

Developing Scholars Program



"Discipline. Skills. People. These are three advantages that the Developing Scholars Program can promise. The discipline you learn will carry into other academic areas; you will develop skills to last a lifetime, and encounter people whom you will never forget."

*-Ariel Anib
Third-Year Scholar
Senior in Sociology/ Latin American Studies*

11th Annual Research Poster Symposium

K-State Union Ballroom
Sunday, April 17, 2011
2:00 pm - 4:00 pm

TABLE OF CONTENTS

Edlin Ortiz.....	1	Valerie Rito.....	18
Pamela Maynez.....	1	Evgeniy Shishkin.....	18
Michelle Foster.....	2	Alexandra Dominguez.....	19
David Villanueva.....	2	Jaime Tobon.....	20
Eduardo Alvarado.....	3	Isaac Falcon.....	20
Justin Curry.....	3	Jasmine Sharp.....	21
April Hostetler.....	4	Laura Gonzales.....	21
Dalila Del Real.....	4	Victoria Fort.....	22
Elizabeth Trevino.....	5	Adrian Gomez.....	22
Shai Buelow.....	5	Jordan Eder.....	23
Caleb Wurth.....	6	Luis Chavez.....	23
Blake Franklin.....	6	Phillip Gomez.....	24
Miguel Valdes, Joshua Ames, Victor Salazar.....	7	Jeanette Aldana.....	24
Mary Jackson.....	7	Stephanie Skinner.....	25
Roberto Diaz.....	8	Ricco Hall.....	25
Joshua Springfield.....	8	Stefani. McCluney.....	26
Perla Salazar.....	9	Tyler Johnson.....	26
Courtney Bell.....	9	Dane Jaeger.....	27
Jimmie Stewart.....	10	Mayabeth Jagosz.....	27
Kathie Nguyen.....	10	Tamica Lige.....	28
Kale Lothamer.....	11	Stephanie Jacquez.....	28
Oscar Rodriguez.....	11	Xavier Gavin.....	29
Kristina Bigelow.....	12	Fabian Martinez.....	29
Priscilla de Los Santos.....	12	Johnathan Johnson.....	30
Morgan Armbruster.....	13	Emma Del Real.....	30
Alejandro De Luna.....	13	Alexia Sampson-Bellot.....	31
Emma Brace.....	14	A. Kekoa Mendenhall.....	31
Phuoc Bui.....	14	Miles McCall.....	32
Ariel Anib.....	15	Catalina Perdomo.....	32
Karmen Harris.....	15	Brooke Williams.....	33
Abraham Denner.....	16	Caroline Fulton.....	33
Jaime Arreola.....	16	Edmond Rivera.....	34
Johanna Diaz.....	17	Natasha Peterson.....	34
Anthony Garcia.....	17	Tiana Brooks.....	35

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

Quercetin Induces Cell Apoptosis via Activation of AMP-activated Protein Kinase and Inhibition of Protein Elongation in Leukemia Jurkat Cells

Edlin Ortiz, Dingbo Lin
Department of Human Nutrition
College of Arts & Sciences
College of Human Ecology

Leukemia is a type of cancer characterized by an abnormal increase in white blood cells. In this study we will be conducting tests to determine whether quercetin triggers leukemia Jurkat cell apoptosis through inhibition of protein elongation, but not initiation in the process of de novo protein synthesis. Human leukemia Jurkat cells were treated with quercetin at 10-40 μ M for 48 hours. Cell apoptosis was measured by flow cytometry. Cellular reactive oxygen species (ROS) were determined by a fluorimetric assay using carboxy-H₂DCFDA as the probe. Alteration of protein expression was monitored by Western blot. Quercetin elevated cellular ROS levels, inhibited cell growth, induced cycle arrest at the G₂/M phase and caspase-3-dependent apoptosis, in a dose dependent manner. Quercetin declined expression of protein kinase RNA-like ER kinase (PERK), TNF α , NF κ B and induced activation of AMP activated protein kinase (AMPK). Quercetin did not alter eIF2 α expression, but enhanced phosphorylation of eEF2 on Thr56, indicating inactivation of eEF2. Quercetin activation of AMPK inhibited eEF2 activity and subsequent inhibition of protein elongation which in turn led to Jurkat cell apoptosis.

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

iRGD Synthesis and Improved Chemotherapy Delivery

Pamela Maynez, Stefan Bossmann
Department of Chemistry
College of Arts & Sciences

Cancer is a well-known disease that currently affects many individuals. Although therapy for cancer is available, the effectiveness of chemotherapeutic agents is limited due to their inadequate penetration into tumor cells. Studies have suggested that an internalizing tumor penetrating peptide with an arginine-glycine- aspartic acid (RGD) motif plays a key role in efficient chemotherapy delivery. It can greatly enhance the cancer drug's potency and tissue permeability as well as increase the drug's tumor selectivity, thereby rendering it less toxic to noncancerous cells. The peptide gains access to the tumor cell's interior via surface receptors, neuropilin-1 integrins, expressed solely on the tissue's vasculature. iRGD homes to α -v integrins and is cleaved through proteolysis. Then it binds to neuropilin-1, which triggers penetration. For evaluation of this improved delivery method several peptides such as iRGD were synthesized employing the solid phase peptide synthesis method. Afterwards, several cyanine dyes and nanoparticles were attached to it. They will be administered to Charles River mice and prospectively to non-Hodgkins lymphoma bearing dogs to evaluate the peptide's delivery efficacy. If successful, this novel delivery scheme would ultimately generate a more cost effective cancer treatment compared to current chemotherapy methods.

Honors/Leadership: Golden Key Honor Society; Bridges to the Future; Terry C. Johnson Cancer Research Award;

Latinas/os and the Current Immigration Debate

Michelle Foster, Tanya González

Department of English

College of Arts & Sciences

In 2007, *Ugly Betty* introduced an immigration storyline where the protagonist Betty's father Ignacio faces deportation. The episodes present the complexity of immigration in a favorable and/or positive light. We collected debates about immigration in order to contextualize Ignacio's plight and the effects it had on his family. This helps us understand how the television show is both a response to these debates, and reflective of future conversations or language in the media and legislative realm that are discussed currently. To achieve this goal, we examined a sample of popular news media addressing the immigration debate in the United States. Our focus was on Latin American immigration given this is the focus on *Ugly Betty*. In gathering data, we gathered and read articles from online news sites as well as reader comments. A summary was done on each article and was put into different categories depending on the particular immigration discussion. We came up with six categories used as rationale for and against Latin American immigration: the economy, racism, children/family, citizenship, jobs and legislation reform. We created a graph of the different categories and discovered that the majority of articles discussed legislation reform. Of that data, we specified the focus of the legislation reform and documented those categories. The collected data confirms the tensions surrounding the topics of immigration and legislative reform in the U.S. during, and directly after, the *Ugly Betty* immigration episodes aired.

Honors/Leadership: Academic Honors; Golden Key Honor Society; National Society of Collegiate Scholars; Phi Eta Sigma Honor Society; Edgerley-Franklin Urban Leadership Scholarship; Multicultural Harmony Week; Community Service Week volunteer; Rake N' Run; Martin Luther King Day of Service; Floor President of Smurthwaite Leadership/Scholarship House; Black Student Union; Hands-on Leaders Program; Union Program Council; Kansas City Urban Service Spring Break; China Study Abroad; Bilingual: English/Chinese

Peptide Synthesis for Treatment of B16-F10 Melanoma Cells in Mice

David Villanueva, Stefan H. Bossmann

Department of Chemistry

College of Arts & Sciences

Almost every day we see internet ads, newspaper articles, and community or student groups raising money for cancer research. Cancer research is significant because a large portion of our population is affected by some form of cancer. For over half a year now, we have been synthesizing various combinations of peptide sequences such as enzymatic cleavage sequences for MMP-1, MMP-2, and MMP-11 with the intentions of activating a fluorescent dye or a drug in tumor cells. 4-tetracarboxyphenyl porphyrin (TCPP) and cyanine dyes have been respectively attached to different peptide sequences and from there to inorganic magnetic nanoparticles to trace tumor metastasis via fluorescence. Ultimately, localized magnetic hyperthermia will be performed, using an A/C (alternating current) magnetic field in order to attenuate melanoma cells of deep tumors in Charles River mice. If successful, this approach to deep tumor cancer therapy will be an alternative and cost-effective method of treatment as opposed to traditional and ineffective chemotherapy.

Honors/Leadership: Bridges to The Future; Golden Key Honor Society; LULAC Scholarship; Internship: Organic Synthesis of Photosensitizers; Rake N' Run; LULAC; HALO; Bilingual: English/Spanish

Cigarette Taxes and Cross-Border Effects: an Analysis of Retail Data by County

Eduardo Alvarado, Tracy Turner
Department of Economics
College of Arts & Sciences

Using monthly sales tax revenue data for the state of Kansas, spanning the years 2001 to 2005, a time period during which Kansas increased the nominal cigarette tax rate by 229%, this paper looks at the extent to which higher cigarette tax rates impact the sales tax revenues remitted by tobacco sellers according to proximity to the lower-tax Missouri border. Since cigarette taxes are levied at the wholesale level and there is no sales quantity reported by location, the data used to infer border effects are the sales tax revenues collected from locations where cigarette sales are a large part of the revenue produced (gas stations, tobacco stores, cigarette vending machines). This can be done because cigarette purchasers pay an ad valorem sales tax on their total purchase and the cigarette tax increase causes the price per pack to change, thus allowing for inferences of quantity demanded to be made when controlling for any sales tax changes. Results show that increasing cigarette taxes leads to a decrease in sales tax revenue collected from convenience stores and tobacco stores for retailers near the Missouri border. Retailers that are farther away from Missouri experience an increase in sales tax revenues for both store types. In contrast, we find no cross-border effects for the sale of cigarettes from vending machines. These findings hold important implications for policy makers.

Honors/Leadership: Academic Honors; Phi Beta Kappa; Sigma Alpha Lambda; Dallas Federal Reserve Bank Economics Scholars Program, presenter; Kansas City Hispanic Scholarship; Rake N' Run; Multilingual: English/Spanish/Italian

Kansas State University Residence Hall Room Energy Consumption

Justin Curry, Noel Schulz
Department of Computer & Electrical Engineering
College of Engineering

One of the growing issues today is effective use of our resources. Energy is an important resource which we often take for granted. In the case of university students residing in residence halls, they do not receive a monthly electricity bill so they may not be as aware of energy costs. This project worked on two aspects of student energy consumption activities. First, using an energy monitoring device, data was taken for commonly used electrical devices found in a residence hall room. Energy consumption was compared for normal use with and without energy saving strategies. These results demonstrated the large amount of energy lost when devices were not in use or did not have high energy efficiency ratings. Second, the project looked at the attitudes of students living in residence halls and how they can be changed by providing educational materials and information. Surveys were done before and after the educational materials to gauge how these materials impacted the students' perceptions of their personal energy use.

Honors/Leadership: Habitat for Humanity; United Black Voices; IEEE National Conference (New Orleans); Wind Turbine Conference (Topeka, Kansas)

Functional and Compositional Properties of Reduction and Break Flour Fractions

April Hostetler, Moses Khamis, Hulya Dogan
Department of Grain Science
College of Agriculture

Flour milling is a continuous grinding and sifting operation composed of several breaking and reduction steps to extract endosperm from bran and germ. Endosperm extraction attained at each step results in flour fractions of different composition and functionality. The objective of this study was to generate a fingerprint of flour fractions obtained from large scale and experimental scale mills. Mixolab (Chopin Technologies) was used to study mixing and pasting behavior of each flour fraction. Tests were carried out at the constant water absorption and mixing speed. Proximate analysis of the stream indicated a wide range of protein (7.4-16.1%) and ash (0.29-1.29%) contents. Breaking flours had higher protein and ash contents than the reduction flours as expected. The consistency of flours at constant water absorption ranged between 0.7-1.3 N.m indicating distinct quality differences between the fractions. Despite their high protein contents, breaking flours generally displayed lower consistency values. However, 5BK flour had the highest consistency due to its high bran content as indicated by extremely high ash values. Mixing stability, protein weakening and starch gelatinization behaviors of flour fractions were observed to reflect characteristics of corresponding processing steps of milling. A solvent retention capacity test was used to predict baking performance by measuring the capacity of flour to retain four solvents (water, Na₂CO₃, sucrose, and lactic acid) to assess overall absorption capacity, starch damage, pentosan and gliadin content, and glutenin quality, respectively. Retention values were found to be reflective of the milling history of each fraction.

Honors/Leadership: Milling Club; Agri-Women; Veseky Scholarship; Charles D. Singleton Scholarship

Implementation of A Music Social Narrative

Dalila Del Real, Bronwyn Fees, Marilyn Kaff, Teri Holmberg , James Teagarden
School of Family Studies & Human Services
Department of Special Education, Counseling & Student Affairs,
Department of Music
Department of Special Education, Counseling & Student Affairs
College of Arts & Sciences

This study examines appropriate social skills in typically developing preschool children and children with exceptionalities. Brownell (2002) proposed music and language are received by separate receptors in the brain, thus music may be used as a mnemonic strategy to recall information. Setting a social narrative to a familiar tune can assist preschool children to recall appropriate pro-social behavior. This study developed a protocol for a social narrative set to a familiar tune and examined perceived efficacy with three preschool teachers in an inclusive program on a military-base. The MSN focused on self-regulation, specifically waiting. Central findings included initiation of song by typically developing children and use of the song by special needs children. Results suggest teachers perceived the intervention to be generally effective.

