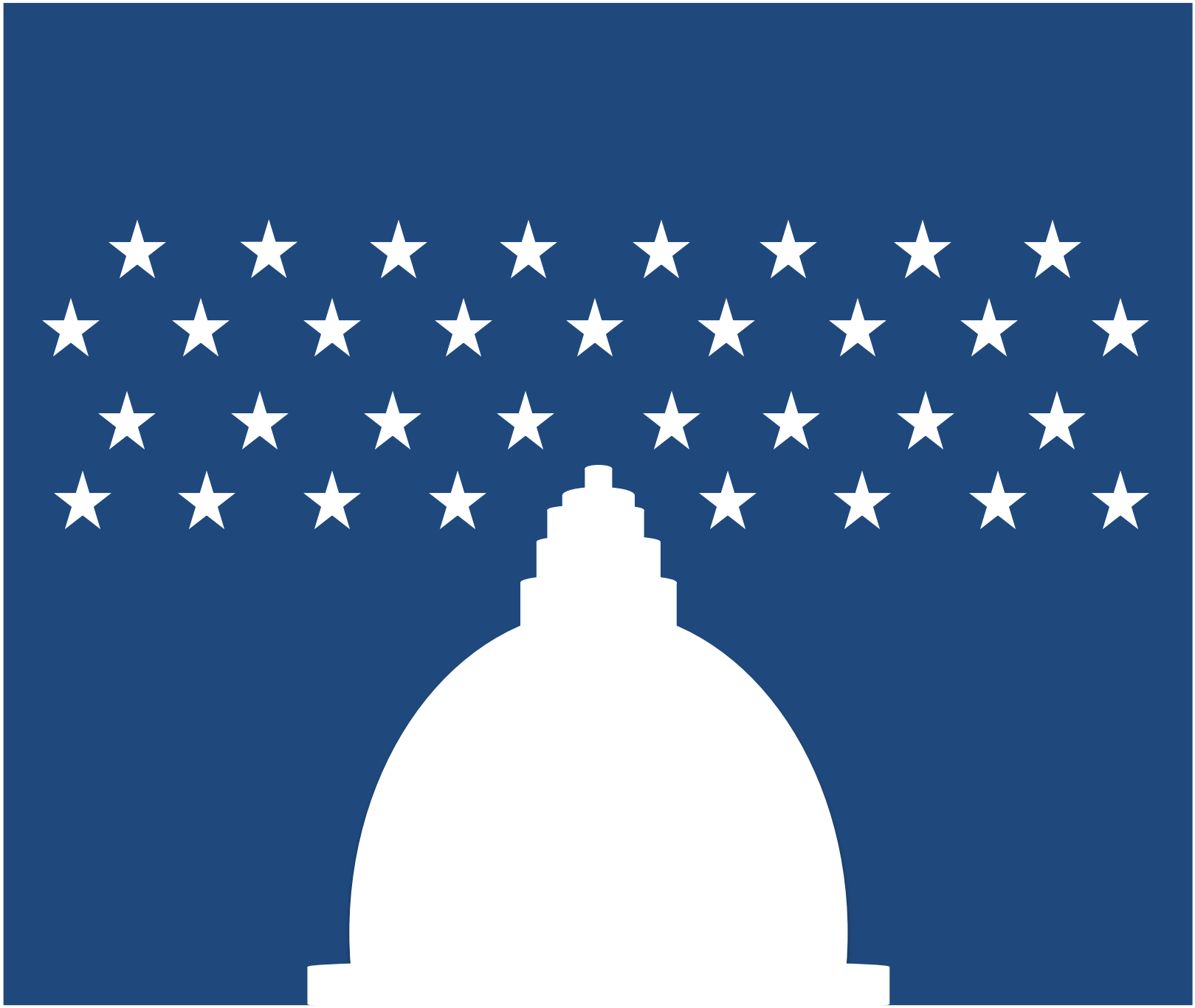
Kansas Undergraduate Research Day at the Capitol

2017



KANSAS BOARD OF REGENTS

Kansas Undergraduate Research Day at the Capitol

The Kansas Board of Regents is pleased to support the outstanding students selected to present at the 2017 Kansas Undergraduate Research Day. University research has propelled the United States into a world leader in the development of new technologies as well as advancements in existing technologies. Students selected for this event are conducting research that matters to the citizens of our great state.

