may increase risk of hospital-acquired infections. Cleaning cage doors, stethoscopes, and thermometers between patients and allowing 10-minute disinfectant contact time on surfaces is recommended to reduce bacterial contamination.

Honors/Leadership: Hill's Pet Nutrition Scholar; Baeten Farm Scholarship; Fairchild Scholarship; Rake N' Run; Spooktacular; Harvesters of KC, Missouri; Cats for Cans; Shoes 2 Share

Kristina Bigelow
Sophomore, Biology/ Pre-Medicine, Chemistry

Annelise Nguyen
Assistant Professor, Diagnostic Medicine Pathobiology

Disruption of Nedd4 and Connexin by Gap Junction Enhancers in Breast Cancer Cells

Breast cancer is the second most common cancer among women; it is also the second leading cause of cancer death among women in the United States. Progress in understanding the disease and developing therapies has been slow. Cancer cells exhibit many defects in cell communication that contribute to the loss of tissue homeostasis (excess cell proliferation, invasion, and metastasis). Most normal cells have functional gap junctional intercellular communication (GJIC), while most, if not all, tumor cells have dysfunctional GJIC. GJIC consists of connexin proteins, which mediate the direct passage of small molecules from one cell to the next. Previous studies have been shown that gap junctions are involved in tumor formation and progression. It is believed that restoring GJIC is linked to drug sensitivity and reduction of tumorigenicity. Thus, increasing gap junction activity or enhancing GJIC in tumor cells provides the targets to enhance anti-neoplastic therapies. Recently, we synthesized a new class of substituted quinolines (code name: PQ) and found that they possess potent inhibitory activities against T47D breast cancer cells (IC50 value of PQ1 is 119 nM) through the enhancement of GJIC. Since the mechanism of action of GJIC enhancement caused by PQ is unknown, the current study is to determine the target proteins that PQ interacts with, which may lead to the mechanism of enhancement of GJIC and inhibition of cancer cell growth. Using surface plasmon resonance (SPR) spectroscopy, we have found that PQ1 has a strong binding with Nedd4, an E3 ubiquitin ligase. Interestingly, others have shown that Nedd4 activates the degradation of gap junction. The approach was to use immunoprecipitation assay. T47D breast cancer cells were treated with various concentrations of PQ1 for 24 hours. Whole cell extract was isolated and subjected to an antibody of interest (Nedd4 or connexin), followed by western blot analysis. The results show that 100 nM PQ1 can cause a 2-fold decrease in the interaction of Nedd4 and connexin 46 compared to control without treatment or solvent alone. Since gap junction turnover has been shown to be facilitated by lysosomal and proteasomal degradation, disruption of Nedd4 and connexin 46 suggests that PQ1 may inhibit the lysosomal and proteasomal degradation of connexin 46 in breast cancer cells. Future study will focus on whether PQ causes an increase in gap junction activity via inhibition of Nedd4-ubiquination of connexin.

Honors/Leadership: Target on Excellence presenter; Hill's Pet Nutrition Scholar; Rake N' Run; Fair Trade Marketplace

Matthew James
Senior, Economics, Graduate Masters, Industrial Engineering

Todd Easton
Associate Professor, Industrial Engineering

Movements of an Infection through a Rural Environment

This multiyear project has developed a computer simulation that models the spread of infectious diseases in rural Kansas. To date, the majority of the research on the spread of infectious diseases focuses on heavily populated urban areas. This simulation can act as a guide for all rural areas and, more importantly, test the impact of various mitigation strategies that governmental agencies could impose. Computational results show that limiting the number of contacts is far more effective than reducing the rate that a disease spreads. That is, reducing the number of distinct individuals that a person comes in contact with is a more effective strategy than decreasing the rate of transmission between individuals.

Honors/Leadership: University Honor's Program; Multicultural Student Honor Society; Golden Key International Honor Society; Presidential Scholarship; NACME Associate Scholarship; Engineering, National Merit Scholarship; Hammel Scholarship; Internships: EnVisage Consulting; Multicultural Engineering Program; Institute of Industrial Engineers; Student Center; Sigma Phi Epsilon; Engineering College Council; SCTE Committee; Rec Expansion Committee; Outstanding Freshman in Industrial Engineering; K-State Wrestling Club; Rake N' Run

Curtis McClain III
Senior, Kinesiology

Thomas Barstow
Professor & Coordinator, Kinesiology

The Effects of Work Rate on Heart Rate Variability

Introduction: Heart rate variability is measured as the time between R wave intervals of the QRS complex of an ECG tracing, called the R-R interval. Heart rate variability describes the fluctuation in the interval between consecutive heart beats. It is known that heart rate variability is an indicator of withdrawal/activation of sympathetic and parasympathetic nervous systems. These autonomic nervous systems influence these beat-to-beat changes in heart rate. For example, the withdrawal of parasympathetic influence and an increased level of sympathetic activation lead to increases in heart rate, which is associated with reduced heart rate variability. Purpose: The purpose of this research is to determine if heart rate variability decreases with increasing exercise intensity. Methods: 10 subjects performed incremental exercise to maximum on a treadmill. A time-domain evaluation of R-R intervals was used to determine heart rate variability over the last 30 seconds of each exercise intensity. Heart rate variability was then plotted as a function of time, %VO2 max, and mean heart rate. Anticipated Results: In theory, as the intensity of the work rate increases, heart rate variability should decrease. As the intensity increases, sympathetic nerve activation increases, causing an increase in heart rate which should decrease the variability in R-R intervals.

Honors/Leadership: Bridges to the Future; Life Fitness Center Practicum; Kinesiology Student Association

Marcus Bragg
Freshman, Industrial Engineering

Eric Higgins
Professor/Head, Finance

The Great Depression versus The Great Recession

The current recession has caused country-wide panic. People are even going as far as to say that our current recessionary state is comparable to that of the Great Depression. This project will take an in-depth look at this claim's validity, by examining the unemployment rates during these time periods, the index of business activity, export/import rates, amongst other economic determining factors. Based upon the data, results will be drawn to determine whether our current recession mirrors, or falls short of, the Great Depression.

Honors/Leadership: Big XII Outstanding Freshman of the Year; Student Alumni Board, Multicultural Ambassador

Victor Salazar
Senior, Mechanical Engineering

Jose Chavira
Junior, Mechanical Engineering

Warren N. White
Associate Professor, Mechanical & Nuclear Engineering

Non-Linear Control of Underactuated Mechanical Systems

We use underactuated mechanical systems in our daily lives. Two researchers, Dr. Warren White from the mechanical and nuclear engineering department at Kansas State University and Dr. Mikil Foss from the mathematics department at the University of Nebraska have used their National Science Fund sponsored research to develop a new method that yields control laws for such systems that out-perform and even work where previous techniques have failed. They have presented a control method for stabilization based on the Lyapunov stability theory. An inverted pendulum cart in conjunction with the ball and beam will be used to showcase this technique. In this work sponsored by the Developing Scholar's Program (DSP), we have conceptualized, designed, and begun to build and test such a cart using previous findings from NSF-sponsored work to control this novel device.

Honors/Leadership (Victor): General Motors Engineering Excellence Award 2009-2010; Multicultural Engineering Program; Society of Hispanic Professional Engineers; Society of Automotive Engineers; Rake N' Run; Bilingual: Spanish/ English

Honors/Leadership (Jose): Bilingual: English/Spanish

Priscilla De Los Santos
Sophomore, Animal Science & Industry/ Pre-Veterinary Studies

Kristopher S. Silver
Fellow, Clinical Sciences

Effects of Non-Steroidal Anti-Inflammatory Drugs on Calpain 4 Expression in the Horse Gastrointestinal Tract

This project focuses on identifying novel mechanisms of toxicity of non-steroidal anti-inflammatory drugs (NSAIDs) on gastrointestinal tract (GI) epithelia. One way NSAIDs may cause toxicity is by inhibiting wound healing in GI epithelia. Our laboratory has shown that NSAIDs inhibit cell migration, an important process in wound healing. Furthermore, we have also demonstrated that NSAIDs decrease expression of a group of proteases called calpains that play an integral role in cell migration. Therefore, my research project involved measuring protein expression of Calpain 4 in the stomach, small intestine, cecum, and large colon in the horse GI tract using standard protein gel electrophoresis and western blot procedures. I compared the protein expression of control tissues from horses that have not been treated with any NSAIDs, to tissues from horses that have been treated with the ulcerogenic NSAID, phenylbutazone. Our results suggest that NSAIDs decreased calpain 4 protein expression.