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

Optimizing GFP Transfection Efficiency of Wharton's Jelly-Mesenchymal Stromal Cells

Elizabeth Trevino, Yelica Lopez Rodriguez, AJ Mellot, Michael Detamore,

Mark Louis S. Weiss

Department of Anatomy & Physiology

College of Veterinary Medicine

Mesenchymal stromal cells (MSCs) are an attractive therapeutic resource due to their regenerative and immunoregulatory capacities. For preclinical testing, it would be important to determine biodistribution of the MSCs. Many laboratories use fluorescent reporter gene expression in order to follow the distribution of cells in vivo, in situ and in real time. Previous work revealed very low transfection efficiency in MSC. Therefore, we proposed to develop optimized protocols that yield a high-efficiency and stable transfection. Green fluorescent protein (GFP) is an important reporter gene and widely used for these studies, gene transfer and gene expression. The goal of this study is to compare the transfection efficiency of GFP in human MSC derived from the umbilical cord using nucleofection (Amaxa), lipofection (manufacturer) and Neon transfection (Invitrogen). We measured the gene transfection efficiency using flow cytometry, fluorescence microscopy and live/dead staining. The transfection efficiency was evaluated as a function of the number of transfected cells, number of dead cells post-transfection, proliferation index and if the integration in the genome is transient or stable. In our preliminary results, lipofectamine and Neon transfection had a minimal impact in cells' viability and proliferation, and the gene transfection efficiency was low. In contrast, nucleofection had more impact on cell viability and proliferation, and it had the highest transfection efficiency, too.

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: English/Spanish

Comparison of Residual Feed Intake and Gain in Beef

Shai Buelow, Erika Blair, Jennifer Minick-Bormann, Dan Moser, Jim Drouillard

Department of Animal Sciences & Industry

College of Agriculture

A current emphasis in the beef cattle industry is increasing efficiency of production. Cattle that can consume less feed and maintain the same weight gain are more efficient and profitable. Two measures of efficiency are residual feed intake (RFI) and residual gain (RG). Residual feed intake predicts which cattle ate less than expected for their gain, and RG predicts which cattle gained more while eating the same feed. The objective of this project is to calculate the relationship between these two measures of feed efficiency, and to determine if animals rank the same. One hundred heifers and seventy steers were measured for individual feed intake. Dry matter intake was used to calculate RFI and RG. The Pearson and Spearman rank correlations between RFI and RG were -0.16 ($P = 0.1108$) and -0.17 ($P = 0.0882$) for heifers, and -0.61 ($P < 0.0001$) and -.62 ($P < 0.0001$) in steers. While RFI and RG were moderately correlated in steers, the correlations indicate that there would be re-ranking of animals between the two measurements. Using each measure of efficiency would result in different animals being selected for the breeding program.

Honors/Leadership: University Honors Program; Gamma Lambda Scholarship; Rake n'Run

**Corncobs Fueling the Future:
Discovering Profitability Along the Supply Chain of Corncob Derived Ethanol**

Caleb E. Wurth, Leland J. McKinney
Department of Grain Science & Industry
College of Agriculture

The economic feasibility of alternative energy has been a heated topic in recent years. New advances in bio-processing has launched the Agricultural Industry into a frenzy to develop the next best viable bio-fuel source. In recent years, major U.S. ethanol companies have been researching ways to create bio-ethanol from various components of the corn plant; corncobs in particular. There are major gaps in the economic “field to fuel” models regarding corncob usage in ethanol production. Transportation, storage, and available sugar extraction are three major economic factors when determining if a fuel source can be feasible. The Department of Grain Science and Industry at Kansas State University has developed a project designed to look into various methods of increasing the profitability of the transportation, storage, and utilization of corncobs and corn stovers in ethanol production. The purpose of this research is to quantify the effect of pelleting corncobs and stovers in order to increase bulk density, thus allowing for more economical shipment and storage of the product while at the same time, determining sugar yield of the pelleted product. Sixty pounds of corncobs were ground to two different particle sizes through a 0.125 inch and 0.187 inch hammermill screen. Thirty pounds of corn stovers were also ground through using a hammermill equipped with a .187 inch screen. The samples were pelleted in five independent groups: 0.125in corncob, 0.187 corncob, corn stovers, 50%/50% mixture, and a 12%/88% mixture. Pellets were then tested for sugar extraction. A logistics model was created, comparing the difference in transportation costs and storage costs between pelleted and whole corncobs. Through this economic model we will be able to better define the economics associated with pelleting corncobs and stover before processing at ethanol facilities. Ultimately, these results will serve as a key reference for ethanol companies designing product logistics models.

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; Internships: Paragon Investments Inc., Cargill Horizon Milling; Pi Kappa Alpha Interfraternity Council; Feed Science Club; Agriculture Council; MANRRS; “The Importance of Defining the Methods Used to Determine and Express Fineness of Feed Materials by Sieving,” Feed Management Magazine January 2010

The Effects of 3D Television on Sport Attendance

Blake Franklin, Esther Swilley
Department of Marketing
College of Business

The purpose of my research is to investigate if and how sport attendance will change with the advent of 3D television. The practical importance of this research is understanding the differences between watching sports on 3D television and attending a live sporting event. Understanding the effects of enjoyment, motivation to see a sport, and involvement with the sport is the theoretical significance of this research. The variables include perceived enjoyment, game involvement, motivation, sport fandom and attitude toward the game. Surveys will be conducted after the sample watches a 3D sporting event, and attends a live sporting event. We will compare the survey responses to investigate the differences between 3D and game attendance.

Honors/Leadership: Dean’s Choice Scholarship; Rake N Run

Engineering Design of Introductory Control Theory Tools

Mentor: Warren N. White

J. Miguel Valdes, Joshua Ames, Victor Salazar
Department of Mechanical & Nuclear Engineering
College of Engineering

The teaching of introductory control theory is often associated with an additional laboratory section of the course in association with the lecture. In many cases, a tool consisting of a DC motor with the necessary feedback devices forms the basis of the laboratory experiments to demonstrate the application of control theory. In the Mechanical and Nuclear Engineering Department at Kansas State University, the experimental device is called the "MotorLab." The experimental systems are often expensive to purchase and there is no standardization between the manufacturers. Often times, universities build these devices in-house for the classes using the equipment. The KSU MotorLab is a simple affordable design accessible to all academia through the Mechanical and Nuclear Engineering Department website. Along with the Motorlab are traditional specialty devices, such as the inverted pendulum cart, used in technical electives classes and graduate courses. The current MotorLab devices are ten years old and need to be replaced. A prototype design was completed and built in the spring of 2010. An improved design for the MotorLab was developed during this academic year, one that is less expensive than the prototype. In addition to the redesign, a complete parts list with price and shipping expenses was compiled so that the manufacturing costs could be estimated. The inverted pendulum cart is being redesigned for three major reasons. The three reasons consist of replacing aging parts, providing better traction, and incorporating wireless fidelity (wi-fi) control of the device. The basis for the redesign is to provide a steppingstone to a more complex application of control theory, which is ultimately a major component of the research.

Honors/Leadership (Miguel Valdes) : Purple and White Scholarship; Edgerley-Franklin Urban Leader Scholarship; Rake N' Run; DSP Food Drive and Mittens for Many; Martin Luther King Day of Service; Kansas City Urban Service Spring Break

Honors/Leadership (Joshua Ames): Ecological Genomics Institute Internship; Rake N' Run; Food For Thought; DSP Food Drive and Mittens for Many

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

Sound or Subtitle

Mary Elizabeth Jackson, Richard Jackson Harris
Department of Psycholinguistics
College of Arts & Sciences

This experiment was designed to further understand how people process information in movies whether from dialogue or subtitles in a second language. For this test the subjects first answer a few questions that result in finding out how much Spanish they have been exposed to prior to this experiment. The subjects next watch a short clip from the movie Sense and Sensibility with either Spanish sound and English captions, English sound and Spanish captions, Spanish sound and Spanish captions, English sound and English captions, Spanish sound and no captions, English sound and no captions, Spanish captions and no sound or English captions and no sound. Next the participants are given a thirty-four-question multiple-choice test. Ten of the questions are only related to pictorial information while the other twenty-four are questions designed to test comprehension of information that appeared in both the dialogue and subtitles. Results will compare the number correct in each condition to determine the relative efficacy of acquiring information from soundtrack versus subtitles and native language versus second language/foreign language.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Kansas City Urban Service Spring Break; International Service Trip to Mexico; Hope Ranch Volunteer; Rake N' Run; Bilingual: English/Spanish

Incorporating Multiple Stargates in a Wireless Mesh Sensor Network

Roberto Diaz, Gurdip Singh, Sumeet Gujrati, Sudhir Reddy
Department of Computing & Information Sciences
College of Engineering

A Wireless Mesh Sensor Network (WMSN) is a network of small, power-efficient sensors. These sensors communicate wirelessly by sending each other's packets with the goal collecting the information at the gateway, which is connected to a PC. Ongoing research being done on WMSNs has allowed the identification of several problems. One problem with the software application currently being used is that it does not allow for tiered grouping and visualization of motes and Stargates. This is a problem as a WMSN could potentially be a large network, making a topological view hard to understand and organize. Battery life of sensor nodes is another issue. A problem being researched to address this issue is the creation of software applications which can be used for energy efficient monitoring of sensor nodes. An approach being explored is to allow connecting multiple Stargates on one User Interface (UI), which would allow organization of a WMSN by levels (i.e., each level could represent a floor or a building in a WMSN spanning multiple buildings). This eliminates communication between nodes connected to different Stargates. For the set of nodes connected to a single Stargate, better workload distribution and power consumption can be further reduced by grouping them by different group IDs. This curtails unnecessary communication between motes, but allows the organization of data to be accessed on one UI. For example, multiple floors have different ambient light readings and use of different group IDs eliminates communication between motes on different floors as they are focusing on different areas. These advances would allow for better deployment of WMSN and improve the scalability and efficiency, thus making it more commercially deployable.

Honors/Leadership: Bridges to the Future; Rake N' Run; Food For Thought; DSP Food Drive and Mittens for Many

Detection of Vancomycin Resistant Enterococcus (VRE) from Horse Feces

Joshua Springfield, R. G. Amachawadi (1), David. G. Renter*(1), H. M. Scott (1), E. G. Davis (2), T. G. Nagaraja (1)

(1) Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine.

(2) Department of Clinical Sciences, College of Veterinary Medicine

* Corresponding author

Vancomycin is a glycopeptide antibiotic most often used to treat infections caused by gram-positive bacterial pathogens. Acquired resistance to vancomycin is becoming more common in *Enterococcus* sp. and most often the resistance (van) genes are carried on a plasmid. Vancomycin-resistant enterococci (VRE) have emerged as important nosocomial pathogens in the United States. Because the van gene arising from enterococci in horses has not been reported in the United States, we conducted a study to determine the occurrence of different types of van resistant genes among fecal enterococcal isolates of horses. Vancomycin is sometimes used in horses to treat enteritis. To accomplish our objective, we collected fecal samples from horses which were presented to a veterinary hospital with a history of enteritis and that were subsequently treated with vancomycin. For initial screening, we collected fecal samples from four horses and the enterococci were selected using selective media; specifically, mEnterococcus agar with and without vancomycin at 20 µg/ml. An equal number of isolates from both of the isolated groups (n=20) were subjected to preliminary identification by the esculin hydrolysis test. A total of 40 enterococcal isolates will further be examined for the presence of vancomycin resistance using both phenotypic as well as genotypic assays. Speciation, genotypic characterization, and screening for other antibiotic resistant determinants are currently being undertaken.

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Rake N' Run

Extinction Times of Solutions to a Degenerate Parabolic Equation

Perla Salazar, Marianne Korten, Charles Moore

Department of Mathematics

College of Arts & Sciences

Our work deals with explicit similarity solutions of the special case where $M=0$ and $N=0$ in the degenerate parabolic equation

$$u_t = \operatorname{div}(u^M |\operatorname{grad} u|^{N-1} \operatorname{grad} u).$$

In this case the equation becomes
$$u_t = \operatorname{div} \left(\frac{\nabla u}{|\nabla u|} \right).$$

$$u_t = \operatorname{div} \left(\frac{\nabla u}{|\nabla u|} \right).$$

We find radial similarity solutions to the equation

Using these solutions, a comparison theorem, and radial solutions of other authors, we give close upper and lower estimates of the extinction time of entropy solutions for a large class of initial data.