The role of undergraduate students in research is vital in developing products that will shape our future.

These students learn skills that prepare them for the workforce while promoting engaged learning both inside and outside the classroom. Undergraduate student researchers complete projects that benefit their personal growth, expand knowledge in a variety of fields, and contribute to the growth of the state's economy. The talent of these students and their mentors is remarkable.

The Kansas Board of Regents invites you to explore the research selected for presentation today from Emporia State University, Fort Hays State University, Kansas State University, Pittsburg State University, The University of Kansas, Wichita State University, and Washburn University.

We are confident you will leave the event committed to continue supporting research that benefits our students and our state and in awe of the outstanding work of these students.

Zoe F. Newton
Chair, Kansas Board of Regents

Blake Flanders
President and CEO, Kansas Board of Regents

Kansas Undergraduate Research Day at the Capitol

February 15, 2017

Participating Kansas Board of Regents Institutions:

Emporia State University

Fort Hays State University

Kansas State University

Pittsburg State University

University of Kansas, Lawrence Campus

University of Kansas, Medical Center

Washburn University

Wichita State University

Emporia State University

Poster #1
Student: Jessica Carrillo, Katelin Gibson
Year: Senior
Department: Biological Sciences
Mentor: Dr. Tim Burnett
Title: Manipulating Development of Mucosal Tolerance by Blocking IL-2 Signaling

Colonization of bacteria begins in the small intestine shortly after birth as the newborn transitions from the sterile conditions in utero. The resulting microbe-laden intestinal lumen drives the development of mucosal immunity and tolerance. The objective of this study is to determine if IL-2 signaling modulates the response to initial colonization.

We manipulated mucosal response to colonization using an IL-2 receptor antagonist (anti-CD25) utilizing in vitro and in vivo models. Mouse fetal explant cultures established from small intestine were incubated with or without heat-shocked intestinal bacteria in the presence or absence of anti-CD25. The responses were compared by measuring the expression of Tnf, a gene associated with inflammation and Il10, which is attributed to anti-inflammation. In vivo experiments involved injecting dams and/or their offspring with anti-CD25 and determining effects on expression of the same genes in the small intestine of 4-week old offspring.

The in vitro experiments revealed no difference among the treatments for either gene, indicating the fetal explant cultures did not respond to bacteria. However, blocking IL-2 signaling in vivo had an effect on the expression of immune genes in weanling mice. Expression of both IL10 and Tnf genes were decreased when dams were injected with anti-CD25 shortly before parturition. Postnatal injection was similar to control. These results indicate the initial response to microbial colonization occurs within 3 days of birth and can be impaired when anti-CD25 antibodies are delivered via placenta.

Poster #2
Student: Ana Lucia Castro-Munoz
Year: Senior
Department: Biological Sciences
Mentor: Dr. Tim Burnett
Title: Blockage of IL-@ Signaling at Birth Increases Bacterial Diversity of the Intestine

The intestinal tract is perhaps the most immunologically relevant site because it is heavily colonized by microbes. Initial colonization occurs at birth and the subsequent immune response could establish a balance between effector T-lymphocytes (immune response) and regulatory T-lymphocytes (tolerance). Interleukin-2 (IL-2), a cytokine signaling molecule, is important in the activation of T-lymphocytes. Therefore, the objective of this experiment is to assess if blocking IL-2 signaling during the perinatal period in mice affects the bacterial communities that reside within the small intestine.

An antibody specific for a subunit of the IL-2 receptor (anti-CD25) has been shown to block IL-2 signaling in mouse models. We collected matter from intestinal lumens of mice injected with anti-CD25,

or control antibody, before and/or shortly after birth. DNA from these samples were subjected to a molecular technique called Ribosomal Intergenic Spacer Analysis (RISA). Because it is not critical for rRNA function, the region between rRNA subunits contains significant length variability between bacterial species. Therefore, bacterial communities can be compared by analyzing the length and intensity of resulting bands in a polyacrylamide gel following electrophoresis of the PCR products.

The small intestine bacterial community varies greatly between animals. From the RISA gels, we can observe an increase in bacterial diversity when IL-2 has been blocked from birth through day 20. Also, it is likely the first three days of birth are the most important. The results showed that RISA is specific for bacterial DNA and the technique is useful for a wide range of bacterial DNA concentration.