Honors/Leadership: Hill's Pet Nutrition Scholar; Bilingual: English/Spanish

Victoria Fort
Junior, Public Health Nutrition

Brian L. Lindshield
Assistant Professor, Human Nutrition

Five Alpha-Reductase Inhibitors for Prostate Tumor Reduction

Background: Five alpha-reductase (5AR) is an enzyme in the prostate that converts testosterone into the more potent androgen, dihydrotestosterone (DHT). DHT production is important in stimulating prostate tumor growth. The objectives of this study are to determine whether two 5AR inhibitors, Finasteride and Dutasteride, will decrease prostate tumor growth and 5AR activity in athymic mice, and to determine whether timing of administration of either drug is critical to treatment.
Methods: Sixty athymic mice were fed control diet for one week prior to being randomized into five study groups (Control, Post-Finasteride, Pre-Finasteride, Post-Dutasteride, and Pre-Dutasteride). The mice were fed their study diet for one to two weeks prior to tumor implantation. Three weeks after tumor implantation the post diet groups started their study diets. Food intake, body weights, and tumor growth are being measured weekly.

Honors/Leadership: United Black Voices

T'Keiyah Bell
Freshman, Chemistry, Pre-Medicine

Stefan H. Bossmann
Professor, Chemistry

The Synthesis of Polymers

The phase transition behavior of PNIPAM in aqueous solution has been widely investigated by calorimetric, and spectroscopic techniques. An interesting feature common to other thermosensitive polymers lies in the possibility of tuning the LCST by incorporating co-monomers with variable degree of hydrophilicity, as well as weakly ionizing co-monomers. Increasing or decreasing the hydrophilic content of a copolymer will result in an increase or decrease of PNIPAM's LCST, respectively. Therefore, polymerizing N-isopropylacrylamide (NIPAM) with weakly ionizable commoners allows to obtain intelligent polymers capable of responding to both temperature and pH variations; interestingly, owing to the variation of their degree of ionization with pH, systems with pH dependent LCST are obtained. We will investigate these polymer mixtures as potential vehicles for drug transport to cancerous tissues. Polymers bearing carboxylic acid functional group such as polyacrylic acid, are pH sensitive, as they adopt a coiled conformation in solutions of lower pH, where the carboxylic acid groups are protonated, and an extended conformation in solutions of high pH where the negatively charged carboxylates undergo strong electrostatic repulsion. Consequently, pH and temperature of aqueous solutions for spin-casting of P(NIPAM-co-AA) polymers are very important parameters that had to be closely observed to achieve reproducibility of the spin-casting experiments reported here. In the work reported here we synthesized a series of copolymers of N-isopropylacrylamide with the co-monomer acrylic acid) and investigated the influence of both temperature and pH on their solution behavior. These polymers will be linked to the anticancer drug SN-38 by means of a linker that can be hydrolyzed by a carboxylesterase.

Honors/Leadership: Denison Scholarship

William Rand
Senior, Pre-Professional Architectural Engineering

Raphael A. Yunk
Associate Professor, Architectural Engineering & Construction Science

New Building, New Tricks: Green Buildings in Manhattan and Kansas City

In recent times, there has been a greater concern towards constructing buildings that are energy efficient and reduce carbon emissions, in other words, "green buildings." In my project, I will be working with Ray Yunk, a LEED certified professional in studying various "green buildings" in the Manhattan, KS and Kansas City area, including the new Leadership Studies building on campus based on their Leadership in Energy and Environmental Design (LEED) certification ratings. LEED certification is a way of rating a building's energy efficiency based on the various features implemented into the construction of the building. These implementations include water recycling, using geothermal heating/cooling and using daylight in order to reduce energy usage. We will be comparing the LEED certification point distribution among the buildings throughout different certification levels. We will also be interviewing a designer of one of the buildings in order to better understand the design of one of the buildings, that is, how it incorporates the environment around it into its design. Finally, we will compare the benefits of the buildings by presenting their energy efficiency. This project will increase public awareness of green buildings and energy efficiency, hopefully leading to healthier habits and smarter energy consumption.

Honors/Leadership: Rake N' Run

Stephanie De Spain
Freshman, Business Administration

Olivia P. Collins
Assistant Professor, School of Leadership Studies

Nonprofit Life Stage Assessment and Its Relationship to Organization Sustainability

This project focuses on understanding the developmental model and critical sustainability of nonprofit organizations. The project also focuses on the documentation of the growth and development of nonprofit organizations. This project uses "Five Life Stages of Nonprofit Organizations," written by Judith Sharken Simon as an assessment to better understand a nonprofit organization's status and helps recognize areas of potential improvements. I will be working closely with Jennifer Bixby, who is the North East Kansas and North West Missouri Membership Manager of The Girl Scouts nonprofit organization. The project will include administering the "Nonprofit Life Stage Assessment" to Jennifer Bixby and the volunteer leaders of the Girl Scouts organization located in Manhattan, KS. After the assessment results are compiled, I will be helping these members of the organization to implement any changes that may be relevant to the future of the organization. I will work with the organization members to find ideas for these improvements and changes as well although it is understood that suggestions and applied thoughts to improve the organization's structure and status can only go so far. I plan to continue to work with the members of the organization to see these results in action.

Honors/Leadership: Latinos of Tomorrow, Hispanic Chamber of Commerce

Ariel Anib
Junior, Criminology, International Studies, Pre-Law. Minor: Spanish & Leadership Studies

Roy L. Barnett
Instructor, Sociology, Anthropology & Social Work

Who Gets Death?: Understanding the Characteristics and Individual Case Factors of Death Row Inmates in Texas

This study examines the characteristics of death row inmates in Texas and the factors involved in each inmate's capital offense case. A continuation from the previous year's research, the objective of our research this year is to look for specific racial and/or social correlates related to being sentenced to death. In order to accomplish our objective of analyzing death row inmates on a case-by-case basis, we created a database of Texas death row inmates sentenced from 1998 to 2009. In the database we indentify factors such as: education, prior occupation, previous record, age/race of victim, number of victims, and gender for each sentenced offender. We also noted the presence of certain offenses -- specific factors such as aggravating and mitigating circumstances of the case and the offender's relation to the victim. Our results point to a lack of fairness of who gets the death penalty based on racial differences, social characteristics, and case-specific variables.

Honors/Leadership: Academic Honors; Housing Leadership Scholarship; Internships: International Service Team in Mexico; Student Senate Governmental Relations Committee; Leadership Ambassadors; Student Foundation; Wildcat Warm-Up Counselor; Bilingual: English / Spanish

Oscar Rodriguez
Freshman, Engineering Technology

Leslie A. Kinsler
Professor, Engineering Technology

Applications of Speech Recognition in Common Software

The purpose of this research is to investigate the current usage of speech recognition software and the implementation requirements into today's commonly used computer platforms and other software. This research utilizes both the Microsoft Windows® and Linux® platforms along with commonly used speech recognition software. An evaluation of each speech recognition program will be based on four points: ease of installation, ease of configuration, ability to interface with various software applications, and the advantages gained over the standard methods of information input.

Honors/Leadership: Elite Scholarship; Edgerley-Franklin Urban Leadership Scholarship; SIFE 2009 Competition Presentation; Rake n Run; 1st DSP Scholar, K-State Salina; Bilingual: Spanish/ English

Christopher Sanders
Junior, Landscape Architecture, Graduate Masters: Landscape Architecture

Stephanie A Rolley
Professor/Head - Landscape Architecture/Regional & Community Planning

Mapping Kansas State University's Form: Influences of the Presidents

This digital mapping project presents a comprehensive historical mapping of Kansas State University from 1863 through the present. The purpose is to illustrate the impact of the university's presidents on development of the campus. K-State began as an agricultural school and evolved into a suburban academic community. This project traces that history.

The maps are created in ArcGIS using current campus maps and historical references to determine the layout of the campus throughout its history. Hand drawn maps created by Lori Tolliver, MLA '96, are used as a primary reference to compose the digital maps of all campus buildings and roads. Map layers illustrate the major eras of presidential impacts.

The map helps users understand the factors that have influenced the form of the Kansas State University campus and its sense of place. Viewed in chronological sequence, one can see the evolution of the campus' physical form as well as the influence of different administrations. Users may select the date in time they wish to see and all buildings and campus roads will be displayed accurately. A multi-year project, map development during 2009-2010 includes greater detail and animation.