Honors/Leadership: Real Industrial Mathematics Program, Institute for Pure & Applied Mathematics, UCLA; Bridges to the Future; Rake N' Run; DSP Food Drive and Mittens for Many; DSP lecture series presenter; Nebraska Conference for Undergraduate Women in Mathematics, presenter; McNair Heartland Conference presenter; Bilingual: English/Spanish

Foam Stability

Courtney Bell, Can Chen, Karen Schmidt

Department of Food Science

College of Agriculture

The objective of this study is to evaluate the foaming properties of low and high heat nonfat dry milk (NDM). Nonfat dry milk can be an ingredient used for baking, infant formulas, and several other dairy products. Because of the diversity of the use, NDM is processed using two heat treatments which affect protein denaturation, and in turn influences the functional properties, such as foaming. Low heat (LH) and high heat (HH) NDM were obtained from commercial suppliers, hydrated to 3.5% protein and evaluated. Findings of my research show that: the HH treatment had a maximum air capacity of 1432% at 45 min vs. the LH sample had a maximum air capacity of 943% at 60 min. When comparing foam capacity after 30 min of whipping the LH had 550% overrun, whereas HH had approximately 1350% overrun, indicating greater air incorporation. The foam from the HH NDM was more stable compared to the LH NDM sample. These results would indicate that HH NDM is a better ingredient choice in a product such as an instant cappuccino mix.

Honors/Leadership: Cargill Scholarship; Memorial Scholarship; Hill's Pet Nutrition Scholar; Rake N' Run

Contributions of the Cystic Fibrosis Transmembrane Conductance Regulator to Ion Transport in Ferret Male Reproductive Ducts

Jimmie C. Stewart III, Fernando Pierucci-Alves, Bruce D. Schultz
Department of Anatomy & Physiology
College of Veterinary Medicine

Cystic Fibrosis (CF) is a recessive genetic disorder affecting multiple organs including reproductive tracts of male patients resulting in azoospermia and infertility. Multiple murine CF models have been produced, but each shows limited manifestations that are similar to those of human CF patients. More recent models include the CF Pig and the CF Ferret. We showed previously, using a limited number of tissues from affected newborns, that abnormalities in the reproductive tract that are comparable to the conditions reported for male CF patients are present in the porcine model. Cells isolated from normal pig vas deferens exhibit increases in short circuit (a sensitive indicator of net ion secretion or absorption) in a response to norepinephrine, bradykinin, and prostaglandins, indicating bicarbonate and chloride secretion, likely mediated by the CF protein. The purpose of this project is to determine if the CF ferret model, which is available commercially, will manifest similar abnormalities. A benchmark data set must be acquired first to determine whether ferret tissues exhibit ion transport processes and capabilities that are similar to those reported for pigs and humans. Ferret vas deferens epithelial cells will be isolated and seeded on permeable supports to grow confluent monolayers. Monolayers will then be tested for short circuit current responses to autotoxins and neurotransmitters including adenosine, bradykinin, prostaglandin, norepinephrine, acetylcholine and serotonin. Chronic effects of androgens and corticosteroids on cation absorption and on the regulation of anion secretion will be examined. Ion substitution studies will be performed to identify ions that contribute to the short circuit current. Ultimately experiments will be conducted using the ferret model to determine the developmental stage at which CF-associated tissue pathology is first observed, and to develop interventions to preclude or circumvent tissue malformation. [Supported by NIH HD058398.]

Honors/Leadership: Terry C. Johnson Cancer Research Award; Phi Theta Kappa Honor Society; Bridges to the Future; Memorial Scholarship; Sigma Lambda Beta; Wonder Workshop

Evaluating the Mediation Effect of Engagement on Health-Turnover Intention

Kathy Nguyen, Michael Smith, Andrew Wefald
School of Leadership Studies
College of Human Ecology
College of Education

Engagement is a “positive, fulfilling, work-related state of mind characterized by vigor, dedication and absorption” (Schaufeli et al., 2002, p. 74). Saks (2006) suggested that engaged workers are more likely to have a greater level of commitment, involvement and exert more energy and have a reduction in turnover intentions. The current research seeks to build on Saks research to explore the roles of both health and engagement as they relate to the reduction of turnover intentions. Using a sample of 717 employees in casual dining restaurants, a mediated model of turnover intentions was evaluated. A mediator accounts for the relationship between the predictor and outcome variable. Findings supported a partially mediated effect of engagement on health and turnover intentions. Implications are discussed.

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Phi Kappa Phi; Multicultural Student Honor Society; Tyson Family Foundation Scholarship; Vietnamese Student Association; United Multicultural Women; Bilingual: English/Vietnamese

Towards understanding of the house fly - bacterial symbiosis

Kale Lothamer, Ludek Zurek

Department of Entomology/Diagnostic Medicine & Pathobiology

Colleges of Agriculture & Veterinary Medicine

House flies (*Musca domestica* L.) are the most important non-biting insect pest of medical and veterinary importance. House fly larvae strictly develop in decaying organic substrates that are comprised of rich and active microbial communities essential for house fly larval development. While the principle of this symbiosis is not understood, this association likely plays a fundamental role in vector potential of house flies for parasites and pathogens. Microbial communities potentially provide nutrition for the house fly larvae through degradation of organic substrates or synthesis of essential nutrients (e.g. vitamins). In this study, *Escherichia coli* K-12 was chosen as a model organism, and a single-gene knockout mutant collection of this strain has been used to analyze significance of genes involved in bacterial metabolism for house fly development. For each bioassay, ten first instar larvae were transferred to kanamycin supplemented egg yolk tryptic soy agar (EYTSA), and the experiments were performed in triplicates. Insect mortality, pupation, adult emergence as well as time to pupation and adult emergence were measured. The wild type isolate and sterile EYTSA were used as positive and negative control, respectively. Out of 162 mutants, seven (4.3%) showed significantly lower support (<15% pupation) for the fly survival compared to that of the wild type (30%). Out of these 7 mutants, 5 genes are part of lipid metabolism: *yciA* (predicted hydrolase), *ygbJ* (predicted dehydrogenase with NAD(P)-binding Rossmann-fold domain), *ynjF* (predicted phosphatidyl transferase, inner membrane protein), *yjgI* (predicted oxidoreductase, with NAD(P)-binding Rossmann-fold domain), and *hdhA* (7 α -hydroxysteroid dehydrogenase, NAD-dependent) and the remaining two genes, *yafE* (predicted S-adenosyl-L-methionine-dependent methyltransferase) and *yrbD* (predicted ABC-type organic solvent transporter) are associated with secondary metabolites biosynthesis, transport, and catabolism. Evaluating effects of individual genes on fly survival will lead to information on the principle of this insect-bacterial symbiosis and provide a platform for development of new management strategies for this insect pest.

Honors/Leadership: Ecological Genomics Institute Internship; Baeten Farm Scholarship; Fairchild Scholarship; Rake N' Run; Spooktacular; Harvesters of KC, Missouri; Cats for Cans; Shoes 2 Share

Trends in Carbon Nanotube Research and Its Implications to Ultra-Capacitors

Oscar Rodriguez, Saeed M. Khan

Department of Engineering Technology

College of Engineering, K-State Salina

The purpose of this research is to investigate the future and current state of carbon nanotube technology and its implication to ultra-capacitors. This research will employ an in-depth study of carbon nanotubes, capacitors, and testing of ultra-capacitors. Evaluations of these subjects will determine the application of carbon nanotubes in the construction of more efficient capacitors capable of holding a greater charge in a smaller area. The knowledge gained by the study will assist K-State Salina researchers in the design of a cutting-edge power management system for Unmanned Aerial Vehicles. The research goals of the project include conducting a critical literature search into the state-of-the-art in carbon nanotube technology; ethical issues with nanotechnology; application of ultra-capacitors in electric power management systems; and participation in the building of a complete power management system.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholarship; Elite Scholarship; SIFE 2009 Competition Presentation; Rake N' Run; Kansas City Urban Services Spring Break; Premier DSP Scholar; K-State Salina; Bilingual: English/Spanish

Regulation of Gap Junctions in Colon Cancer Cells

Kristina Bigelow, Thu A. Nguyen

Department of Diagnostic Medicine/ Pathobiology

College of Veterinary Medicine

Colon cancer is one of the most common cancers in the United States with a high predisposition to metastasize. Cancer cells exhibit many deficiencies in cell-to-cell communication, particularly gap junctional intercellular communication (GJIC). GJIC has been reported to diminish as cancer cells progress. Gap junctions are intercellular channels composed of connexin proteins, which mediate the direct passage of small molecules from one cell to the next. They are involved in the regulation of cell cycle, cell differentiation, and cell signaling. Since the regulation of gap junction is lost in colon cancer cells, the goal of this study is to restore GJIC in colon cancer cells. Recently, substituted quinolines (PQs), gap junction enhancers, have been shown to increase gap junction activity in breast cancer cells. The level of Cx43 is low in SW620 and SW480 human colon cancer cells. Transfected Cx43 cells have a 6-fold increase of gap junction activity compared to control using scrape load/dye transfer assay. Western blot analysis confirmed that a significant level of Cx43 was expressed in transfected Cx43 cells compared to control. This suggests that overexpressing Cx43 can restore GJIC. Interestingly, 200 nM PQ1 causes a 4-fold increase of gap junction activity as well and subsequently causes a decrease in cell proliferation by 15%. However, TPA, GJIC inhibitor, can reverse the gap junction activity of transfected Cx43 or treated PQ1 cells. Further analysis of Cx43, survivin, and cyclin D1 in treated cells was observed. Overall, the results show that substituted quinolines can directly enhance gap junction activity and attenuate cell proliferation in colon cancer cells. The findings provide an important implication in which restoration of gap junction activity can be targeted for drug development.

Honors/Leadership: Academic Honors; Target on Excellence presenter; American Association for Cancer Research Annual Meeting; K-INBRI Symposium; K-INBRE Scholar; Terry C. Johnson Cancer Award; AACR Undergraduate Student Member; Hill's Pet Nutrition Scholar; Presentations: American Association for Cancer Research (AACR) Annual Meeting in Orlando, FL; K-INBRE; NIH National IDEa Symposium in Washington D.C.; 2010; Undergraduate Research Forum; Phi Zeta Research Day; Biomedical Research Excellence; Rake N' Run; Fair Trade Marketplace

Assessment of Hand Hygiene by Equine Veterinary Personnel

Priscilla De Los Santos, Elizabeth Davis, Katherine KuKanich,

Gina Jensen

Equine Veterinary Teaching Hospital

College of Veterinary Medicine

This project focused on observing hand hygiene frequency of veterinary personnel in a clinical equine veterinary teaching hospital. Previous studies, performed in human medical hospitals, have demonstrated that overall hand hygiene compliance is about 39%. This project aims to extend these data to include an equine veterinary setting to determine if hand hygiene frequency differs. Observations included: personnel, gender, staff position, patient identification, illness of patient, and hand hygiene procedure before and after contact with any equine patient. Hand hygiene attempts were recorded as 1) rinsing hands with water, 2) use of soap and water and/or 3) utilization of hand sanitizer stations located around the facility. We observed that 5/36 (14%) students performed hand hygiene, compared with 6/20 (30%) clinicians, and 3/7 (57%) technicians in the hospital. Of those that did practice hand hygiene, only 1/14 (7%) was observed to wash their hands both before and after handling a patient. In comparison, 12/14 (86%) only practiced hand hygiene after patient contact and 1/14 (7%) washed their hands just prior to coming in contact with a patient. Overall, 78% of observed personnel that manage equine patients did not wash their hands before and/or after contact with a patient. These findings will be used to increase awareness regarding personal hygiene in an equine veterinary clinical setting.

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

Efficacy of Anticancer Drugs in 3-Dimensional Cell Culture

Morgan Armbruster, Thu A. Nguyen
Department of Diagnostic Medicine/Pathobiology
College of Veterinary Medicine

Breast cancer is the second most common cancer in women. There are many factors that have shown to increase the risk of breast cancer. One example is that women who started using oral contraceptives as teenagers are at an elevated risk for developing breast cancer (NCI). Until a cure or better treatments are found, early detection is the most that women can do by giving them self-exams and visiting their physician if any questions arise. In search of a better treatment, the development of an in vitro model, imitating in vivo breast carcinomas, is needed. Using animal models have consistently been a challenge due to a high cost and intricacy. Breast cancer cells are commonly extracted from human cancer patients and grown on a 2-dimensional (2D) tissue culture, for experimental purposes. After years of preliminary data, well-supported and advancing therapeutic approaches can be administered to animal models in a clinical trial setting for further testing. Because actual tumors are a 3D structure, the goal of the project is to create a 3D structure from breast cancer cells in an in vitro setting and determine the efficacy of anticancer drugs. Using soft agarose with cell culture media, cells were grown at different concentration of agarose and density of cells. Breast cancer cells were treated with various concentrations of anticancer drugs in 3D cell culture. The results show that anticancer drugs, PQ11 and PQ15 show a significant decrease in cancer cell proliferation compared to control or solvent alone in a 3D culture. Further analysis using immunofluorescence assay will be performed. The outcome of this work will lead to quicker testing of a therapeutic drug and a better way to mimic tumors in a 3D environment.