Poster #3

Student: Antonia Harrell, Rayan Allehaibi, Candace Cote
Year: Senior
Department: Biological Sciences
Mentor: Dr. Stephen Fields
Title: Characterization of Melatonin Signaling in Wild-Type and Mutant Strains of *C. Elegans.*

Melatonin (MEL) is well-known for its role in circadian rhythms but may also regulate neuronal plasticity. The Caenorhabditis elegans genetic system would be a valuable tool in determining the impact of melatonin on the nervous system. Previous studies have suggested that: 1) MEL is associated with reduced locomotion in L4 and adult stage C. elegans; and 2) MEL upregulates acetylcholine signaling in annelid larvae. The purpose of this study is to determine the effects of melatonin on worm behavior and on neuronal growth and development in primary cell cultures. Embryonic C. elegans cells expressing a GFP transgene marking all neurons were grown on coverslips in L-15-10 medium with or without 1mM MEL. Cells were imaged after a seven-day incubation period. The effects of MEL on neuronal growth is currently being analyzed. Paralysis rates of wildtype (N2) C. elegans were measured using NGM plates containing 2 mM aldicarb (ALD) in the presence and absence of 1 mM MEL. In the presence of both ALD and MEL, N2 worms paralyzed significantly faster than on ALD alone. EMS mutagenesis progeny were screened using ALD+/MEL+ plates. Seven mutant strains paralyzed at significantly slower rates than wildtype. Further analysis of these mutants showed that crawling rate of at least 3 strains is not modulated by MEL, suggesting potential insensitivity to MEL. Identification of the mutated genes in these strains will aid in characterizing the C. elegans signaling pathway in neurons. The authors thank the K-INBRE program funded through the NIH under grant number P20GM103418.

Poster #4

Student: Murad Jalilov
Year: Senior
Department: Social Sciences
Mentor: Dr. Phil Kelly
Title: Recognizing the North American Heartland: A More Suitable Fit for Mackinder's

Four parts complete this essay: first, a brief outline of methodology that will enlist two international-relations models, geopolitics and realism; second, a critique of Halford Mackinder's original Eurasian heartland thesis; third, an assertion that North America represents a more suitable fit for Mackinder's heartland premise; and fourth, several conclusions will follow relative to this updating of the heartland portrayal. The authors concluded that: (1) Mackinder's Eurasian heartland simply does not pass the test of logic and history. Its central and isolated position has not brought wealth and security; its resources are not sufficient to dominate the World Island; potentially hostile nations encircle it; and most of its rimlands are controlled either by the United States or by American allies and trading partners. (2) The whole Eurasian continent will continue being a focus in strategic relationships because it holds roughly two/thirds of global lands, peoples, and wealth and because the leading states, China, Germany, Russia, and Japan, reside within or near the continent. Nothing remarkable affixes to the Russian core; (3) North America provides the only suitable fit for Mackinder's thesis. It more than fulfills all of the original heartland descriptions: an isolated and distant continental center with an area united internally, blessed with resources for a vibrant economy, and poised for a hegemonic leadership. (4) Thus, two strategic regions, the North American heartland plus the entire Eurasian World Island, are together pertinent to global stability and prosperity. In sum, correct theory; wrong application – better North America and not Eurasia.

Poster #5

Student: Alex Rickard, Savannah Bender, Mariah Rey, Leora Seiler, Ali Nasrazadani
Year: Junior, Sophomore
Department: Physical Sciences
Mentor: Dr. Diane Nutbrown, Dr. Andrew Miller
Title: Air, Water, and Soil: Student Civic Engagement Projects from an Honors Chemistry II Course

Emporia State University offered an Honors College seminar to complement its Chemistry II lecture and laboratory curriculum in the Spring 2016 semester. Students in this seminar worked in groups to identify local manifestations of "wicked problems," including air, water, and soil quality. Specifically, these research projects involved surface water analysis for fertilizer runoff, radon testing in area homes, and nutrient-level soil testing. The Neosho and Cottonwood rivers were tested for phosphates and nitrates, which are typical fertilizer components. The phosphate concentrations were higher than the EPA limit for both rivers; however, the limit is undergoing further examination by the EPA. To raise awareness of radon contamination in homes, a public service announcement was broadcast on local radio stations and homeowners were recruited to participate in radon screenings. A map of Emporia was generated to indicate the locations of radon concentrations both above and below the action limit. Finally, soil samples from three area farms were tested for nitrate and phosphate content, and radishes grown in these soils were tested for potassium concentration. Each farm used a different practice with

respect to tilling the soil: no till, no till with cover crop, and tilling. All of the soil samples were determined to be healthy soils with respect to the concentration of nitrates, phosphorus, and potassium when compared to a positive control of potting soil. The farm employing tilling and the application of fertilizer is considering changing its practice to a no-till system as a result of this study.