Honors/Leadership: National Wild Turkey Federation; Rake N' Run; Trapshooting Club, President-elect; National Trapshooting Championships, San Antonio, '10; KSU Competitive Shooting Squad, Accepted into Masters of Landscape Architecture Program

Karmen Harris
Junior, Industrial Engineering

Noel Schulz
Professor, Electrical and Computer Engineering

Wind Energy in Kansas: Not Just a Bunch of Hot Air

Wind is a form of renewable energy that is not being sufficiently recognized by Kansas communities as an applicable alternative energy source. It is important for people to understand the potential use of wind energy in Kansas and how wind farms can be integrated into the community or as separate generating sources. Research was done to evaluate likely locations where the use of wind energy within the state would be the most beneficial. Software developed by the Department of Energy was used to look at various types of locations, turbines, land elevations, and the economic feasibility for wind energy. To develop and make use of a survey, Institutional Review Board (IRB) training was utilized as well. Future work will involve a survey of participants at the Kansas State University open house to determine public perception and impediments for wind energy in Kansas. Based on the evaluations, materials will be developed to promote wind energy. If more people can become educated about the feasibility and value of this renewable energy source, then Kansas can make a significant difference in creating an environmentally conscious energy plan.

Honors/Leadership: Bosco Achievement/Leadership Scholarship; Housing Leadership Award; NAACP Book Scholarship; NACME Scholar; White Industrial Engineering Scholarship; Tillman Scholarship; Hwang Memorial Scholarship; Memorial Scholarship; Student Opportunities and Awards Committee; Kansas State University Marching Band; Women in Engineering and Science Program; Women Mentoring Women; Multicultural Engineering Program; Institute of Industrial Engineers; Cargill Summer Bridge Scholar; James R. Coffman Award of Excellence of Excellence; Rake N' Run; CATS for Cans; Bag Lady Luncheon

Edlin Ortiz
Junior, Life Sciences

Dingbo Lin
Research Assistant Professor, Human Nutrition

The Use of Wolfberry to Fight Against Age-Related Macular Degeneration

This research involves the study of phytochemicals in fruits that can contribute to the body's health. The fruit being focused on is the Wolfberry from China due to its high levels of antioxidants. The health problem currently researched is Age-Related Macular Degeneration (AMD) with the use of ARPE-19 cells. AMD is a disease that develops as age increases in the macular area of the eye causing a person to lose the ability to see clearly. The main focus in this study is comparing how effective Wolfberry is against oxidative stress in these cells.

Honors/Leadership: Bridges to the Future awardee; Bilingual: Spanish/ English

Morgan Franklin
Junior, Management, Pre-Law

Donita Whitney- Bammerlin
Instructor, Business Management

Examining Best Practices in the Development of a Public Relations Campaign for Sportsmanship at Kansas State University

Our project is a survey of Big XII Schools and an investigation of several Division I schools across the United States to examine what tools exist to enable university athletic departments to leverage their public relations in a way that promotes sportsmanship and ethical behavior. We plan to report our findings to a leadership team at the K-State Athletic Department. The aim of the project is to introduce Kansas State University to a new outlook on sportsmanship. With the guidance of Kansas State University's Athletic Director and other representatives of the department, we will create a model for schools across the nation. It is the goal of this project to improve the sportsmanship and ethical behavior within the collegiate sports arena at this university. Kansas State University is a leader in many ways and would benefit from national recognition as a leader in ethical sportsmanship. In this project, we will be developing posters, flyers, videos, and other promotional material related to the advocacy of ethical behavior at all Kansas State sporting events. As we improve the behavior of the great fans of this university, it is our hope that such behavior should influence others who support their schools. Kansas State will thus become a model for the rest of the nation and maybe other nations. Such improvements will also enhance the family style atmosphere Kansas State takes pride in. People of all ages and all backgrounds should expect to enjoy a very entertaining and quality athletic event when in attendance at Kansas State Athletic events. Whether you are attending in support of Kansas State University, or the opposing school, it is important that you feel comfortable and welcome in our facilities as well as in our town. If we create a culture of friendly and respectful fans, students, faculty, and support staff, these behaviors will resonate for future generations. Our slogan , Kansas State Represents. "WILDCAT PRIDE. SPORTSMANSHIP COINCIDE." truly embodies what it is this project stands for.

Honors/Leadership: National Society of Collegiate Scholars; Blue Key Chester E. Peters Student Development Scholarship; Internships: Vector Marketing Management Candidate, Premiere Sports Management; KSU Board of Publications; Developing Scholars

Alejandro Estrada
Senior, Life Sciences/ Pre-Chiropractic Medicine

Stephen K. Chapes
Professor, Biology

Testing for Drosophila melanogaster genes involved in Ehrlichia chaffeensis infections

Ehrlichia chaffeensis is an obligate intracellular bacterium, which will only grow in live cells. Individuals are infected with E. chaffeensis when bitten by ticks (generally Amblyomma americanum) carrying the bacteria. The disease caused by infection with E. chaffeensis is called human monocytic ehrlichiosis. Infected individuals may experience headaches, muscle aches, fever, chills, and/or nausea. If not treated with care, it may cause neurological side effects or death. Several Drosophila genes were identified in a microarray study that were up-regulated after infection of Drosophila S2 cells with E. chaffeensis. We hypothesized that adult Drosophila, which are mutant for the genes identified in the microarray, may display altered survival compared to wild-type flies. In our current study, E. chaffeensis was injected into flies that are mutant for genes hook-like and CG17293. Survival of the flies was monitored for 120 hours post infection. By testing genetically altered D. melanogaster, we can gain an understanding of the genes which are necessary for bacterial replication. Since the Drosophila innate immune system has many vertebrate homologs, the information we obtain from our fly studies is readily useable in animal systems and relevant to human medicine.

This project has been supported by KSU Developing Scholars Program, NIH grants AI55052, AI052206, RR16475, and RR17686; NASA grants NAG2-1274, American Heart Association Grant 0950036G the Kansas Agriculture Experiment Station, and the Terry C. Johnson Center for Basic Cancer Research.

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

Anthony Garcia
Senior, Kinesiology

Timothy I. Musch
Professor, Kinesiology

Are Aging and Heart Failure Similar Syndromes of Sympathetic Dysregulation?

The sympathetic nervous system plays a critical role in the regulation of physiological homeostasis under basal conditions and in response to acute stressors. Both heart failure (HF) and aging alter the basal regulation of sympathetic nerve discharge (SND). An estimated 4.8 million Americans have HF and the aged are at an especially high risk of developing this condition; however, the effect of combined aging and HF on SND regulation to acute stress is not known. Hyperthermia is an environmental stressor that produces marked activation of SND in young rats. In the present study we tested the hypothesis that aging and HF are not similar syndromes of sympathetic nervous system dysregulation and predicted differences in SND responses to acute heating in young HF compared with aged HF rats, and in aged HF compared with aged non-HF rats. Anesthetized young (3-6 months) and aged (24-25 months) F344 rats received either a myocardial infarction (MI) or a sham infarction. Heating experiments were completed in anesthetized rats after the MI or the sham procedure. HF was documented using echocardiographic techniques. Preliminary results indicate that individually both HF and aging markedly attenuate SND responses to acute heating. However, the effect of these conditions on SND regulation are not additive, as demonstrated by similar SND responses to acute heat stress in young HF, aged HF, and aged non-HF rats. These results are consistent with the hypothesis that the working strategies employed by sympathetic neural circuits to respond to acute stress are modified by advanced age and selected pathophysiological conditions. Supported by NIH HL91342.

Honors/Leadership: Multicultural Student Honor Society; Golden Key International Honor Society; Phi Kappa Phi; Dodge City Chamber of Commerce Scholarship; State of Kansas Pioneer Award; Kansas State University Alumni Association Club Scholarship; Memorial Scholarship; McNair Scholars; Rake N' Run; Mittens for Many

Vanessa Reyes
Senior, Elementary Education

Cora Cooper
Professor, Violin

Injury education for violinists and violists

It is not uncommon for all levels of violinists and violists to experience discomfort while playing their instruments. However, when discomfort turns into pain and pain turns into injury, many musicians do not, and sometimes refuse to, make the connection between playing and physical pain. The realm of musician's injuries is a relatively unexplored one, and only recently have physicians and musicians begun to work together. The purpose of this project is to educate violinist and violists about upper extremity injuries to which they are susceptible and how to prevent them. Various injuries related to playing will be identified and their locations of impact will be pinpointed on diagrams of the human body. Descriptions, diagrams, and prevention methods will be incorporated into a condensed brochure or pamphlet to be presented as an educational resource for musicians.