Honors/Leadership: DSP lecture series presenter; Kandance; Rake N'Run

Integration of Similar Professions

Alejandro De Luna, Raymond Buyle
Department of Architectural Engineering & Construction Science
College of Engineering

Collaboration is a major factor that contributes to the success of delivering a construction project to the owner. Based upon the delivery method, collaboration between the design team and the contractor varies. By comparing the hard-bid and design-build delivery methods, we explored how integrating the contractor in the design process affects the cost, schedule, and delivery of the project to the owner. To explore this, we participated in various student competitions which focused on the design-build delivery method. From the analysis of these competitions, a survey was created for both design and construction professionals to acquire an opinion from the building industry. In order to confirm the accuracy of the answers to the survey, professional meetings were attended where I acted as a visiting student and the various professionals were not aware of our research. The results will be used to increase collaboration between students from the College of Architecture and the Department of Architectural Engineering and Construction Science and Management.

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

Proso Millet Potential: ethanol fermentation performance of proso millets

Emma Brace, Donghai Wang
Department of Biological & Agricultural Engineering
College of Engineering

Proso millet is a major alternative crop for dry land producers and is well-adapted to the Mid-West. Proso millets showed great potential for use as raw material in producing ethanol. The objective of this research was to study the ethanol fermentation performance of proso millets as an energy crop. Furthermore, the aim was to study the possibility of combining proso millets with corn and sorghum in an attempt to increase the fermentation efficiency of corn and sorghum. Approximately six proso millet varieties were evaluated. The starch, protein, oil, fiber, and ash content of each sample was analyzed using standard methods. The effects of solid content, fermentation time and the ratio of millets to corn or sorghum on ethanol yield were determined. In addition, the effects of starch content, protein content, and amino acid content on ethanol yield were also studied. In general, the ethanol fermentation efficiencies from 88 to 93% were obtained depending on type of variety. The fermentation efficiencies of the mixtures were the same or higher than corn or sorghum fermented along. The fermentation results showed that proso millets are promising as an energy crop for biofuel production.

Honors/Leadership: Academic Honors; Edgerley-Franklin Urban Leadership Scholarship; President's Scholarship; Society of Women Engineers; KSU Marching Band; Marthin Luther King Day of Service

Embryo Transfer and Knockout Rat Production

Phuoc Bui, James Hong, Mark L. Weiss
Department of Anatomy & Physiology
College of Veterinary Medicine

Embryonic stem (ES) cells are pluripotent in vivo. ES cells are able to differentiate into the primary germ layers: ectoderm, endoderm, and mesoderm. Though ES cells are undifferentiated under optimal culturing conditions, they proliferate at an incredible rate. This has led to research with ES cells being injected into donor embryos and implanted within the reproductive tract of recipients, resulting in the formation of chimeric offspring comprised of two different cell types: host cells and ES cell derivatives. According to literature, injecting a mouse blastocyst with 10-15 ES cells is the optimal amount; otherwise too few will not result in cell proliferation and too many will prove toxic to the embryo. Here, we aim to optimize the production of chimeric rats. Our hypothesis is that 5-7 ES cells will be optimal to produce chimeric rats. To test this hypothesis, we will inject embryos collected at 4.5 days post coitum (dpc) from Fischer F344 rats with 1-15 Dark Agouti ES cells into the blastocoele cavity, then transfer the injected embryos into the uterine horn of pseudopregnant Sprague-Dawley rats at 3.5 dpc. Transferring embryos into pseudopregnant recipients that are one day less mature allows the embryos time for resynchronization with the reproductive tract. We will have three trials consisting of 10 rats per trial; each rat will receive 12 injected embryos (6 embryos per uterine horn) containing 1-4, 5-7, and 8-15 DA ES cells, respectively. Upon successful injection, blastocysts are cultured in medium under oil and transferred to a 37 °C at 5% CO₂ incubator for recuperation and reexpansion following the trauma of injection. Embryos will not be cultured longer than 6 hours before they are transferred to the recipients. We will record the number of live born pups and the number of coat-color chimera found. If our hypothesis is valid, then the most chimeras will be found in the group that receives 5-7 DA ES cells (using ANOVA and post hoc analysis).

Honors/Leadership: Bridges to the Future; University Honors Program; PTK All-Kansas Transfer Scholarship; Mortar Board Honor Society; Transfer Ambassador; Rake N' Run

A Clogged Artery: An Analysis of Human Trafficking in the Heart of America

Ariel Anib, Nadia Shapkina
Department of Sociology
College of Arts & Sciences

Over 27 million people are trafficked worldwide. Human trafficking can have many faces: forced prostitution, bonded labor, involuntary servitude, and more. This issue is not limited to countries outside of the United States but can occur within the border. Although there is significant data about trafficking in some states, currently, there is not much research or publicity over human trafficking in Kansas.

This study examines the methods that nonprofits, law enforcement, and the government use to combat human trafficking in Kansas. The objective of our research this year is to provide nonprofit agencies and the citizens of Kansas with an in-depth look at the extent of trafficking in Kansas. In order to accomplish our objective, I conducted a literature review, a survey by email, along with interviews of various nonprofit agencies and law enforcement.

Our preliminary analysis shows that Kansas City and Wichita are hot spots for trafficking due to their proximity to I-35. An analysis of the interviews and surveys will allow us to answer the following questions: What does trafficking look like in Kansas? What are the root causes? What forms of assistance do nonprofit agencies provide in combating this issue? What collaborative efforts can be formed among the major actors in anti-trafficking?

Honors/Leadership: Academic Honors; Inaugural Wildcat Peace Award; Housing Leadership Scholarship; International Service Team in Mexico; Student Governing Association; Leadership Ambassadors; Wildcat Warm-Up Counselor; Sigma Delta Pi; Nonprofit Leadership Student Alliance; K-Staters that Care; Multicultural Student Honor Society; Bilingual: English/Spanish

Greeks Go Green For Take Charge Challenge

Karmen E. Harris, Noel Schulz
Department of Electrical & Computer Engineering
College of Engineering

In 2009, the Take Charge Challenge started as a nine-month-long, energy-saving competition between six neighboring Kansas towns. The results of the competition were so positive that the Department of Energy has since encouraged other competitions among neighboring communities. Now, a competition between Manhattan, KS, home of Kansas State University, and Lawrence, KS, home of the University of Kansas, has taken the challenge to see which community can reduce residential and small business energy use. Research was conducted in conjunction with the Kansas State University Greek community to analyze how their energy consumption habits and attitudes are shaped by different factors. In order to gather this data a short pre-survey was given to specific Greek chapters before a 10 minute presentation on the Take Charge Challenge and how they can get involved. Then a post-survey was given to see if their attitudes had changed. Using these surveys, results will be determined to compare attitudes between men and women, students of different years in school as well as to compare students from different parts of Kansas (city, town or rural). These results will help determine future programming activities.

Honors/Leadership: James R. Coffman Award of Excellence; 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; Rake N' Run; CATS for Cans; Bag Lady Luncheon

Defining species boundaries in grassland soil nematodes

Abraham Denner, Brian Darby, Michael Herman

Department of Biology

College of Arts & Sciences

Approximately 80% of all multi-cellular animals are nematodes and they occupy nearly all habitats globally. Grassland soil nematodes are important components of the food web that regulate plant available nutrient cycles. Despite their ecological importance, in many cases we know very little about the basic biology of many of these nematode species, even those that can be found in our own back yard. For example, several species of the family Rhabditidae are native to the Konza prairie. For at least two of these species (in the genus *Mesorhabditis*), the definition of a species is unclear because they are thought to reproduce asexually, but still require a male. Historical reports suggest that these two species (presently called MR1 and MR2) may reproduce by pseudogamy, meaning that females require mating with males to initiate embryogenesis, but sperm disintegrate in the cytoplasm as the embryo develops parthenogenetically without any male genetic contribution. Our current project seeks to understand species boundaries by testing whether these species are indeed pseudogamous, how widespread this phenomenon is, and what the ecological and evolutionary implication of pseudogamy are for soil nematodes. We have cultured several isolates of nematodes from Konza prairie soils and are employing a PCR assay to determine whether they represent new or previously known species. For species of the genus *Mesorhabditis*, we will test for mating compatibility between the isolates to delineate species boundaries. Preliminary results suggest that around 60% of the isolates are of known species, but the remaining 40% are either un-described or not previously known to be on Konza. In order to work with these species in the lab, we had to work out optimal conditions for determining species boundaries by “mating” tests. We have determined that at least two males mated with three females of the same species reliably produces progeny as a positive assay for successful mating. This work helps us understand the basic biology of nematodes so that we can understand the individual roles of different species within their environment, and how each contributes to ecosystem functions such as nutrient cycling.

Honors/Leadership: Ecological Genomics Institute Internship; K-State Book Network Committee member

Personality and Perceptions of Racial Discrimination Perpetrators within the Context of Political Messages

Jaime Arreola, Brenda L. McDaniel

Department of Psychology

College of Arts & Sciences

Racial discrimination in the political arena is common with minority fear-based political tactics being an effective way to influence voting patterns (van Dijk, 2000). However, more studies focusing on the perceptions of these political candidates' personalities are needed. It is currently known that perpetrators of racial discrimination are associated with lower levels of agreeableness (Akrami & Ekehammar, 2006), higher levels of social dominance orientation (Sidanius & Pratto, 1999), and lower levels of empathy (Sue, 2010). Building on this work, the present study will examine racial discrimination perpetrators' levels of empathy, ability to forgive, gratitude, resiliency, and past trauma. Moreover, perceptions of personality in racist or neutral political candidates will be examined.

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

Response of RWPE-1 and WPE1-NA22 Prostate Cell Lines to Androgen Treatment

Johanna Diaz, Brian L. Lindshield
Department of Human Nutrition
College of Human Ecology

According to the American Cancer Society, prostate cancer (PCa) is the most commonly diagnosed male cancer. PCa cells in the early stages of the disease are androgen-dependent, meaning that androgens increase cell proliferation. In PCa, the androgen testosterone is converted by the enzymes 5-alpha-reductase 1 & 2 into the more potent androgen dihydrotestosterone (DHT), which is preferred by androgen receptors to bind with, and initiate cell growth. Much research has gone into antiandrogen treatments to slow PCa progression and/or tumor growth. In a previous study, we observed poor growth of WPE1-NA22 PCa xenografts in nude mice. One potential reason for the inadequate growth is that WPE1-NA22 cells may not be androgen-sensitive, meaning androgens did not increase their proliferation. To test this hypothesis, WPE1-NA22 cells and its parent cell line, RWPE-1 prostate epithelial cells, were plated in 96-well plates with 10,000 cells/well. The cells were then treated with different concentrations of DHT, testosterone, and the synthetic androgen mibolerone for 5 days. Cell numbers were quantified using the CellTiter96 Aqueous Cell Proliferation Assay. To our surprise, none of the androgen treatments increased cell numbers in either cell line. The RWPE-1 cell line has been reported to be sensitive to mibolerone, contrary to our findings. The lack of androgen-sensitivity may explain the poor WPE1-NA22 prostate tumor growth. Because much remains unknown about these cell lines, this study provides new information about their potential limitations. Our findings suggest they may not be as good of a choice for PCa research compared to other PCa cell lines that are androgen-dependent or androgen-sensitive.

Honors/Leadership: Academic Honors; Golden Key Honor Society; Bridges to the Future; McNair Scholar; LULAC; Rake N' Run

Bacillus anthracis toxins alter sympathetic nerve discharge and arterial blood pressure regulation

Anthony Garcia, Rick Fels, Mike Kenney
Department of Anatomy & Physiology
College of Arts & Sciences
College of Veterinary Medicine

Cardiovascular complications are a crucial component of *Bacillus anthracis* infection, yet little is known about the influence of *Bacillus anthracis* toxins on sympathetic nerve discharge (SND) regulation despite its important role in blood pressure regulation. Lethal toxin (LeTx) and edema toxin (ETx) are produced by *Bacillus anthracis* and they are composed of protective antigen (PA) and either lethal factor (LF) or edema factor (EF). The present experiments examined the effects of LeTx on functional characteristics of SND regulation in anesthetized rats. SND (renal and splenic) and mean arterial pressure (MAP) were recorded before and during intravenous toxin or vehicle infusions (6 hrs). SND was progressively increased whereas MAP remained unchanged during the first several hours after initiation of LeTx infusion (100 µg/kg LF + 200 µg/kg PA); however, approximately 3-5 hours after initiation of LeTx infusion, both MAP and SND were progressively reduced. Nitroprusside-induced reductions in MAP produced substantial increases in SND. LeTx infusion altered the bursting pattern and the frequency-domain characteristics of SND. These data suggest that altered regulation of SND may contribute to the pathophysiology associated with *Bacillus anthracis* infection. NIH HL-092392.

Honors/Leadership: Academic Honors; Phi Kappa Phi; Bridges to the Future; Golden Key Honor Society; Multicultural Student Honor Society; Alpha Epsilon Delta; McNair Scholar; DSP lecture series presenter; Jame R. Coffman Award of Excellence Honorable Mention; Journal of Regulatory and Integrative Physiology; National Science Foundation Experimental Program to Stimulate Competitive Research (EPSCoR) Participant; State of Kansas Pioneer Award; Kansas State University Alumni Association Club Scholarship; Memorial Scholarship; Rake N' Run; Mittens for Many

Analyzing Retention and Degree Completion in Undergraduate Research Programs

Valerie Rito, Kimberly Douglas-Mankin
Industrial Engineering
College of Engineering

The Developing Scholars Program (DSP) is a research-based undergraduate program that matches students with faculty mentors to conduct research in their area of study. According to the DSP website, the program provides students with academic, social and financial support while participating in the discovery and creation of new knowledge at Kansas State. DSP targets students that are historically underrepresented in higher education or that are first-generation college students. Our primary objective is to evaluate the effectiveness of DSP by looking at several performance metrics. Participants will be compared to a matched comparison group as well as general population. Comparisons will be made with respect to retention and GPA, and further subdivided by demographic group, college, and number of years participating. Retention will be looked at within department, within college, and within the university. We will also look specifically at Science, Technology, Engineering, and Mathematics majors (STEM) due to recent national focus, such as President Obama's "Educate to Innovate" campaign (White House Secretary, 2009). We hope that the results of this research can be useful to inform future programming decisions.