Fort Hays State University

Poster #6
Student: Madison Bainter
Year: Senior
Department: Criminal Justice
Mentor: Dr. Tamara Lynn
Title: Understanding the Impact of Participation in Religious Activities for Reducing Criminality and Incarceration

Social bond theory argues that strong social attachments, involvement in conventional activities, commitment to educational or occupational endeavors, and belief in the law or conventional values and norms are important factors for reducing crime. Religion may capture all of these social bonds as individuals are likely sensitive to relationships developed within the confines of religious activities; belief in religious values increases one's morality while involvement in religious activities reduces time to engage in criminal or delinquent behaviors; and commitment to religious endeavors increases the personal cost of loss for violating the expectations of one's faith. If regular involvement in religious activities as a child/youth reduces the likelihood of crime and delinquency, then most prison inmates would report limited to no participation in such activities prior to incarceration. This study surveyed more than 200 inmates incarcerated in two Kansas correctional facilities (just over 100 from each facility). The survey included quantitative questions to identify trends of religious participation by inmates, and qualitative to understand those trends. Early results lack significance, as many inmates report having attended religious services during their upbringing; however, further analysis identifies two key points. First, many who attended services as a youth reported minimal participation. Second, many who did attend regularly reported engagement in the same religious faith (Christianity), and specifically the same denomination (Baptist). The fact that most participated in Christianity is not surprising; however, that most reported growing up in the Baptist denomination raises questions. Further research would help uncover why this particular trend exists.

Poster #7
Student: Megan Bergstrom
Year: Junior
Department: Agriculture
Mentor: Dr. Robert Keener
Title: Pig and Growth Development Based on Differing Swine Rations

This study was developed to provide nutritional advice to young swine producers who are purchasing and growing young show pigs. The objective of this study was to compare the rate of gain and associated economic cost per pound of gain relative to different commercial and show pig rations. Information gained from this study could provide educated decision making tools enabling producers to be economically viable in the swine industry. The trial was divided into eight groups containing seven pigs with similar genetics and similar weights. The trial started when the pigs were weaned at the age of three weeks. Seven groups were fed specific rations according to label directions, while a control group was fed a balanced corn and soybean meal ration. All eight rations throughout the trial were fed unrestricted for fourteen weeks. Each week, the pigs were individually identified, weighed and the

collected data was recorded. Research results revealed differing rates of gain between groups varying between 1.37 and 1.83 pounds/day, with the control group averaging 1.56 pounds/day. The Hubbard commercial ration was the most economical feed, over three times as cost effective with 16% decrease in average daily gain compared to the highest gaining ration. It was concluded that commercial rations provide an above average rate of gain at an economical cost per pound of gain compared to the more expensive show rations. From this study, young producers can make informed decisions toward purchasing nutritionally efficient and economical rations.

Poster #8

Student: Chelsea Marcotte
Year: Senior
Department: Psychology
Mentor: Dr. Trey Hill
Title: Attitudes toward law enforcement officers seeking mental health treatment

Although it may seem obvious that police should receive professional help for any psychological suffering, they often work in an environment where mental illness is heavily stigmatized; therefore, police officers often do not seek the needed services. To explore this topic further, the current study examined attitudes toward police seeking psychological services. It was hypothesized that rates of stigmatizing attitudes toward law enforcement officers would be best predicted by the rates of stigmatizing attitudes toward the self. Participants completed the Self-Stigma of Seeking Help scale (SSOSH) to assess their self-stigma toward seeking mental health treatment (Vogel, Wade, & Haake, 2006) and an adapted version of the SSOSH scale to assess their stigma toward law enforcement officers who sought mental health treatment. A positive correlation was anticipated between the mental health stigma for oneself and that of generalized law enforcement officers. A bivariate correlation between these two variables showed a statistically significant positive correlation, supporting the hypothesis, $r(166) = .55$, $p < .001$. The hypothesis was supported. High rates of self-stigma predicted high rates of stigmatizing attitudes toward law enforcement officers. These results help explain current stigmatizing attitudes in the mental health arena, particularly toward an especially vulnerable population: Law enforcement officers. It is important to understand how law enforcement officers who seek mental health treatment may be perceived in order to combat this stigma and encourage treatment seeking for those who require it.