Honors/Leadership: Golden Key Honor Society; Multicultural Student Honor Society; Cancer Research Award (2); KSU Orchestra, Chamber Orchestra Tour, England & Scotland; Bilingual: Spanish/English

Justin Curry
Freshman, Electrical Engineering

Noel Schulz
Professor, Electrical and Computer Engineering

Understanding How Wind Turbines Work

This project involved studying wind energy and learning how the wind is turned into electrical energy. This involved learning about wind turbines and generators. The goal was to develop an understanding so I will be
able to educate people about wind turbines and demonstrate how they work. While doing background research on creating energy from the wind, I have learned about different types of turbine blades and converting mechanical energy to electrical engineering. Based on this knowledge, I have built my own wind mini-turbine which will be used to demonstrate how the motion of the wind is converted through a generator to electrical energy. Since this turbine will be designed to show others how wind turbines work, it will allow people to see what is actually going on inside the turbine. This not only allows others to learn about wind turbines, but allowed me to learn as well by putting into practice the knowledge that I have obtained via my research.

Jaime Arreola
Sophomore, Pre-Psychology

Brenda McDaniel
Assistant Professor, Psychology

Examining Flow and Cortisol in Intimate Relationships After Conflict and "Happy Times"

Flow is characterized by optimal experience, immersion, and deep enjoyment (Csikszentmihalyi, 1990). While several studies have examined flow in athletes (e.g., Chavez, 2008; Russell, 2001; Schuler & Brunner 2009) and individuals involved in on-line internet activity (e.g., Chang, & Wang, 2008; Chen, Wigand, & Nilan, 2000; Shin, 2006), less is known about intimate relationship flow. Within intimate couples, Graham (2008) found relationship flow was associated with increased positive evaluation of the relationship. Further, Saxbe & Repetti (2010) found that couples in close proximity to each other (i.e., a shared environment) experience coregulation in cortisol levels or cortisol attunement.

The present study builds on previous flow and cortisol research by examining cortisol recovery levels and the experience of flow in intimate couples discussing a recurring, heated conflict and discussing "happy times" within their relationship. It was hypothesized that the experience of relationship flow during a "happy times" discussion would be associated with greater relationships satisfaction and cortisol recovery attunement after conflict.

Participants in this study included 18 heterosexual dating couples between the ages of 18 and 49, with a majority being 19 years of age (M = 21.58, SD = 5.42) and Caucasian (N = 31; 86.1%). In addition to three cortisol samples (baseline, post conflict discussion, and post "happy times" discussion), self-report measures of relationship satisfaction, interpersonal closeness, and the experience of relationship flow were collected. Results supported the present hypothesis and implications of these findings will be discussed.

Honors/Leadership: Bridges to the Future; Bilingual: Spanish/English

Stefani McCluney
Senior, Psychology, Family Studies & Human Services, Minor: American Ethnic Studies

Briana S. Nelson-Goff
Professor, Family Studies & Human Services

Effects of trauma and deployment on military couples: What helps them to sustain and be resilient to the war and/or deployment cycles?

Research with couples who have experienced previous traumatic events indicate both positive and negative effects on the couple relationship. The current study seeks to address how soldiers and their spouses are impacted by war-trauma, specifically addressing the following research question: In what ways is couple-functioning affected when there is a history of war-related trauma?

The current study includes interviews with Army soldiers who have served in Iraq or Afghanistan and their spouses. The couples interviewed in the current study have demonstrated negative effects of war-related trauma, including: problems communicating, verbal misunderstandings, role confusion, and distancing in the relationship. Other participants reported that the deployment experience has had a positive effect on their couple relationship, because it has strengthened their relationship. Some have grown spiritually, and they share a greater appreciation for each other. The current study also will review various factors reported by military couples who have endured war deployment, particularly relationship satisfaction, individual and couple resiliency, and couple support.

Honors/Leadership: Bridges to the Future; Multicultural Student Recruitment; Rake N' Run; Mittens for Many; Food for the Community.

Derrik Wiggins
Sophomore, Open Options

Farrell Webb
Associate Professor, Family Studies and Human Services

Custodial Fathers

In the early 20th century, a divorce often ended with the children placed in the care of the father. By the mid-century, custody was granted primarily to mothers and this arrangement became the norm due to largely changing attitudes, women's suffrage, and the belief that women were more adapted to care and nurturing. Although there are a small number of men who are granted custody, the number remains far behind that of custodial mothers. The purpose of this research is to examine the trends and factors that can influence custodial fatherhood. We also examine the racial aspect of custodial fatherhood in an attempt to unearth the mythology of the absent African-American father. The research has been two-fold. On one hand, we examined the literature on African-American fatherhood to discover what the prevailing ideas around African-American fatherhood were. We found that in the case of unwed African-American couples, a father's custody is sometimes gained through mutual choice with the mother rather than by law. Fathers are less likely to receive child support; however, the standard of living for the children is still slightly higher than with single custodial mothers. Once we examined the literature, we then used official census data to determine what are the trends in custodial fatherhood. We examined custodial fatherhood by race and used employment trends as a co-factor. Our preliminary findings reveal that there are some links between fatherhood choices and employability. Further investigations are pending.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholarship; Multicultural Student Honor Society; Joey Lee Garmon Social Justice Scholarship; International Service Teams; Residence Assistant; Orientation Leader; Rake N' Run; Boys and Girls Club of America; Bilingual: English/Japanese

Evgeniy Shiskin
Junior, Chemical Engineering

Takashi Ito
Assistant Professor, Chemistry

Chemically-selective deposition of metal nanoparticles on horizontally-oriented nanoscale structures.

This project aimed to systematically investigate the adsorption behavior of gold nanoparticles on thin films having nanoscale template structures on their surface. Understanding of the adsorption behavior will permit us to selectively deposit nanoparticles on specific nanoscale area(s), and thus provide a simple means for developing unique electronic devices and chemical sensors. For the last one year, we investigated adsorption of COOH-terminated gold nanoparticles on chemically-distinct nanoscale domains derived from cylinder-forming polystyrene-poly(methylmethacrylate) diblock copolymer (PS-b-PMMA). Thin films of PS-b-PMMA (ca. 30 nm thick) on silicon surface were prepared via spin-coating, and then heated at 190°C in vacuum to obtain horizontally-oriented cylindrical PMMA domains having diameters of ca. 20 nm in PS matrix. Chemical etching of the PMMA domains via UV irradiation provided 20-nm-wide trenches covered with COOH groups, which reflected the structures of the original PMMA domains. COOH-terminated gold nanoparticles (8 nm in diameter), which were synthesized by Prof. Aakeroy's group (Department of Chemistry, KSU), were deposited from aqueous solutions having different compositions. The nanoscale structures of the film surface and nanoparticles adsorbed on the film were measured using atomic force microscope (AFM). In KCl solutions of neutral pH, no adsorption of gold nanoparticles onto the trenches was observed, because both the nanoparticles and nanotrenches were negatively charged due to the deprotonation of the surface COOH groups and thus electrostatically repelled each other. In addition, adsorption of COOH-terminated nanoparticles was negligible in HCl solution of pH 3. Interestingly, the nanoparticles adsorbed onto the nanoscale trenches were observed in 1 mM acetate buffer (pH 6). This result may reflect a decrease in the surface charge of the nanoparticles and nanotrenches due to the strong hydrogen bond formation between the surface COOH groups and acetate in the solution.