Honors/Leadership: Memorial Scholarship; Cat Crew; Rake N' Run; DSP Undergraduate Assistant

Synthesis of Zirconium Nitride by Nitridation of Zirconium

Evgeniy Shishkin, James H. Edgar
Department of Chemical Engineering
College of Engineering

The nitridation kinetics of zirconium metal via the reaction $\text{Zr} + \text{N}_2 = \text{ZrN}$ and the resulting properties of the nitride are reported. The reaction kinetics were determined as functions of the temperature (1450 °C to 1650 °C) and nitrogen pressure by measuring mass gain. A zirconium foil was annealed at various temperatures and pressures (200-900 torr) in a tungsten furnace. To minimize the effect of diffusion nitrogen through the ZrN, a 0.2mm thick zirconium foil is used. Several samples were ground to powder, and x-ray diffraction patterns were taken, to determine their composition (fraction of Zr and ZrN) and lattice constants. The fraction of nitridation was determined by the weight difference before and after the heating process. The general trend of increase in fraction of nitridation over time was obtained with increase in temperature for time dependent trials and decrease in pressure for pressure dependent trials. An exact relationship is yet to be established, however the linear trend for temperature dependent trials could be seen, while third order polynomial trends could be seen from pressure dependent trials. X-ray Diffraction (XRD) was useful in determining ZrN presence but the unconverted Zr was rarely identified. Future work will further analyze the samples using XRD at a slower deg/min and use scanning electron microscopy (SEM) to determine the spatial distribution of nitrogen. Ultimately, zirconium nitride is useful as an electrical substrate for gallium nitride based light-emitting diodes (LED). It will enable simpler device designs that operate with greater efficiency.

Honors/Leadership: Academic Honors; Target on Excellence Presenter; Highway Cleanup Volunteer; Phi Kappa Theta; Bilingual: English/Russian

Evaluation of a transdermal gel of the analgesic fentanyl

Alexandra Dominguez, Butch KuKanich, Deon van der Merwe, Bryan Meyer

Department of Anatomy & Physiology

Department of Diagnostic Medicine/Pathobiology

Department of Anatomy & Physiology

College of Veterinary Medicine

Over the years, there has been an increased interest in animal welfare and more concern placed in an animal's comfort, in this case, dogs. There have been recent studies that involve finding novel methods of more efficient drug administration. The goals of these new methods are to reduce the abuse potential of the drug and provide a more potent and long-lasting effect with a lower dosage. The method of administration is also desired to be more convenient and easy.

For this research project, the drugs that are being used are buprenorphine and fentanyl. For these two drugs, the method that we are aiming to improve is a transdermal patch. A patch on the skin would be much easier to administer, would be a lower dosage, and would be expected to have less adverse side effects than intravenous administration.

Initial studies examined different gel formulations in an in vitro flow through diffusion cell system. Dermatomed human skin was placed between a donor compartment and the flow through receiving compartment. The gel was placed in the donor compartment and a receptor solution, designed to mimic blood plasma, was pumped continuously through the receiving compartment. The receptor solution was collected at hourly intervals for 8 hours and the drug concentrations measured by liquid chromatography with mass spectrometry. The flow-through system allowed the rapid assessment of numerous gel formulations in order to develop the ideal gel formulation. Different combinations of isopropyl alcohol, ranging from 10-50% or ethanol, ranging from 0-50% were assessed as penetration enhancers. Hydroxyethyl cellulose was assessed as the gelling agents with molecular weights ranging from 250,000 – 1,300,000 daltons and concentrations ranging from 0-10%.

Using the gel and drug concentrations that were found to have the greatest drug flux with the lowest concentrations of penetration enhancers and gelling agents, two different gels were created using 5% hydroxyethyl cellulose with 10% isopropyl alcohol. The first gel contains fentanyl, 1 mg/mL and the second gel contains fentanyl, 1 mg/mL and naloxone 10 mg/mL. Four dogs were included in the initial study which is approved by the Institutional Animal Care and Use Committee at Kansas State University. We applied these gels to a shaved area of the neck and covered them with an occlusive bandage. Blood was collected from all of the dogs 1, 2, 4, 8, 12, 24 and 30 hours after patch application. These samples were then analyzed by liquid chromatography with mass spectrometry to measure the drug concentration found in the blood over time.

No adverse effects were observed after patch application. One of the dogs prematurely removed the patch at 8 hours. Mean plasma concentrations peaked at 0.24 ng/mL at 8 hours.

Fentanyl was absorbed by transdermal delivery in dogs. The peak concentrations were lower than the targeted concentration of 1 ng/mL suggesting the dose needs to be increased. Further studies will assess higher doses and the second gel combination.

Honors/Leadership: Legacy Scholarship; Rake N' Run; DSP Food Drive and Mittens for Many

Immunomodulatory effects of a peptide from dog neutrophils on B6MP macrophages

Jaime Tobon, Maricela Robles-Murguía, Tonatiuh Melgarejo, Marcelo Ramalho-Ortigao

Department of Entomology, Department of Human Nutrition

College of Agriculture

College of Human Ecology

College of Arts & Sciences

Phlebotomine sand flies (Diptera:Psychodidae) are the main vectors of leishmaniasis, a multi-spectrum disease ranging from skin lesions to a potentially fatal visceral disease. Leishmaniasis is considered a neglected disease and is present in 88 countries affecting millions of people. One of the ongoing research lines in our laboratory examines the possibility of utilizing peptides identified from dog neutrophils, and found to kill *Leishmania major*, the causative agent of zoonotic cutaneous leishmaniasis in North Africa and the Middle East, and *Le. infantum*, causative agent of visceral leishmaniasis, in vitro. We are assessing whether these peptides are able to kill *Leishmania* intracellularly (within macrophages) and whether this killing is a direct effect of the peptides, or whether it is an indirect effect by activation of nitric oxide (NO). NO is produced by macrophages following activation and expression of Th1 cytokines such as IL-12 and IFN- γ . To assess macrophage activation, different concentrations of the peptide 21N, a synthetic peptide based on the dog neutrophil peptide, was added to the culture. As a control for macrophage activation we use LPS (lipopolysaccharide). Supernatant collected from macrophage cultures (with and without antigens) at 24, 48 and 72 hours following activation were used on a 96-well plate to measure the production of Th1 and Th2 cytokines, which have been associated with infection outcome in leishmaniasis. Interleukin-12 (IL-12) and interferon- γ (IFN- γ) are known as prototypic Th1 cytokines, while Interleukin-4 (IL-4), as a prototypic Th2 cytokine. Levels of cytokine were determined by sandwich ELISA (enzyme linked immunosorbent assay) using a Biotek Synergy HT plate reader. It is well accepted that novel treatments for leishmaniasis are currently needed and natural molecules that likely would pose no harm to humans or animals may provide the tools for control. The risk of human VL cases is greatly increased by the presence of canine companions, which are the main reservoir for the *Le. infantum*. Thus, a canine peptide that may potentially be used as therapeutic for dogs will likely be an important step in improving control of disease transmission to humans. Defining whether the 21N peptide is immunomodulatory for macrophages is a key step towards this goal.

Honors/Leadership: Academic Honors; Phi Kappa Phi; Golden Key; Phi Theta Kappa; Target on Excellence presenter, Memorial Scholarship; Bread Basket Volunteer; Mittens for Many; Academic Decathlon; Pre-Dental Club; Cadaver Dissection Team; CAKSU; Multilingual: English, Spanish, Portuguese

How *Twilight* facilitates parents to communicate with teenagers about relationships

Isaac Cruz Joel Falcon-Campos, Karen S. Myers-Bowman

School of Family Studies & Human Services

College of Arts & Sciences

College of Human Ecology

Today's teenagers have ideas about relationships that are different from those of their parents. Often times, parents and teenagers do not talk about these differences. The *Twilight* novel series written by Stephanie Meyer opens a door for communication between mothers and their sons between the ages of 12 and 16. The current qualitative study investigates what relationship and sexuality messages teenage boys are getting out of the books. Also, we examine how this book series helps family members to discuss these topics within their family. Mothers and their sons who have read the *Twilight* books were interviewed about the main themes in the series as well as any communication they had regarding the books about relationships and sexuality. A goal of this study is to generate better communication between mothers and sons about sexuality, family and romantic relationships.

Honors/Leadership: Bridges to the Future; Phi Theta Kappa; The Greater Kansas City Hispanic Scholarship

Phylogeography of the Buff-breasted Sandpiper

Jasmine Sharp, Zachary Lounsberry, Brett Sandercock, Samantha Wisely
Department of Biology
College of Arts & Sciences

The Buff-breasted Sandpiper, *Tryngites subruficollis*, is a migratory shorebird which breeds in Alaska and Canada. These shorebirds have migratory stopover sites in the Great Plains and overwinter in Uruguay and Argentina. This bird is known to be a global species that is highly imperiled by the U.S. Shorebird Conservation Plan (2004), a designation shared by only three other species of North American shorebirds.

Buff-breasted Sandpipers were historically one of the most abundant shorebirds in North America, but population declines were caused by intensive market hunting in the late 1800's and continued as a result of conservation of upland habitats to agricultural land use. Over the past century, declines have continued, and the most current estimate of wild population numbers is about 30,000 birds.

The goal of this study is to examine how close contemporary individuals of the breeding populations of Barrow Bay and Prudhoe Bay, Alaska are related to one another based on their phylogeny. Mitochondrial DNA (mtDNA) will focus on the changes of selected segments of the genome giving away potential answers about historical populations. In this study, we used the control region and cytochrome B as chosen segments from the genome. There will be 300 base pair sequences for approximately 197 individuals of the Buff-breasted Sandpiper from breeding sites in Barrow Bay and Prudhoe Bay, Alaska.

A genetic analysis will provide concrete, empirical information to address questions of the demographic patterns at broad spatial and temporal scales. These contemporary samples will provide a baseline to examine changes in genetic diversity over time.

Honors/Leadership: Martin Luther King Memorial Scholarship; Blue Key Scholarship; Internships: Acadia National Park Service, Everglades National Park Service, Grant Teton National Park Service; Emerging Leader Award; Delta Alpha Pi; Rake N' Run; Wonder Workshop; Sunset Zoo Food and Mitten Drive; Bilingual: English/French

Improving a Career Fair

Laura Gonzales, Elizabeth Barrett
Department of Hospitality Management & Dietetics
College of Human Ecology

The purpose of this research project was to investigate how to improve aspects of a career fair to be more beneficial to employers and students. A brochure was developed to assist hospitality students to be successful at a career fair and to help the author become familiar with career fairs. Randall S. Hansen, Ph. D., gave ten easy tips on how to be successful at a career fair. For example, prior to the career fair the student should research the companies of interest. Surveys were developed to give the students and employers who attended the Business and Hospitality Career Fair in February 2011, to obtain feedback about their satisfaction with the career fair, what they gained from the career fair, and to determine what could be improved in the future. Also, the survey asked if the brochure was helpful to hospitality students. The final purpose was to understand what it takes to plan and implement a career fair. Results found that employers and students were equally satisfied with the career fair and Hospitality students had researched the employers attending. Concerns were that students wanted more employers and employers thought students could improve their communication skills and attire. The Career Fair Brochure was especially helpful to freshman and sophomores. A recommendation would be to market the career fair through e-mail and social networks.

Honors/Leadership: Academic Honors; Hispanic Scholarship Fund ; Memorial Scholarship; Proud to be a Wildcat Scholarship

Nutrition Education for Childcare Providers—What Are the Needs?

Victoria Fort, Sandra Procter
Department of Human Nutrition
College of Human Ecology

In the U.S., it is estimated that twelve million children younger than six years old spend at least part of their week in a child care facility (Rosenthal, Crowley, & Curry, 2009). It is crucial that during these times, children receive adequate nutrition needed for their cognitive development. Extension workers help ensure that children receive appropriate, adequate nutrition by offering information and techniques providers can implement as part of their care. As changes in nutritional guidelines occur in the Kansas nutritional regulations for child care services, it is very important that Extension agents with programming in nutrition education identify knowledge gaps they need to address with the audience as well as best ways to provide the information to employees of child care and home care facilities. The methods used in this study were electronic surveys comprised of questions concerning: types and frequency of training offered to child care providers, parents' roles in the facility practices, topics discussed when presenting information and needs identified to support future programming in the area. The survey was distributed to Kansas State Research and Extension agents and educators identified as providing training for child care providers in many counties across Kansas. Our results are yet to be determined; we are seeking to identify valuable information that would help us determine in what ways Extension workers can become informed and best address new and ongoing nutritional topics, and ultimately affect Kansas children's health, physical and cognitive development.