Poster #9

Student: Luke Rijfkogel
Year: Senior
Department: Geosciences
Mentor: Dr. Hendratta Ali
Title: Characterization of Cyclotherms in the Eastern Edge of the Cherokee Basin

Within the subsurface of Eastern Kansas, a unique repeating package of rocks exists, known as cyclotherms. A cyclotherm can consist of repeating beds of different types of rocks such as sandstones, limestones, shales, and coal interbeds, which all vary in thickness. Understanding cyclotherms is important for oil and gas exploration in Eastern Kansas. The purpose of this project is to characterize cyclotherms in order to describe their textures and petrophysical characteristics. Understanding cyclotherms is beneficial in petroleum and coal exploration, especially since beds can be a few inches thick. Geophysical well logs were used to investigate cyclotherms to characterize rock layers. The type of geophysical well logs that will be used consist of, density (RHOB), radioactivity (GR), mineralogy (PE), which vary within the rock types. Log analysis and interpretations show 20 distinct rock layers were identified in the sequence of the study area. These layers consist of thin coal beds, fine and coarse grain sandstones, shales, and limestones, indicating cyclicity. Assessing these geophysical characteristics of the cyclotherms have implications for improving exploration and production from small hydrocarbon fields.

Poster #10

Student: Carol Whaley
Year: Senior
Department: Geosciences
Mentor: Dr. Hendratta Ali
Title: Using geochemical data to determine the influence of elemental content and mineralogical composition within the Cherokee Basin in Southeast Kansas

Geochemistry is a valuable tool that can be used to analyze unconventional reservoirs that contain natural gas. Several wells located in the Cherokee Basin in Southeast Kansas were analyzed using geochemical and well log data. The wells were logged between 224-500 feet. The objective of this study was to determine the variations in mineral composition and elemental content in order to describe diagenetic processes and determine the relation between the distribution and presence of specific minerals within the interval. X-Ray Diffraction and X-Ray Fluorescence were used to determine mineral composition and elemental content respectively. Well log data showed that the interval studied is dominantly composed of sandstone and shale with interbedded coal layers. Seven coal beds were identified across the wells with occasional silt beds and carbonates. In some wells, geochemical results show high amounts of pyrite. XRD analysis shows that the coal beds also contain significant amounts of Illite, up to 25 weight %. Where there are high amounts of chlorite, there are low amounts of Kaolinite. Apatite, a phosphate mineral, is also within the shale, limestone and sandstone beds. Data shows elevated amounts of trace elements in the coal layers. The presence of coal beds and shale layers suggest a low energy swampy environment. Trace elements indicate euxinic conditions. This study is significant because it provides information about the composition of coal beds and other rocks and about the source of natural gas (coalbed methane) in the area. This knowledge is useful for improving exploration efforts in Kansas.

Kansas State University

Poster #11
Student: Kathlyn Gomendoza
Year: Junior
Department: Biology
Mentor: Dr. A. Lorena Passarelli
Title: A viral oxidoreductase modifies viral structural proteins, a requirement for virus infectivity

Baculoviruses are enveloped, rod-shaped viruses with circular, double-stranded DNA genomes that infect insects. They have two virus forms: budded virus and occlusion-derived virus. The budded virus specializes in cell-to-cell infection within the insect, while the occlusion-derived virus specializes in infection between insects. The baculovirus *ac92* gene is a sulfhydryl oxidase present in all baculoviruses sequenced to date, suggesting that it has an essential function for baculovirus replication. During sulfhydryl oxidation, thiol groups from cysteines in specific proteins are oxidized to form disulfide bridges within or between proteins. Ac92, the product of *ac92*, is an envelope-associated protein of the budded and occlusion-derived viruses; its oxidation substrates may also be envelope proteins. Deletion of *ac92* affects the phenotype of each virus form: lack of infectious budded virus production and singly-enveloped instead of multiply-enveloped nucleocapsids in the occlusion-derived virus, suggesting defects in assembly. This project identifies viral proteins oxidized by Ac92 using two methods. First, we developed an assay in which viral proteins will be modified by alkylation and identified using mass spectroscopy methods. Second, we will purify tagged viral proteins by affinity chromatography and identify the pulled-down proteins. We hypothesize that the virus encodes a sulfhydryl oxidase gene to carry out this reaction in the nucleus and cytoplasm of infected cells, cellular compartments where this reaction is unfavorable. We further hypothesize that sulfhydryl oxidation of envelope proteins renders more stable and infectious viral particles. This information may translate into methods important to design better vaccines and therapeutic agents.