Honors/Leadership: Target on Excellence Presenter; Highway Cleanup Volunteer; Bilingual: English/Russian; Phi Kappa Theta, Vice-President, Recruitment Chair, Scholarship Chair

Jaime Tobon
Senior, Biology

Marcelo Ramalho-Ortigao
Assistant Professor, Entomology

Analysis of dopachrome conversion enzyme mRNA expression in sand flies

Phlebotomine sand flies (Diptera:Psychodidae) are the main vectors of leishmaniasis, a multi-spectrum disease ranging from skin lesions to fatal visceral
disease. Leishmaniasis is considered a neglected disease and is present in 88
countries affecting millions of people. Although nearly 900 species of sand flies have been identified, not all sand flies are hematophagous, and more importantly not all are vectors of pathogens to humans. Interestingly, a strong relationship exists between sand flies and Leishmania such that, in nature, only certain species of sand flies are able to transmit certain species of Leishmania. Underlying causes of such specificity are not fully understood, but may be associated in part with distinct sand fly innate responses. Here we are investigating potential differences regarding melanization capacity in sand flies. Melanization (i.e., production of melanin) by insects is critical for wound healing, egg tanning, cuticular sclerotization, and immune responses against invading pathogens. Dopachrome conversion enzyme (DCE) is responsible for conversion of dopachrome, an intermediate product in the conversion of DOPA, into melanin. The conversion of dopachrome is a rate-limiting step of the melanization pathway, and DCE accelerates the reaction. DCE activity has been well characterized in mosquitoes and other insects, but it is yet to be identified in sand flies. We are assessing the levels of mRNA expression in one sand fly species, Phlebotomus papatasi. DCE expression levels from P. papatasi will be compared with those from another species, Lutzomyia longipalpis. These species display significant morphological differences regarding their color and exoskeleton hardness, which may be associated with different abilities to produce melanin. Future studies will compare DCE mRNA expression of naïve sand flies, with flies following bacterial challenge and Leishmania infection.

Honors/Leadership: Phi Theta Kappa; Phi Kappa Phi, Golden Key, Academic Honors; Target on Excellence presenter, Memorial Scholarship; Bread Basket Volunteer; Mittens for Many; Academic Decathalon; Sigma Lambda Beta International Fraternity; Pre-Dental Club; Cadaver Dissection Team; CAKSU

Jasmine Sharp
Junior, Life Sciences, Minor: French

Samantha Wisely
Assistant Professor, Biology

Biogeography of the Buff-breasted Sandpiper

Museum studies have used genetic methods on historical specimens to infer subspecies designation and patterns of geographic variations in populations. Biologists use this information to compare historical populations to contemporary ones. We can then determine changes in populations and uncover new conservation approaches. The Buff-breasted Sandpiper, Tryngites subrufficollis, lives on short grass prairies of South America in the winter and the dry tundra of the Arctic during breeding season and migrates between annually. To determine which institutions house reserved specimens of this species, we created a database to record locations and the date in which museum specimens were collected from the wild. A map was constructed from all known museum samples of Buff-breasted Sandpipers and then superimposed on their biological distribution. We did this to determine whether or not museum collections
represent the actual distribution of the species. We mapped 786 samples: 79 were from South America, 335 from the Arctic, and 372 were collected in the flyway. This study will assist scientists in sampling the near-threatened species for conservation genetic work. Having a better idea of how genetic diversity changes throughout history can assist conservation goals for the Buff-breasted Sandpiper.

Honors/Leadership: Martin Luther King Memorial Scholarship; Blue Key Scholarship; Internships; Acadia National Park Service; Emerging Leader Award, Best Essay Award from PILOTS; Rake N' Run; Wonder Workshop; Sunset Zoo Food and Mitten Drive; Bilingual: English/ French

Jose Valles
Senior, Animal Sciences and Industry/ Pre-Veteriary Studies

Daniel U. Thomson
Associate Professor, Clinical Sciences

Christopher D Reinhardt
Assistant Professor, Animal Sciences & Industry

Bilingual audiovisual technology improves dairy animal care and quality assurance.

The Beef Cattle Institute at Kansas State University (BCI) has developed bilingual educational tools based on audiovisual technology in order to improve technical knowledge within livestock operations. The Dairy Animal Care and Quality Assurance (DACQA) program is available in a package of 36 multimedia modules with a total length of 2hrs and 42 minutes of training material to train animal care givers in areas of animal health, productivity and well-being. This quality assurance program promotes the best management practices for dairy animal care and husbandry through each area of the milk production operation, including proper management of feedstuffs and nutrition; pharmaceutical usage and administration; cattle handling guidelines; identification; record keeping and animal marketing decisions. The information in the modules is presented in a simple and colloquial communication in order to assure effective transmission of information. Two of the DACQA modules (one module addressing animal health practices and one module addressing animal handling) were presented to 10 professional dairy care workers who had a preference for learning in either English (n = 7) or Spanish (n = 3); a 10-question examination with questions relating to each specific module was given before and after viewing each of the modules. Test scores improved by 28% from pre-viewing to post-viewing ($P < 0.01$; pre-viewing score = 7/10; post-viewing score = 9/10); there was no effect of module or language preference or their interaction ($P > 0.37$). These results concur with previous data we have generated which demonstrated a 25% increase in knowledge of beef quality assurance best management practices following viewing of this type of module. With the audiovisual technology available, the industry not only addresses current topics related to producing safe and wholesome dairy products, but also supports a welfare-centered and economically sustainable dairy industry.

Honors/Leadership: Bridges to the Future; James R. Coffman Award of Excellence; Hill's Pet Nutrition Scholar; Beef Cattle Symposium; Men's Soccer Club; Rake N' Run; Bilingual: Spanish/English

Miguel Aldrete
Senior, Biochemistry

Thomas Roche
Distinguished Professor, Biochemistry

Altered Short-term Regulation of Pyruvate Dehydrogenas Kinase for Ameliorating Type II Diabetes, Heart Ischemia, and Cancer Cell Growth

The multi-enzyme known as pyruvate dehydrogenase complex (PDC) that is located in mammalian mitochondria plays an important role in regulating metabolism. This massive and highly-organized enzyme complex catalyzes the decarboxylation of pyruvate to ultimately produce acetyl-CoA. The PDC reaction is a highly regulated step in carbohydrate metabolism since it leads to irreversible loss of carbohydrates. The first reaction of the overall process, the two-step E1-catalyzed reaction, is an irreversible decarboxylation step and a reductive acetylation step that is the rate limiting reaction of PDC. The irreversible and rate limiting E1 reaction is regulated in response to energy needs by being inactivated or activated by phosphorylation and dephosphoylation respectivley. This is carried out by a set of four PDC-specific kinases: PDK1, PDK2, PDK 3, and PDK4. Conversely, E1 is reactivated by two phosphorylases, PDP1 and PDP2. PDK2 itself is regulated and the focus of this study is to characterize the mechanisms of effector regulation of this kinase using normal and mutated structures. Diabetes, heart ischemia, and cancers all can create circumstances in which the up-regulation of PDC by PDK inhibition would provide beneficial results. Downregulating PDK2 with synthetic inhibitors like DCA and Nov3r shows promise in treating those diseases. For our experiments, human PDC components such as wild-type and mutant PDK2, E2, and E1 must be produced using two plasmids inserted in E. coli and selection with two antibiotics. In the case of PDK2, one plasmid codes for PDK2 and the other for two proteins that assists the folding of this kinase. The bacteria are selectively induced to over-express these proteins. The target protein is subsequently extracted and affinity purified. To date, most of my research effort has been in expressing these components. Planned research includes conducting enzyme and protein activity assays after further stages of component purification.

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

Rose Djiofack
Senior, Modern Language, Secondary Education

Spencer Wood
Assistant Professor, Sociology, Anthropology, & Social Work

The Juniper Gardens Urban Agriculture Project

The project has two main goals. The first is to implement a community-based, change-oriented urban agricultural program. The second is to assess the impact made on the health well-being of community residents. Indicators of well-being include, but are not limited to, behavioral changes in daily fruit and vegetable intake, changes in attitude and sense of responsibility for the community, enhanced power over the health decisions made in areas' households, increased civic involvement among participants, and an increase in the level of association among community residents.
This study relies on the active involvement of community resident "stakeholders" in the process of problem identification and study design. It will specifically explore whether community health behaviors change as a consequence of participation in activities associated with the urban agricultural production plot, newly developing farmer markets and food outlets, and education around food production, preparation and consumption. In addition, the study asks whether these changes are associated with changes in levels of community civicness or community trust.
The research will rely on mixed methods including a comprehensive secondary data analysis of demographic and socioeconomic trends of the area; an initial survey assessment of attitudes, outlooks, and opinions of the community; focus groups to validate the survey results; and an oral history project with a particular focus on the food narratives in people's past. To facilitate community support for the research, area youth will learn about the research by helping assist in conducting interviews, and entering and analyzing data.

Honors/Leadership: Mortar Board Volunteer; Education Symposium Volunteer; Target on Excellence presenter; BESITOS; Rake N' Run; Breadbasket Food Drive; Multilingual: French/Dshang/English/Spanish

Kathy Nguyen
Senior, Public Health Nutrition, Gerontology

Mark Haub
Associate Professor, Human Nutrition

Koushik Adhikari
Assistant Professor, Human Nutrition

Is there a link between bitterness sensitivity and type 2 diabetes in humans?