Honors/Leadership: Multicultural Student Honor Society; Bridges to the Future; DSP Food Drive and Mittens for Many; Rake N'Run; United Black Voices Gospel Choir; Alpha Kappa Alpha Sorority; Multiple Sclerosis Walk for a Cure; K-Staters that Care

Chemiluminescence blue light for invitro photodynamic therapy for B16F10 melanoma cells and 4T1 mammary carcinoma cells

Adrian Gomez, Tej Shrestha, Sivasai Balivada, Marla Pyle, Gwi Moon Seo,
Deryl Troyer
Department of Anatomy & Physiology
College of Veterinary Medicine

Photodynamic therapy (PDT) is one of the many methods being developed for cancer therapy. PDT uses a chemical compound, a photosensitizer, combined with a certain type of light. When the photosensitizing agent is exposed to a specific wavelength of light, it becomes excited and produces highly unstable reactive singlet oxygen. This generates a chain reaction that will cause apoptosis of cancer cells and damage blood vessels in the tumor. One of the limitations encountered with PDT is that the light needed to excite the photosensitizer may not be able to penetrate through more than 1 cm of the tissue making it difficult to treat larger and metastatic tumors. So developing a more efficient light source is a key for the success of this modality. Gaussia luciferase (GLuc) transfected mouse neural progenitor cells (NPC) which have tumor tropic properties can act as a biological light source for photodynamic therapy in the presence of GLuc substrate coelenterazine. To test this hypothesis first NPCs were successfully transfected with GLuc plasmid and light emission was confirmed with IVIS imaging system. To test the photosensitizing ability of these NPCs they will be co-cultured with B16-F10 melanoma cells and 4T1 mammary carcinoma cells. 5-aminolevulinic acid (ALA) and tris (4,4':2,2'':4'',4'''- quaterpyridine-N',N'') ruthenium (II) chloride will be used as photosensitizers.

Honors/Leadership: Bridges to the Future; Phi Theta Kappa; Golden Key Honor Society; Rake N' Run

Effect of heating on the quality of sorghum DDGS

Jordan Eder, Solange Uwituze, James Drouillard
Department of Animal Science & Industry
College of Agriculture

In the production of dried distillers' grains with solubles (DDGS), heating conditions can have a large influence on color of resulting feed products. Excessive heating can decrease nutritional value and produce DDGS that are dark in color. However, color is also greatly influenced by the color of the original grain used for ethanol production. Grain sorghum, which is commonly used for ethanol production in Kansas, is highly variable in color, ranging from creamy white to almost black. Therefore, color alone, is not an effective determinant of nutritional content. The objective of this experiment is to evaluate the effects of heating distiller's grains derived from grain sorghum varieties representing a range of colors on their nutritional characteristics. In this study, sorghum samples of different colors were used to produce DDGS that were dried for 3 different times at temperature of 350°F, 400°F, 450°F and one group lyophilized to evaluate effects of heating on DDGS quality. Digestibility will be evaluated using in vitro gas production and dry matter disappearance assays. Color will be measured using a colorimeter. Relationships between color measurements and digestibility of DDGS will be assessed to determine usefulness of color as a determinant of quality.

Key terms: sorghum DDGS, color, nutritional value

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Rake N' Run; Block-and-Bridle; Zeta Tau Alpha; Campus Clean-up; Tie-Blankets for shelter

Effects of PQ1 and I3C on Gap Junctional Intercellular Communication in PC3 Human Prostate Cancer Cells

Luis Chavez, Thu A. Nguyen
Department of Diagnostic Medicine/Pathobiology
College of Veterinary Medicine

Cancer is caused in part by the disruption in cell homeostasis, in effect impairing the cells' ability to respond to extracellular signals, consequently triggering some intracellular events that negatively affect gap junctional intercellular communication (GJIC). First generation substituted quinoline (PQ1), a gap junction enhancer, has been proven to have antitumorigenic effects on breast cancer cells and it is believed that the same effects will be shown in cells with low level of gap junctional activity. Previously, others have shown that human prostate carcinoma (PC3) has a low expression of connexin proteins Cx26 and Cx32 in gap junction activities. Preliminary data showed that PC3 cells do express lower quantities of connexin proteins Cx26 and Cx32 by using Western blot analysis. The goal of this study is to examine the effects of gap junction enhancers, PQ1, as well as the compound I3C (Indole-3-carbinol) on PC3 cells. So far, results show that 24 hour I3C-treated cells show no change in the concentration of Cx26 expressed in PC3 cells. This suggests that the compound I3C is not able to cause an increase of connexin in prostate cancer cells in 24 hours. Currently, functional assay of gap junction activity using scrape load/dye transfer (SL/DY) and testing on PQ1 is being carried out, confirming the upregulation or downregulation of connexin in PC3 cells. The outcome of this study will provide a novel approach using synthetic compounds to regulate GJIC in prostate cancer.

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Terry C. Johnson Cancer Award ; Rake N' Run

Importance of Entrepreneurship at Kansas State University

Phillip R. Gomez, Dawne Martin, David Lehman

Office of the Dean

Department of Marketing

College of Business Administration

The College of Business at Kansas State University added an entrepreneurship major in the fall of 2009. The undergraduate major has grown steadily to have a total of 66 students as of February 14, 2011. This research focuses on the viability of offering a minor in entrepreneurship to undergraduates from all colleges and departments. Research will include preliminary survey results from students, indicating their interest in the minor and comparing other entrepreneurship programs at public universities in Kansas. Supporting information includes a study by the Ewing Marion Kauffman Foundation that shows the growth in entrepreneurial activity during the past 14 years. The Center for the Advancement of Entrepreneurship at Kansas State University received some encouraging results from the first survey distributed to students during the fall of 2010. This follow-up survey may add further support for a minor in entrepreneurship, making it only the second such program in the state by an accredited university.

Honors/Leadership: Dean's Choice Scholarship; Rake N' Run; Semillas Latinos Success; Marketing Club; Multicultural Business Student Association; Persuasive Speech Competition; Cats for Cans; College of Business Ambassador; Semillas de Excelencia Ambassador

Portraying Latinas in the Workplace: How Education Level Impacts Opportunity

L. Jeanette Aldana, Tanya González

Department of English

College of Arts & Sciences

The television show *Ugly Betty* (2006-2010) was groundbreaking in its depiction of professional women of color. This research is part of a larger project looking at women of color in the workplace in relation to education and feminist politics. Our research question for this portion was the following: Is there a correlation on the television show between educational attainment and continual employment?

In this project we analyzed episodes of the first and second seasons of *Ugly Betty* to identify the employment and education of the protagonists, Betty and her older sister Hilda, to measure their levels of employment and unemployment. Betty and Hilda's employment rates were compared to their levels of education. A content analysis showed the message about the relationship between Latina education and employment opportunities on *Ugly Betty*.

The collected data confirms that the higher the level of education, the more consistent the employment. Betty, a college graduate, is more consistently employed as a professional on the show. Hilda, a high-school graduate, is inconsistently and precariously employed and must undergo more training before pursuing self-employment. As these results are part of a larger research question, the results establish the consistency between real-world research on the relationship between education rates and employment and the television show's representation of this relationship for Latinas.

Honors/Leadership: Bridges to the Future; Multicultural Student Honor Society; HALO; United Multicultural Women; Lambda Theta Nu Sorority; Bilingual: English/Spanish

Binding sites of experimentally-induced antisperm antibodies in bulls

Stephanie Skinner, Maria S. Ferrer
Department of Clinical Science
College of Agriculture
College of Veterinary Medicine

In certain circumstances, spermatozoa induce the production of antibodies against themselves from the immune system. These antisperm antibodies (ASA) can interfere with fertility, but only if they are bound to the sperm and not free in seminal fluid or blood. A technique to detect sperm-bound IgA and IgG in bull semen using flow cytometry has been standardized. However, it is not possible to visualize the sperm using flow cytometry, so it is unclear to which portions of the sperm the antibodies are binding. The location of the binding site may have different effects on fertility. Our objective was to identify the binding sites of experimentally-induced antisperm antibodies in bulls. Frozen semen was available from three bulls with experimentally-induced antisperm antibodies (Group 1), as well as sperm from two bulls with naturally occurring ASA (Group 2) and two ASA-free bulls (Group 3). After thawing, semen was divided into four aliquots that were incubated with FITC-labeled anti-bull IgG, IgA, or their respective isotype controls. Spermatozoa were evaluated under a confocal laser microscope and the percentage of sperm with binding at different sites was assessed. Data are expressed as means \pm SD. The IgG treatment had too much nonspecific binding to provide useful data. Anti-bull IgA bound primarily to the acrosomal (Group 1 $30.4 \pm 7.5\%$, Group 2 $30.2 \pm 9.9\%$, Group 3 $20.2 \pm 11.5\%$) and equatorial area (Group 1 $22.7 \pm 5.1\%$, Group 2 $19 \pm 5.6\%$, Group 3 $15.5 \pm 11.7\%$). There was also binding to the post-acrosomal area, midpiece, and tail. More work is needed to determine if binding sites of naturally occurring antisperm antibodies are similar to those of experimentally-induced antisperm antibodies. Nevertheless, the results confirmed binding of antisperm IgG and IgA to bull sperm. The binding sites were considered significant for fertility in bulls.

Honors/Leadership: Academic Honors; Edgerley-Franklin Urban Leadership Scholar; University Honors Program; Cargill Scholar; Kansas State Book Network Committee

The Importance of the Negro Motorist Green Book

Ricco Hall, Spencer Wood
Department of Sociology, Anthropology, & Social Work
College of Arts & Sciences

During Jim Crow, travel for Blacks could be very dangerous. There were many sundown towns and a good deal of open hostility toward African Americans throughout the nation. In particular, it was very difficult for African Americans to find safe places to stay when traveling. During the mid 20th century an individual named Victor Green created a book with list of locations across the United States that were safe for African Americans to stay. This travel guide was called the *Negro Motorist Green Book*. This project explores mobility for Blacks via a system that was set in place in the mid 20th century in the United States by an individual named Victor Green. Green created a travel guide called the *Negro Motorist Green Book*. The guide was specifically for African Americans who intended to travel during the Jim Crow era when African Americans were not able to freely stay nor travel where they wanted. The *Negro Motorist Green Book* listed safe places for lodging, dining, and other needs for traveling African Americans. The purpose of this project is twofold; to contribute toward a better understanding of the realities of racism and racial inequality that African Americans experienced under Jim Crow; and, to document how access to travel and physical mobility was an important challenge to the effects of Jim Crow. For this project, I am constructing a map of these safe locations first in Kansas, and then more generally across the United States, using the data and addresses listed in the *Green Book*.

Honors/Leadership: Emerging Leader Scholarship; Pilots Honor Roll Award; MAPS

Early Childhood Professional Development: An Environmental Scan of Extension Resources with an Emphasis on Military Children

Stefani McCluney, Elaine Johannes
School of Family Studies & Human Services
College of Human Ecology

Research has shown the importance of quality early childhood education experiences and its positive effects on children during their developing years. With an increase in the migration of military families into Kansas, frequent deployments, unpredictable and long work schedules, there is greater need for professional childcare providers to assist with the unique needs of the military families. Though the Department of Defense supports more than 800 installation-based Child Development Centers (CDC) which provide quality childcare to military families, many of these families are wait listed and/or do not live near military installations, causing a large number of these families to use civilian childcare providers. As a result, there is lack of availability and access to quality childcare programs to meet the needs of military families. This project will consist of multiple stages during a period of three years. A statewide environmental scan of extension resources is the first stage of the three-year Child Care and Youth Training and Technical Assistance Project (CCYTТА) which is a 13-state initiative funded by the Department of Defense. This statewide environmental scan will help identify professional trainings offered by local Kansas Extension Agents to early childhood providers serving military families in targeted regions and counties of Kansas. Although extension agents are not the primary trainers of child care providers in Kansas, local extension professionals collaborate and offer training with other organizations (i.e., Child Care Aware of Kansas) on an as needed basis. In stage two of the project, data collected through the scan will be examined by the University of Nebraska and Pennsylvania State University to determine where training and professional development sessions should be offered. The overall objective of CCYTТА is to increase the professional training of child care providers in order to increase the number of high-quality childcare programs available to military families.

Honors/Leadership: Bridges to the Future; Golden Key Honor Society; Multicultural Student Honor Society; McNair Scholar; Pinnacle Honor Society, Sunflower CASA; Douglas Community Center volunteer; Multicultural Student Recruitment; Rake N' Run; DSP Food Drive and Mittens for Many; Study Abroad: Puebla, Mexico

Sponsor-Event Pairings: Expanding the one-dimensional approach to finding the perfect fit

Tyler M. Johnson, Kevin P. Gwinner
Department of Marketing
College of Business Administration

There is common agreement and support for the position that sponsor-event pairings that are highly congruent are more effective than pairings between non-congruent sponsors and events. There are multiple ways for a sponsor-event pairing to be considered congruent, but these different types of congruency have received little empirical attention in the marketing literature. This study attempts to overcome this lack of knowledge by assessing whether the basis for a sponsor-event's congruency has an impact on important consumer outcome variables such as consumer's attitude toward the sponsor, intention to purchase, accuracy of brand recognition, brand recall, and perception of sponsor credibility. In order to tease out the impact of congruency type, scenarios are developed of five different sponsor-event congruency pairings (image congruency, usage congruency, audience congruency, geographic congruency, duration congruency). After being exposed to one of the congruency stimuli, subjects rated the consumer variables of interest. From these results, we hope to identify which of the pairings are most effective and also discover new types of pairings that can be just as beneficial.