Our study focused on two SNPs (Single Nucleotide Polymorphism) present in the taste receptor gene TAS2R38 (Alanine49Proline or A49P) and peroxisome proliferator-activated receptor gamma PPARG (Proline12Alanine or P12A) genes to determine if there is a link between bitter sensitivity and propensity towards type 2 diabetes. Recent studies have shown that the SNP at 49th position of TAS2R38 gene might be enough to determine bitterness sensitivity to thiourea compounds. If proline is encoded, then the individual might be a taster or supertaster.
On the other hand, if alanine is encoded, then the individual might be a nontaster. Researchers have found that PPARG gene plays a role in human diseases which include type 2 diabetes (T2D). Our hypothesis is that if a person is bitter sensitive, then the propensity towards T2D might be lower. Therefore, the objectives of this study was to genotype normal and diabetic human subjects for the two above-mentioned polymorphisms, and determine if there is a link between bitterness sensitivity and risk of T2D. A 7900HT Fast Real-Time PCR System was used to genotype the DNA samples collected from 32 subjects. We were unable to find any trends in the data because 1) the sample size was too small, and 2) all the subjects were identified with allele 1(Proline) for the PPARG SNP. The major limitation of this study was the sample size (n=32, and only 7 of the subjects were type 2 diabetics), but our major aim was to set up the protocols involved in the genotyping, and gather some preliminary data to observe some trends, if any.

Keywords: TAS2R38 gene, PPARG gene, bitter sensitivity, type 2 diabetes, single nucleotide polymorphism

Honors/Leadership: Golden Key International Honor Society; Blue Key; Phi Kappa Phi; Multicultural Honor Society; Tyson Family Foundation Scholarship; "K-State Senior Researches Possible Link Between Bitter-Taste Sensitivity and Type 2 Diabetes", Kansas State University Media Relations, Manhattan, Kansas 2009; Vietnamese Student Association-Vice President; United Multicultural Women, Secretary; Benefiting and Educating Latinas in Leadership, Academics and Sisterhood (BELLA's interest group- Secretary; Multilingual: Vietnamese/English/French

Jessica Rodriguez
Senior, Food Science & Industry, Minor- Spanish

Butch KuKanich
Assistant Professor, Anatomy and Physiology

The effects of concurrent administration of cytochrome P-450 (CYP) inhibitors on the pharmacokinetics of oral methadone in healthy dogs

Methadone is an analgesic used to reduce pain. Methadone is not currently used orally in dogs because absorption into the blood is very low. The purpose of the study is to increase oral methadone absorption by inhibiting the cytochrome P-450 (CYP) enzymes. Methadone is to be dosed with multiple CYP inhibitors to assess the effects of CYP inhibition on the oral absorption of methadone. The goal is to increase methadone absorption by administering a combination of CYP inhibitors, subsequently resulting in an analgesic effect in canines. Methadone will be administered with different inhibitor combinations to healthy dogs. After dosage, blood samples are taken in predetermined increments over a 48 hour period. Plasma is then separated and drug plasma concentrations are measured by a mass spectrometer and pharmacokinetic analysis.

Honors/Leadership: Hill's Pet Nutrition Scholar; Veterinary Early Admission Scholars Program.; College of Agriculture Honors; Phi Kappa Phi; Sigma Alpha Lambda; Cargill Project IMPACT; Hispanic Association of Colleges and Universities Wal-Mart Achievers; Kassebaum; Baeten Farm; KSU Foundation; OJ Vanvranken Memorial Scholarship; Internships: Quality Associate Intern, General Mills; (*"The Effects of Concurrent Administration of Cytochrome P-450 (CYP) Inhibitors on the Pharmacokinetics of Oral Methadone in Healthy Dogs"* Veterinary Anaesthesia and Analgesia); Ali Kemp Foundation; Ronald McDonald House; Alpha Delta Pi, Music Chair; Formal Recruitment Chair; WRL Chair; Student Alumni Board; K-State PROUD; MANRRS; Bilingual: English/Spanish

Leonel Hernandez
Senior, Construction Science & Managment

Blythe A. Vogt
Instructor, Architectual Engineering & Construction Science

Relating Building Information Modeling and Architectural Engineering Undergraduate Curriculum

Industry leaders, professional societies, and trade articles have advertised Building Information Modeling (BIM) as the next "big" industry trend shaping the delivery of commercial construction by architects, engineers and construction managers. Of recently polled industry partners, over half have reported using BIM delivery. Withstanding a separate technological programming breakthrough, BIM will likely sustain high levels of growth in implementation in industry with the rise of the next generation of design and construction professionals and building owners in the next 50 years. BIM will become the primary means of commercial construction document and project delivery.

Due to this growth and publicity, universities around the USA have been directed to implement BIM into their educational curricula fabric of course work, placing an ever increasing emphasis on a BIM skill set for their graduates. Surveys of Architectural Engineering programs focused on current and planned implementation of BIM and associated costs of hardware and software for universities – specifically Architectural Engineering Departments to include BIM in their curriculum. Potential employer surveys emphasized recruiting graduates with BIM skills, reading and referencing of trade articles relating BIM to industry delivery trends, research on initial and sustained requirements, and associated costs of hardware, software, and training.

This compilation of research and information will trend towards suggestions and conclusions (by Blythe Vogt and Leonel Hernandez) related to BIM's importance in Architectural Engineering curriculum of the present and future.

Honors/Leadership: Bridges to the Future; NACME; McCown Gordon Construction Science; Wilson Undergraduate; Builder's Association; Blue Key; NAWIC; Turner Construction Diversity Scholarship; Internships: DSP/Bridges; Hensel Phelps Construction; McCown Gordon Construction; Relay for Life; Greensburg Cleanup; Highway Cleanup; Rake n' Run; Junior Achievement; Habitat for Humanity House; Extreme Makeover Home Edition-Chapman; Operation Nehemiah-New Orleans; Neighborhood Empowerment Network Association- New Orleans; Can & Glove/Mitten Drive; AGC; ARE; ASC Design Build; Sigma Lambda Chi; Society of Hispanic Professional Engineers; Multicultural Engineering Program; National Action Council for Minorities in Engineering; James R. Coffman Award of Excellence; Target on Excellence; Open House Technical Booth Head; Engineering Student Council; Architectural Engineering Institute; Bilingual: Spanish/English

Jenny Menjivar
Senior, Microbiology

Tonatiuh Melgarejo
Associate Professor, Department of Human Nutrition

Gene Expression Analysis of Epithelial Antimicrobial Peptides in Domestic and Wild Carnivore Species

One of the main components of the Host defense at mucosal surfaces seems to be epithelium-derived host defense peptides, also known as antimicrobial peptides. These peptides are found in virtually all species and form part of the innate immune system. Different HDPs protect organisms against bacteria, viruses, fungi and some target abnormal or cancerous cells. Antimicrobial peptides are classified on the basis of their structure and amino acid motifs. Peptides of the defensin, cathelicidin, and histatin classes are found in several mammalian species. In addition of their direct antimicrobial function, antimicrobial peptides have multiple roles as mediators of inflammation with effects on epithelial and inflammatory cells, influencing such diverse processes as proliferation, immune induction, wound healing, cytokine release, chemotaxis, and redox homeostasis. The purpose of this study will be to analyze the gene expression patterns of HDPs in the skin of three different carnivores, the domestic dog (Canis familiaris), the house cat (Felis catus), and the Stripped Hyena (Hyaena hyaena). Data generated from this study is expected to shed light on the basic innate immune mechanisms of defense as well as wound healing processes in these three species.

Honors/Leadership: Bridges to the Future; Bilingual: English/Spanish; Other Achievements: Baby Daughter, Marissa!

Jorge E. Mendoza
Senior, Biology

Samantha Wisely
Assistant Professor, Biology

Admission Requirements For Integrated Science Doctoral Programs

A quantitative analysis of the admissions requirements of doctoral programs at different universities' in the United States was conducted. To gather information for universities admissions requirements, an internet search was used as well as visits to some of the universities. Comments from professors' websites and interviews provided advice on what they look for in prospective students. The analysis attempts to help students (I) become knowledgeable about different aspects of graduate school, from planning admission for college freshmen to the application process; (II) become familiar with the GRE; and (III) provide recommendations to be an outstanding applicant.