Honors/Leadership: Academic Honors; Quest Freshmen Honorary; Kassebaum Scholar; Dean's Choice Scholarship; K-State Proud Advisory Board; Marketing Club; Delta Upsilon Fraternity

Medical Training in an Augmented Reality

Dane Jaeger, William Hsu, Nathan Bean, Richard Korentager, Dhaval Bhavsar
Department of Computing & Information Sciences
College of Engineering

We are working on developing a system where students learning to perform laparoscopic surgery could practice suturing arteries in perfectly realistic and repeatable operating conditions. Currently, students practice these sutures on pig arteries, which obviously don't provide a perfect representation of conditions and are a nuisance to keep gathering for practice. With the new system we hope that we can give students better feedback and make them more comfortable with their sutures. Good sutures can reduce recovery time tremendously and give the patient an overall more comfortable experience.

We are currently in the very early stages of this project and are doing background research. Our research includes: seeing if this has been attempted before, seeing if the values for pressure of sutures and trajectory of the needle into an artery exist, and determining what the best way of approaching this project would be. We have had a hard time finding values we need because they aren't out there. Our next step will most likely be conducting tests to find these values.

Because this a multiyear project we have not yielded many results, nor have we come to any conclusions.

Honors/Leadership: Edgerley-Franklin-Urban Leadership Finalist; Management Information System Club; Rake N' Run

Influence of Novelty Seeking and Differential Rearing on Amphetamine-Induced Sensitization

Mayabeth Jagosz, Mary Cain
Department of Psychology
College of Arts & Sciences

Differential rearing and novelty seeking behavior play a critical role in influencing amphetamine-induced sensitization. To examine the effects of differential rearing on the response to amphetamine, rats are raised in enriched, standard, or isolated conditions during childhood and adolescence. To examine the effects of novelty seeking, rats are categorized as high or low responders based on the amount of activity in a novel environment. "High responder" rats are more active in an inescapable novel environment, which causes a higher sensitivity to amphetamine and "low responder" rats are less active in an inescapable novel environment, which causes a lower sensitivity to amphetamine. While it is well-established that differential rearing and novelty seeking alters the response to amphetamine, the relationship between novelty seeking and differential rearing is not well understood. In a previous study, enriched condition (EC) and standard condition (SC) rats were tested. The purpose of this follow-up study is to further examine the influence of environment on novelty seeking and amphetamine-induced sensitization by including an isolated condition (IC) group. In this follow-up study, response to inescapable novelty was calculated in 21 day old Sprague-Dawley rats. They were then assigned to EC, IC, or SC (with each grouping having an equal number of high and low responders). After rearing the rats for 30 days, novelty was measured in a second screening. It was determined that differential rearing alters original novelty preference. Currently, the rats are receiving amphetamine (0.5/mg/kg; s.c.) or saline injections before each of seven locomotor sessions. To date, SC rats are showing the greatest response to amphetamine. Rats will then receive an amphetamine-induced sensitization test and we will examine the ability of differential rearing to alter amphetamine-induced sensitization in high and low responder rats.

Honors/Leadership: Honor Roll; KSU Women's Ultimate team (Cheshire Ultimate); KSU Women's Rowing (Coxswain); Manhattan Emergency Shelter community service; Concert for Hope (Milford, MI); Read-to-Achieve; Rake N' Run; Bilingual: English/Japanese

Matron Patrons: Art Consumption by Women during the Italian Renaissance

Tamica Lynn Lige, Douglas N. Dow
Department of Art
College of Arts & Sciences

Over the last 30 years, scholars of the Italian Renaissance have taken an interest in art consumption by female patrons, expanding an area of study that previously focused primarily on patronage by men. The word *patronage* comes from the Latin root *paternitas* and implies a masculine model. Therefore the term alone diminishes the role of female patrons and suggests that patronage by women was unusual. Isabella d'Este appears to be an exception, standing alone as a significant female patron whose collected works rival those of her male contemporaries. Isabella's patronage has attracted vast amounts of attention due to the abundant amount of documentation available. This study seeks to reconstruct patronage by other females in the Renaissance. Lack of documentation of female patrons may hinder this effort; however, this study will explore the circumstances that resulted in the absence of adequate records. I will examine art consumption by Isabella d'Este and other women during the Italian Renaissance and will analyze how gender roles, financial boundaries, and the historical position of Renaissance women affected their ability to commission art.

Honors/Leadership: Academic Honors; Mortar Board; Sigma Alpha Lambda; Multicultural Student Honor Society; Smith-Craig Art History Scholarship; Art History Society; Italian Conversation Club; K-State Proud Award; James R. Coffman Award of Excellence; Mortar Board National Senior Honor Society; Pinnacle Non-Traditional Student Honor Society; Kauffman Scholars Mentor; McNair Scholar; Arts & Sciences Alumni Advisory Board; Italian Conversational Class, teaching assistant; Multilingual: English/Italian/Spanish

Evaluation of the efficacy of cationic peptide nanoparticle-based therapeutic gene delivery for human lung cancer treatment

Stephanie Jacquez, Atsushi Kawabata (1), Naomi Ohta (1), Abdulgader Baoum (2), Cory Berkland (2), Masaaki Tamura(1)

(1) Department of Anatomy & Physiology

(2) Departments of Pharmaceutical Chemistry & Petroleum Engineering
College of Arts & Sciences

The angiotensin II (Ang II) type 2 receptor (AT2R) has been shown to mediate apoptosis in cardiovascular tissues. Thus, the aim of this study was to explore the anti-cancer effect of AT2R over-expression on lung adenocarcinoma cells in vitro and in vivo using newly developed cationic peptide nanoparticle (NP) vector. The NP vector efficiently transfected human AT2R plasmid DNA into lung cancer cells but caused minimal gene transfection in normal lung epithelial cells. NP encapsulating human AT2 plasmid DNA significantly attenuated growth of A549 human lung cancer cells and murine Lewis lung carcinoma cells as compared to the control NP treated cells. Examination of annexin V staining by flow cytometry revealed the activation of the apoptotic pathway via AT2 over-expression. The efficacy of in vivo gene transfection by NP vector was assessed by firefly luciferase plasmid DNA encapsulated NP using mice bearing LLC lung tumors. Administration of the NP was carried out through a bolus intratracheal spray (7.5 µg plasmid DNA/50 µl NP solution). Although moderate expression of luciferase was detected throughout lung bronchial epithelium, intense expression was localized within the tumors as evident in (over 95% tumor cells were positively stained by anti-luciferase antibody). The duration of the expression lasted over two weeks after the transfection. This luciferase expression was strong enough to detect by in vivo imaging. These results indicate that AT2 over-expression effectively attenuates growth of lung adenocarcinoma cells through intrinsic apoptosis. The newly developed NP vector is suggested to be an effective gene transfection vector for lung adenocarcinoma targeted therapy.

Honors/Leadership: Bridges to the Future; Terry C. Johnson Cancer Research Award; Golden Key Honor Society; Bilingual: English/Spanish

The Moral Foundations: A look into the use of ethics in the Design fields

Xavier Gavin, Jani Vibhavari
Department of Interior & Product Design
College of Architecture Planning & Design

Ethics can be described as set of moral guidelines which are used to guide an individual or group's behavior. The aim of this research project is to explore the influence that ethical standards have on several fields of design. It will bring to light the special interest groups that may create these regulations, as well as address the people who are placed under the restrictions of said groups. This project is designed to be engaging for all college level students; those with college level education and above are the target audience. In addition to a brief history of the ethics in design, it will give viewers an early look at the challenges and relationships that exist between said organizations, industrial workplaces, and constituents. The project will focus on three levels of design: Product design, Architecture, and City and Regional planning.

To appeal to the different learning preferences that will be represented, the display board will draw its viewers in with pictures depicting what has been recognized as common incidences of poor ethical communication in the design fields as well as examples of well planned principles. The display board will serve as a visual aid to complement the text within the Power Point. The pictures located on the board will be divided into three parts. The middle section will have information concerning the base knowledge of what ethical standards are present in the design fields today. On the left panel of the board criticisms and opposition will appear in contrast to the right panel where commendations and support for the current standards will be displayed. The Power Point Results section will begin with a concise history of how the current ethical standards came into place, and examples from specific time periods will be used to show this process. This will bring the viewer to the modern day standards. Results will discuss the successes and the decisions that did not gain popularity by the public made by organizations that deal with ethics in design. The project will conclude with a current Architects opinion on the future of ethical designs.

The project will end with an elaboration on where the public opinion lies currently stands with the decisions made by those who enforce ethical policy on designers. This will give the viewer a chance to formulate their own opinions as they relate to current events. This project is designed to bring to show the people behind the decisions being made concerning morally sound design.

Honors/Leadership: Phi Eta Sigma; Memorial Scholarship; Chicago Japanese Language Competition, 2nd place; West Hall Academic Star Award; Bilingual: English/Japanese

Anaerobic Digestion of Manure and Food Waste

Fabian Martinez, Richard Reed, Larry Erickson
Department of Chemical Engineering
College of Engineering

Anaerobic digestion is the process of converting waste materials into biogas, a mixture of methane and carbon dioxide, using microorganisms in the absence of oxygen. The methane collected from this process can be used to generate heat and electricity and by converting biomass to methane, the amount of carbon dioxide that is released to the atmosphere is reduced. In this research both manure and food waste are digested in separate containers that are fed four times a week with 150 ml of manure and food waste. On average the manure is producing 125 ml of biogas per hour and the food waste is producing at a higher rate than the manure but the actual volume of biogas that is produced is unknown.

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

Earth's Radiation Budget and The Density of Supercooled Water

Johnathan Johnson, Christopher Sorensen
Department of Physics
College of Arts & Sciences

Global warming is becoming a more relevant issue worldwide. The radiation budget of the earth, the balance of the Sun's energy input and the Earth's energy usage and output, has a lot to do with global warming. The Earth's radiation budget has been affected drastically by the pollution of our atmosphere with aerosol particles. Many of the aerosol particles are water-based. Thus, it is important that we gain knowledge about the properties of water to understand how these properties might affect the aerosols and ultimately the global environment. This research deals with water at a super-cooled (well below 0 °C) temperature since very often the aerosol droplets in the atmosphere are supercooled. Furthermore, this research deals with the density of water, with respect to temperature, since density is a fundamental property. The experiment is set up to measure the rise and fall of the surface of water, its meniscus, contained in small capillaries as the temperature changes. The temperature is controlled by a circulating bath. A tele-microscope will be used to pinpoint the meniscus of the water when it undergoes its changes in density. Different samples of temperature-regulated water will be tested to observe what happens to water when it is held in the liquid state beyond its freezing point. This research will yield useful data for understanding water droplets in the atmosphere. Hopefully the results of this experiment will yield solutions to alleviate the effects of the aqueous aerosol pollutants.

Honors/Leadership: National Society of Collegiate Scholars; Golden Key Honor Society ; Alpha Epsilon Boule "Circle 10" Scholar ; Dallas Black Chamber of Commerce Excellence in Education 2010 Scholar ; WESP' Community Service; BSU ; MAPS Scholar; MANRRS; Multicultural Engineering Program

Effects of a Viral Fibroblast Growth Factor N-Glycosylation Modification on Virulence

Emma Del Real, Justin Trowbridge , A. Lorena Passarelli
Department of Biology
College of Arts & Sciences

Baculoviridae are a family of rod-shaped enveloped viruses with circular, double-stranded DNA genomes that are infectious to arthropods. Most baculoviruses sequenced to date carry a fibroblast growth factor (vfgf) that is homologous to fgfs found in many invertebrate and vertebrate organisms. FGFs are a family of signaling molecules that exhibit a broad range of functions during cellular development. FGFs may be posttranslationally modified by the addition of sugar chains (N-glycans) that may affect folding, secretion and activity. The vFGF of *Bombyx mori* nucleopolyhedrovirus (BmNPV) is N-glycosylated, secreted and affects virus replication in cell culture and its host. In contrast, the vFGF of *Autographa californica* MNPV (AcMNPV) is not N-glycosylated - yet secreted - and its activity is only obvious during *in vivo* infections. In this study, we constructed recombinant viruses where sites for N-glycosylation were altered or introduced in the BmNPV and AcMNPV fgfs, respectively. We hypothesize that N-glycosylation of AcMNPV FGF enhances secretion and results in more robust effects both *in vitro* and *in vivo*. Similarly, eliminating N-glycosylation from the BmNPV FGF would result in a phenotype similar to the AcMNPV FGF. We are currently characterizing the altered vFGFs by determining N-glycosylation patterns, effects on virus replication and virulence. This will allow us to determine the role of vFGF N-glycosylation during virus replication, a potential tool for the development of improved biological insecticides.

Honors/Leadership: Bridges to the Future; Multicultural Student Honor Society; Terry C. Johnson Cancer Research Award; McNair Scholar; Sigma Lambda Beta Latino/a Immigrant Scholarship; McNair Heartland Research Conference; LULAC (League of United Latin American Citizens); Bilingual: English/Spanish

Emergence of disease carrying mosquitoes and their habitats

Alexia Sampson-Bellot, Samantha Wisely, Claudia Ganser

Department of Biology

College of Agriculture

College of Arts & Sciences

Kansas has a myriad of mosquito species. Many of these mosquitoes carry diseases, which are harmful to humans and animals alike.

We sampled a total of 20 locations in the tallgrass prairie ecosystem of Kansas to determine the composition of the mosquito community and the time of emergence. Fifteen sites were located in grassland and five were close to man made water sources. The samples were collected between the dates of 5/28 – 7/27/2010. We collected a total of 5,291 individual mosquitoes. The species collected were *Culex tarsalis*, *Culex pipiens*, *Culex restuans*, *Aedes vexans*, *Aedes sollicitans*, *Aedes nigromacilis*, and *Aedes taeniorhynchus*.

The *Aedes* species usual time of emergence is 10 days after a large flooding. We measured an increase in the *Aedes* species at 6/25, 6/30, 7/20 and 7/27. The usual time of emergence for the *Culex* species is during times of high heat. We measured an increase in the *Culex* species at various times during the collection dates.

These species carry a suite of diseases. Both the *Culex* and *Aedes* species are vectors for West Nile Virus. *Aedes vexans* is a vector for Eastern Equine Encephalitis (EEE). *Aedes sollicitans* and *Aedes taeniorhynchus* are both vectors for *Dirofilaria immitis*, which is heartworm in dogs. *Culex tarsalis* is a vector for yellow fever, Japanese encephalitis, and St. Louis Encephalitis (STE). *Culex pipiens* is a vector for STE as well, but it is a primary carrier for Rift Valley Fever (RVF). These diseases have a strong affect on many populations worldwide. By studying the emergence time, habitat preference, and the diseases, we can begin to control vectors that contribute to sickness.

Honors/Leadership: Hill's Pet Nutrition Scholar; Joey Lee Garmon Scholarship; Everglades National Park; Pathways to Public Health Internship; Zeta Phi Beta; Boyd Hall Governing Board; Bilingual: English/Spanish

Controlling Future Devices ...With Your Eyes?

Kekoa Mendenhall, Xiongjie Dong, Steve Warren

Department of Electrical Engineering

College of Engineering

Technology can help to improve the lives of some physically handicapped individuals by enabling them to perform everyday tasks without the use of their arms or legs. For example, one can use the signal from an electrooculograph (EOG) as a device controller. An EOG uses electrodes placed on the temples, near the eyes, to measure the electrical activity generated by the eye muscles. When the eyes look left/right, for example, a positive/negative signal is generated. These readings are relayed through an interface to be used as a controller. If the readings can be fine-tuned to a point where the eye movement can be followed precisely, then the applications of EOG-based controllers could be endless. A few practical applications of EOG-controlled devices include (1) moving a mouse on a computer screen, (2) controlling or assisting with wheelchair mobility, and (3) maneuvering a remote-control car. The latter is demonstrated as part of this project.

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

The Effects of Music on Athletic Performance

Miles McCall, Shawna Jordan
Department of Human Nutrition
College of Human Ecology

Music and sport have an undeniable bond. This is evident in the tendency of athletes to desire music before and during activity. Since athletes will, in general, have some type of music in relationship to activity it is a great benefit to understand exactly how music may affect their performance. As the extent to which the effects of different musical variables are understood increases, the athletic population will better be able to choose music that will maximize positive effects, and avoid music that may have detrimental effects. The effects of music on athletic performance have traditionally been studied using aerobic or cardio type exercises, with very little research using anaerobic tasks. However many sports involve a good deal of anaerobic exercise, especially in training. Another aspect that has been previously overlooked is coordination and balance. So, though the main point of this study will be the general effect of music on athletic performance, there will be an emphasis on the anaerobic aspect as well as balance and coordination. Subjects will be tested in a variety of exercises; pushups, sit-ups, 300 meter shuttle run, 40 yard dash, mile run, bench, squat, and clean. The control pretest will be conducted without musical stimulus. After the pretest the subjects will re-perform the exercises in a series of sessions with a different musical stimulus in each session. Several variables, both qualitative and quantitative, will be measured to determine the effects of the music; heart rate, time to fatigue, test performance, rate of perceived exhaustion (RPE), subject opinion of workout quality, and observable energy output. The data will be recorded and analyzed to discover trends in athlete response to the music.

Honors/Leadership: Putnam Scholarship; Rake N' Run

Effects of Farmer/Rancher Completion of Animal Care Training in Food Safety, Animal Welfare and Environmental Stewardship on Consumer Spending Habits

Catalina Perdomo, Daniel Thomson, Chris Reinhardt, Wrenn Pacheco,
Abby Jones

Department of Clinical Sciences
College of Veterinary Medicine

This study is focused on the effects of animal care training on consumer spending habits. There is currently no research related to this topic. This study will serve as a pilot project that examines consumers' opinions of beef products that originate from farmers/ranchers that have completed animal care training in food safety, animal welfare, and environmental stewardship. Consumer surveys will measure demographics and specific questions that pertain to their beef consumption, spending habits and views on animal care training in food safety, animal welfare and environmental stewardship. The information from these surveys will be published to guide beef producers, packers, and retailers on the consumer awareness of animal welfare. Results will be presented in subsequent years as data collection is finalized.

Honors/Leadership: Quest Freshman Honorary; Hill's Pet Nutrition Scholar; University Honors Program; Foundation Scholar; LULAC; Multicultural Ambassador; Bilingual: English/Spanish

The Relationships Between Social Support and Three Forms of Sexism: Can Social Support Alleviate the Effects of Sexism?

Brooke Williams, Po Sen Chu, Donald A. Saucier
Department of Psychology
College of Arts & Sciences

Various forms of sexism evoke different feelings among women. Research shows that sexism, in the workplace and in general, initiates feelings of female inferiority towards men as well as inflicts outdated traditional roles upon women. We are specifically looking at three types of sexism (Benevolent, Modern and Hostile) and the positive effects that social support may have on the negative effects of the different forms of sexism. We began by drafting 4 professional letters. Three of the four letters contained sexist messages, one of each form of sexism we were looking at (Benevolent, Modern, and Hostile). The last letter had no sexist message and served as the model letter in the control group. The criterion for the participants was female and at least 18 years of age. Participants were told that they were to be participating in a mock job interview and that they would be subjected to different tasks that would overall show position suitability. The procedure was split into eight conditions, four that provided social support and four that did not provide social support but rather provided a “wait period” where participants were asked to perform the task of listing previous employment. Participants in the experimental group were provided with the social support. Participants were given a personality survey, problem-solving task, and ending questionnaire. After completing the series of tasks, participants were then debriefed. We hypothesize that participants receiving a supportive message after experiencing sexism will perform better on a problem-solving task than those who do not receive the supportive message as well as yield higher ratings on a measure of positive and negative affect. We also believe that the administration of social support will serve as a buffer for possible exposure to sexism. We are hoping that our results can provide better insight into coping mechanisms that can be used for women who are experiencing or have experienced sexism.

Honors/Leadership: Academic Honors; Food for Thought; Rake N’ Run; Cats for Cans

Round Cell to Spermatozoa Ratio in Bull Semen Ejaculates

Caroline Fulton, Maria Soledad Ferrer
Department of Clinical Sciences
College of Veterinary Medicine

In this study, bull ejaculates were obtained and spermatozoa and round cells were counted to calculate the sperm to ‘round cell’ ratio. ‘Round cells’ are recognized by lacking the typical characteristics of spermatozoa. Some are inflammatory cells while others are immature germ cells including degenerated spermatids. It is important to know what the ratio is so that a standard can be set of a normal number of round cells to look for in the future. Our objective was to set reference values for round cell to spermatozoa ratio in ejaculates from reproductively normal bulls. Our hypothesis was that based on the earlier data of round cell counts, these samples would have a very low number of round cells in comparison to spermatozoa, about one round cell per every 100 spermatozoa. Spermatozoa and round cells were counted with a hemocytometer and the ratio of round cells to spermatozoa was calculated in 25 semen samples. Ejaculates were obtained from 1-year old Angus bulls presented to KSU for routine Breeding Soundness Exam (BSE). Eleven bulls passed the BSE, 14 did not pass. Semen was diluted to 1:1000 in formalin buffered solution before counting. When we compiled our data we found no round cells in any of the samples. We concluded that there are normally no round cells in ejaculates from bulls without obvious reproductive pathologies. We propose using a larger sample group of 120 bulls of different ages and breeds to determine if the same result occurs with a larger sample size.

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

Comparison of three systems for recombinant expression of a protease from insect hemolymph

Edmond Rivera, Michael Kanost
Department of Biochemistry
College of Arts & Sciences

Insect immune response, as in any other organism, is regulated by a series of protein pathways that are activated in the presence of foreign invaders. One particular protein that is believed to play a role in this is Hemolymph Protease 13 (HP13). A protease is an enzyme responsible for cutting peptide bonds, which are found in proteins and hold proteins together. Other hemolymph proteases are known to be involved in insect immune response, and we suspect that this hemolymph may have a similar role. Obtaining purified recombinant protein is necessary to perform controlled experiments in order to test HP13's activity in cleaving other proteins in the immune pathways. In order to determine the most efficient method to express and purify this protein, three different methods for expressing HP13 in insect cell lines will be compared. One method involves the construction of a plasmid and insertion into *Drosophila* S2 insect cells to form a stable cell line, with expression under control of a metallothionein promoter. A second plasmid will be created, using a silkworm actin promoter, to insert into Sf9 cells from a moth *Spodoptera frugiperda*. The third expression system uses a baculovirus system with Sf9 cells. Expression using S2 cells yielded almost no protein of interest, while the baculovirus system yielded about 26µg of the recombinant HP13 from 3 liters of original insect culture. The results for the plasmid expression system with Sf9 cells are still pending, as that experiment is now in progress. Selecting the best expression method will allow for obtaining enough purified protein for testing HP13's activity.

Honors/Leadership: Edgerley-Franklin Urban Leadership Scholar; Wonder Workshop; Cats for Cans; Rake N' Run; Sigma Lambda Beta; College of Human Ecology Multicultural Scholarship; KSU Foundation Scholarship; Sam Walton Community Scholarship; Bilingual: English/Spanish

Connected and Confident Student Technology Adoption at Kansas State University

Natasha Peterson, Roger McHaney
Department of Management Information Systems
College of Business

Today's students have become more connected to each other and the Web by embracing emerging technologies and new social patterns. Web 2.0 ideas such as social networking, mobile computing, and information filtering/sharing are changing how students today understand concepts and learn new material. These students aren't necessarily smarter or technologically superior, but they do have different expectations of their peers and higher education. Many of them have spent their formative years using a wide array of technology. According to research conducted by the Pew Research Center and others, other important attributes characterize and differentiate current tech-savvy millennials from past generations. First, this group has been empowered by social networking and other forms of convenient, computer-enabled and mobile communication capability to "try" various identities and personas. Second, this group has incorporated time-shifting into their lifestyle. For them, waiting is undesirable at best and intolerable under most circumstances. Third, this group has been endowed with the ability to personalize and customize their world to a degree never before possible. Finally, the tech-savvy millennial has a variety of delightful and promising characteristics. For instance, many are creative, innovative beings. This study seeks to better understand the technologies used by Kansas State University students and the ways these technologies influence them as students in an increasingly digital world.

Honors/Leadership: Cargill Scholarship; Memorial Scholarship; Jardine Child Care Center; Black Student Union
Bilingual: English/Spanish

Data mining applications to social network problems

Tiana Brooks (1), Doina Caragea (2), Rohit Parimi (2)

(1) Department of Electrical & Computer Engineering

(2) Department of Computing & Information Sciences

College of Engineering

This study has been focused on social networking problems that can be addressed using data mining. Data mining is a term used to describe the process of extracting useful information from data. As social networks have become very popular, the amount of data produced by users has increased dramatically. These data contain information that can further benefit the users. However, finding this information in the ocean of data available can be very challenging. Data mining algorithms have the ability to automatically bring forth this information. One specific social network problem encountered was the friendship link prediction problem. The approach proposed makes use of the assumption that if two social network users have similar interests or common friends, then they could potentially be friends. Another problem discovered was prediction of important newsfeed posts. Some features that make this prediction problem possible include the number of posts by a specific user, the number of likes associated with posts by that user, the actual content of the post, the post length, etc. Finally, the third part of the project was learning about how to detect important news in the blogosphere. Two basic data mining approaches can be used for this problem. The first approach is based on content analysis, meaning that the news importance is detected based on the text itself. In the second approach, the importance is detected based on the graph that can be constructed from the blogs (where blogs are nodes and edges are given by links between nodes). To conclude, the research that I have done this year has helped me learn about the wealth of data in social networks and how data mining can help identify useful information from these data.

Honors/Leadership: Kansas State Silver Medallion Scholarship; KSU College of Engineering Scholarship; Bilingual: English/German