Honors/Leadership: Golden Key International Honor Society; Cancer Research Award; Federal S.M.A.R.T grant; Multicultural Student Honor Society, President; Hispanic National Scholarship Fund; K-State Hero Award; Internships: Research Experience for Undergraduate Students (REU program); Harvard University; Berkeley Edge Conference; SEEDS Fall Field Trip; Virginia: SEEDS Puerto Rico, team leader; Rake and Run; Acts of Kindness; Canned Food Drive; Hispanic American Leadership Organization; Bilingual: Spanish/English

Liliana Garcia
Junior, Public Health Nutrition, Dietetics

Michael R. Kanost
Distinguished Professor, Biochemistry

Neal Dittmer
Research Associate, Biochemistry

GNBPA2 role in Anopheles Gambiae mosquitoes

Anopheles gambiae mosquitoes are the main vector of many diseases, including Malaria in Africa. In our research we are studying the insect's immune system and how it might help the insect fight off infection by parasites. The Gram-negative bacteria-binding protein A2 (AgGNBPA2) is linked to a defensive response against infection in Anopheles gambiae.

We collected RNA from 3 day old adult mosquitoes and used the RNA to prepare cDNA. We then used Polymerase Chain Reaction (PCR) to amplify the AgGNBPA2 gene. We sequenced the amplified gene and it was compared with the predicted sequence to make sure it was correct. Then we transformed the gene into bacteria and allow the bacteria to produce the protein (AgGNBPA2). We next purified the protein from the bacteria by nickel affinity chromatography. Following purification the protein, will be used to create antibodies. Antibodies allow us to study changes in the levels of the protein AgGNBPA2 during different developmental stages of the mosquitoes as it goes through alterations such as fighting an infection. With our research we are trying to understand the insect's immune system and how it responds to infection. This will aid the effort to develop methods that help protect people from diseases such as malaria.

Honors/Leadership: United Multicultural Women Founder, Benefiting and Educating Latinas in Leadership, Academics, and Sisterhood; Wonder Workshop; Rake N' Run; Bilingual: Spanish/English

Catrina Elmore
Junior, Accounting

Stacy Kovar
Professor, Accounting

Joseph Ugrin
Assistant Professor, Accounting

Group Identification: How Outcome Effects on Juror Judgments in Fraud Cases Can Be Influenced by Controlling Juror Surprise

Recent literature has found that substantive sanctions that are actively enforced can reduce financial fraud but has also noted that ultimate enforcement lies in the hands of jurors (Ugrin and Odom, 2010). Jurors tend to evaluate illicit acts in two ways, one is to merely evaluate the outcome (an outcome effect), which jurors tend to do when the outcome is not surprising and the jurors assume the defendant should have known what the outcome would be all along. The second is to put themselves "in the shoes of the defendant," which they tend to do if an outcome is surprising. When surprise is high, jurors attempt to make sense of the defendant's actions resulting in a judgment that more effectively fits the crime, essentially mitigating the outcome effect (Charron and Lowe, 2003). Thus, we propose that managing surprise can influence jury verdicts. The results of Pezzo (2003) would suggest that when highly surprised by an outcome, jurors' sense-making actions only moderate the outcome effect when they can indeed make sense of the criminal offense. We propose that jurors who identify with the context of the crime can effectually make sense of it and thus judge the crime based on the heinousness of the act. In context, we hypothesize that jurors with more financial expertise are less likely to be influenced by outcomes and will make judgments based primarily on the criminal act, regardless of the outcome. This study will make two primary contributions. Theoretically, it will reconcile the research of Charron and Lowe (2003) and Lipshitz, Gilad, and Suleiman (2000) with recent psychology literature on hindsight bias and surprise. Practically, it will extend the fraud deterrence literature of Ugrin and Odom (2010) to the jury box thus adding to that line of study.

Honors/Leadership: The National Scholars Honor Society; National Society of Collegiate Scholars; Kansas Minority Scholarship; Bluemont Scholarship; Black Student Union; Freshman Action Team; Workers of Wisdom

Mychal Christopher Davis
Junior, Animal Science and Industry

Sanjeev Narayanan
Associate Professor, Diagnostic Medicine Pathobiology

Avian Feces Carry Plasmids that can Transfer Antibiotic Resistance in Food-borne Pathogens

Plasmids are self-replicating DNA that exists independent of the genome and may carry information that render the bacteria resistant to antimicrobials. Plasmids are often used in genetic engineering to carry desired genes into prokaryotic or eukaryotic organisms. Plasmids are capable of transferring modified genes through a process known as horizontal transfer.

The vectors (including pUC19) are one of the most commonly used plasmid vectors in cloning experiments, and are able to transfer genetic information to common food-borne pathogens including E. coli. These vectors can exist in multiple copies in a single bacterial cell. If these human made plasmids escape from laboratories to the outside environment it could lead to rise and spread of resistance.

During spring season large flocks of crows that travel on their migratory path stay for a period of time in Manhattan, Kansas. During spring 2009 we collected 75 fecal samples from these crows to isolate and identify bacterial pathogens that may be harmful to humans. We isolated 20 Salmonella and identify their serovars by traditional serological methods, and the Typhimurium was the most predominant serovar. We isolated 50 non-hemolytic E. coli, and used their total DNA to perform PCR analysis targeting ColE1 origin of vector replication. Fourteen E. coli strains gave positive amplicon. We selected one isolate for further characterization. Isolated plasmid provided resistance to penicillin, streptomycin, tetracycline, and chloramphenicol. Currently, we are in the process of subcloning and sequencing this plasmid to determine its origin.

Honors/Leadership: Multicultural Student Honor Society; K-State Purple and White Scholarship; Cargill Diversity Scholarship; American Royal Scholarship; Target on Excellence Presenter; American Red Cross Blood Drive; Reading to Ogden Elementary School; Rake N' Run; K-State Student Union "Trick or Treat"; MANRRS, President; Boy Scout Merit Badge Day; Ag Student Council representative; Black Student Union Delegate; Big XII Head Delegate; Kansas Assistant District Director for Alpha Phi Alpha

Alexia Sampson-Bellot
Freshman, Animal Science & Industry, Pre-Veterinary

H.M. Scott
Professor, Diagnostic Medicine Pathobiology

Detecting Mycobacterium avium subspecies Paratuberculosis in Domestic Animals by Polymerase Chain Reaction

Mycobacterium avium subspecies paratuberculosis (MAP) is the causative agent of Johne's disease in cattle and other ruminants, and this organism has been implicated as a potential cause of Crohn's disease in people. Investigation of MAP's potential contribution to gastrointestinal (GI) disease in dogs and cats is in its infancy. MAP has been isolated from canine GI tracts, and preliminary data suggest it may be associated with GI disease in dogs. MAP has also been isolated from intestinal and lymph node tissue from feral cats on farms with known Johne's disease. The goal of this pilot study was to determine the prevalence of MAP in lymph node and intestinal tissue from dogs and cats that had a necropsy performed at Kansas State University. Tissue samples were collected from proximal duodenum, distal ileum, and mesenteric and colic lymph nodes. DNA from tissues was isolated using the DNeasy kit on an automated QIAcube system. DNA was analyzed for presence of insertion sequence 900 (specific for MAP) using a nested PCR. Medical records were reviewed to determine if patients lived in an urban or rural environment. Fifty-seven animals have been enrolled in this study, including 44 dogs and 13 cats. Preliminary PCR testing to date has identified MAP from the tissue of 5/10 animals. The positive animals include 2 cats and 3 dogs. MAP has been identified from the proximal duodenum (n=1), distal ileum (n=2), and colic lymph node (n=2). For the limited sample size tested thus far, the odds ratio for exposure to a rural environment was 1. These preliminary results suggest that MAP can be isolated from the intestinal tissue and lymph nodes of dogs and cats. Further investigation into a potential association of MAP with GI disease in dogs and cats may be warranted.

Honors/Awards: Hill's Pet Nutrition Scholar

Barbara Braga
Sophomore, English

Stefan H. Bossmann
Professor, Chemistry

MspA in Mycobacterium smegmatis

Our long-term goal is to identify effective therapies that will functionally overcome the problem of multi-drug resistance in the treatment of cancer. Our objective in this proposal is to capitalize upon our recent studies with a mycobacterial porin (channel protein), termed MspA, to develop a strategy to reverse the established pH-gradient across the cell membrane of cancer cells to make them sensitive to anticancer drugs. MspA, isolated from Mycobacterium smegmatis, is an extremely stable outer-membrane porin. This protein reconstitutes spontaneously in membranes and can be expected to provide a cation-selective pathway through the cancer cell membrane. MspA can be easily bound to stealth protected iron/iron oxide nanoparticles (NanoScale Corporation, Manhattan, KS), which can remain in the circulation up to 72h. If a porphyrin is linked to the oligoethylene glycol stealth units, these liposomes can specifically target cancer cells, because the porphyrin receptor is highly overexpressed in almost every cancer line.
Our central hypothesis is that MspA will be incorporated into the cell membranes of cancer cells and will serve to enhance the efficacy of anticancer drugs. We plan to combine MspA with the irinotecan, a highly prodrug for the highly effective anticancer drug SN-38. The latter is among the only drugs available against pancreatic cancer. If higher MspA concentrations (more than 100 porins per cancer cell) can be achieved, MspA itself is toxic due to its ability to act as ion channel. We have based our central hypothesis on our previous results, which include successful reconstitution of MspA in phospholipid bilayer membranes,artificial monomembranes and polymer layers, as well as the characterization of MspA and MspA-mutants in single-chain-conductance and voltage-gating experiments. Our rationale is that successful completion would offer a strategy for greatly improving the efficacy of chemotherapy against pancreatic cancer by eliminating the pH-gradient along the cancer cell membrane, a strategy suitable for treating cancers in later (metastasizing) stages, where classic chemotherapy is highly ineffective. We have already developed the technology to grow and harvest MspA and its mutants in sufficient quantities from M. smegmatis during my last semester of research.

Honors/Leadership: Alpha Chi Sigma; Housing Leadership Scholarship; Opportunity Scholarship; Rake and Run; Cats for Cans; Trick or Treat the Zoo; Association of Residence Halls, Secretary; Multilingual: English/Portuguese/ German/ Spanish

Robert Moreno
Junior, Financial Planning, Pre-Law

Yun-Oh Whang
Assistant Professor, Marketing

Sports Fanfare and Common Identity: The Differences between Caucasians and Latino-Americans

This project focuses on the major cultural and sociological differences between Caucasians and Latino-American fans at university sporting events. This project is designed to identify the driving force between the two races' behaviors, focusing on various esteems that represent common group identity. It helps us understand the differences in the fanfare of sporting events between the two major ethnic groups on university campuses. Information is gathered first by inquiring what work has already been done pertaining to this topic. Next, a series of interviews were conducted with students who are intense and moderately intense fans to measure their common identity perception and support for the university's football program. Interviews are given to fifteen subjects. Seven are Caucasians and eight are Latino-American. The content of the interviews are transcribed and categorized to identify various types of common identity including public esteem, identity esteem, membership esteem, and private esteem of the respondents. The levels of these four esteems are recorded to be correlated with the intensity of the respondents' support for university's football program. Based on the correlations found, the differences between Caucasian and Latino-American college students are analyzed and discussed.

Honors/Leadership: Kansas City Securities Commission Scholarship; Rake N' Run, Recycle after K-State Football Games; Future Financial Planners; Invest-a-Cats; Bluemont Grant

Tamica Lige
Senior, Art History

Douglas N. Dow
Assistant Professor, Art History

Meeting with Masters: A Biographer's Responsibility to History and Himself, The Vasari Perspective

Giorgio Vasari, a Tuscan painter and architect, is better known for his biographies of Renaissance artists than for his contributions to the visual arts. Vasari's book, *The Lives of the Painters, Sculptors, and Architects*, published in two editions in the middle of the sixteenth century, has long served as a valuable source for historians of Italian Renaissance art. Vasari's intentions for writing *The Lives* were not solely to record history, but to document the rebirth of artistic greatness, to celebrate the achievements of sixteenth-century painters, and to bestow honor upon the Tuscan people for their contributions to art. The biographies accomplish these goals by proposing ideal characteristics and behaviors required to propel and maintain an artist's excellence. Vasari suggested that for an artist to become a master of his craft he should be willing to face hardship and discomfort in order to obtain glory from his labor. The anecdotes in each biography offer an interesting look into social lives of Renaissance artists and demonstrate how possessing certain qualities assisted or hindered their success. Take, for example, the story of Filippo Brunelleschi. According to Vasari, Brunelleschi was chosen by the heavens to restore architecture to the glory it held in ancient Rome. He described Brunelleschi as a kind, studious man, who put the interests of others before himself, and who was ever pleased to help his neighbors. These qualities, combined with his heaven-sent artistic ability, gained Brunelleschi the favor of the people. Not only was he able to bring fame and profit to Florence by means of his accomplishments, but he also motivated other artists to strive for perfection in the art of design. Vasari highlighted these qualities of Brunelleschi to make him a model of a successful artist who exhibited selflessness and was willing to face adversity to reach perfection. As a student of the history of Italian Renaissance art, I believe it is important to understand the motives and methods utilized by Vasari as a biographer. Many scholars have analyzed Vasari and *The Lives*, and my historiographical project builds on the critical insights of historians such as Patricia Lee Rubin and Paul Barolsky. In addition to the main scholarship on Vasari, I will critically read all 166 biographies so that I can illustrate how Vasari employed anecdotes as part of his rhetorical strategy to convey the importance of the achievements of the most eminent painters, sculptors, and architects of the Renaissance.

Honors/Leadership: Mortar Board; Sigma Alpha Lambda; Multicultural Student Honor Society; Smith-Craig Art History Scholarship; Art History Society; Italian Conversation Club; Kauffman Scholars Mentor; McNair Scholar; Arts & Sciences Alumni Advisory Board; Italian Conversational Class, teaching assistant; Trilingual: English/Italian/ Spanish.

Edmond Rivera
Sophomore, Nutritional Sciences, Pre-Medicine

Michael R. Kanost
Distinguished Professor, Biochemistry

Study of Hemolymph Proteinase 13

Hemolymph Proteinase 13 (HP 13), a protein found in an insect, Manduca sexta belongs to a group of serine proteinase pathways hypothesized to control immune and homeostatic processes in insects. Other serine proteinases have been extensively studied, but the functions of HP13 remain largely unknown. In order to study the biochemical activity of HP13, we are trying to purify HP13 using a baculovirus expression system. A baculovirus is a virus that can be engineered to contain a DNA segment that codes for a protein of interest. These viruses can be used to infect insect cells. The virus will attach itself to cells—in our case SF9 insect cells—and infect the cell. The cell then starts producing the desired protein. We amplified a virus stock to obtain a titer of at least $1x10^8$ plaque forming units/ml, measuring the viral titer with a plaque assay. Then, we conducted trials to determine how the SF9 cells can most effectively produce HP13. Since HP13 has a secretion signal peptide, we expect the cells to secrete the protein into the surrounding media. Once the media is collected, purification using nickel-affinity chromatography will be conducted. HP13 has a 6-His-tag that enables the protein to bind to the Nickel in the column while the rest of the media and its contents wash through. Once our protein is purified, we can begin the study of its response when placed with other serine proteinases and discover whether HP13 is part a cascade immune response or what role it plays in insects.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Wonder Workshop; Cats for Cans; Rake 'N Run; Sigma Lambda Beta, Vice President; Multilingual: English/ Spanish/ French

Rymonda Davis
Sophomore, Open Options; Minor: Leadership Studies

M.J. Morgan
Adjunct Professor, History

The Exploration of Image in Media

My research was initially conducted to learn about the familial roles of African American women in the family. After making some discoveries that weren't necessarily what I expected to learn, I realized that many times there are preconceived notions about what African American women represent in the family. Often, these stereotypes come from the media portrayal of African American families, especially in television shows from the 1970s through the 1980s. These shows include The Jeffersons, Good Times, and The Cosby Show. My research was conducted through an in-depth study of these shows as well as interviewing students and professionals about their biases and stereotypical views and if watching any of those shows impacted that.

Throughout researching the image of African American women in the media, a primary discovery was that stereotyping often occurs without the realization that it has occurred. Phase one of my project included interviewing older African American women about their roles in their families and before starting my research, I believed that they would all say that they served as symbols of strength in their families. My own biases came from the strong matriarchal character that I saw on television, as well as my family which I assumed was typical.

Media portrayal has a definite impact on the views and beliefs that shape society today. Although the role of African American women in the family are highly complex and have multiple causes, it is imperative that all biases be removed before taking a closer look.

Honors/Leadership: Diverse Mass Communicators; Chapman Center Fellow