Poster #12
Student: Vaithish Velazhahan
Year: Junior
Department: Biology
Mentor: Dr. Kathrin Schrick
Title: Investigating the molecular mechanism underlying the anti-cancer action of dietary flavonoids

Flavonoids are plant-derived metabolites that have been shown to have anticancer properties. However, the biochemical mechanisms underlying flavonoid action is currently unknown. By investigating the regulation of gene expression in development using Arabidopsis as a model system, several regulatory proteins have recently been shown to be stabilized by natural compounds of the flavonoid biosynthesis pathway. This finding, combined with another recent study that shows that the dietary flavonoid fisetin induces apoptosis in human cancers by inhibiting the transcription factor Heat Shock Factor 1, led to the hypothesis that fisetin stabilizes HSF1 by direct interaction. Our results from differential scanning fluorimetry (DSF), a thermal shift assay, suggest promising binding of HSF1 to the flavonoids fisetin

and quercetin. After separating the different forms of HSF1 using fast protein liquid chromatography, our results from Native-PAGE following treatment of HSF1 with fisetin indicate fisetin binding to the monomeric form of HSF1. Furthermore, we have uncovered another novel mechanism of action that fisetin could directly bind to SUMO (ubiquitin-like modifier) in a concentration-dependent manner. Since trimerization and post-translational sumoylation of HSF1 under heat shock is critical for its activation and DNA binding, by stabilizing monomeric HSF1 and SUMO, fisetin could inhibit tumor proliferation. This is the first study to have shown that HSF1 can directly bind flavonoids. Our current efforts are aimed at co-crystallization of HSF1 and SUMO with fisetin. Since fisetin has chemotherapeutic potential, promising novel drugs that more efficiently stabilize HSF1 and SUMO could be developed as innovative therapies to combat cancer progression.

Poster #13

Student: Caroline Fuss
Year: Junior
Department: Family Studies and Human Services
Mentor: Dr. Briana Nelson Goff
Title: Hostility as a Mediator between Trauma Exposure and Health Outcomes in Married Soldiers

Military personnel consistently report high levels of mental (Sen, Seal, Miner, Bertenthal, & Marmar, 2007) and physical health problems (Hoge, Terhakopian, Castro, Messer, & Engel, 2007) problems. Further, suicide rates among veterans are roughly 50% higher than their civilian counterparts (Kang, 2015). However, few empirical studies have explored the pathways by which trauma exposure negatively impacts health outcomes. Conflict in romantic relationships has been associated with decreased health quality (Choi & Marks, 2008). Yet, close interpersonal bonds have been found to buffer the negative impact of traumatic stress (Johnson & Williams-Keeler, 1998). Thus, the couple relationship is an important unit of analysis for exploring factors that influence the outcome of trauma exposure. Using a sample of over 21,000 active duty soldiers, this study examines the mediating role of relationship conflict between lifetime trauma exposure and health outcomes (i.e., depression, generalized anxiety disorder, bipolar disorder, PTSD, sleep problems, and chronic pain).Using cross-sectional data from All Army Study (AAS), results indicate that PTSD symptoms, compounded with reported negative relationship functioning and satisfaction, resulted in an increase in negative health outcomes associated with trauma exposure (insomnia and chronic pain). As predicted, when higher reported levels of relationship functioning and satisfaction were paired with PTSD symptoms, a significant decrease in negative health outcomes associated with trauma exposure (insomnia and chronic pain) were reported. These findings support the conclusion that the couple relationship is an important unit of analysis for exploring factors that influence health outcomes of trauma exposure when treating PTSD.

Poster #14

Student: Patricia J. Melton
Year: Senior
Department: Digital/Experimental Media Program, Department of Art
Mentor: Professor Carlos Castellanos
Title: The Cicada: Interactive Art Promoting Healthier Human-Insect Relationships

The Cicada life cycle is one of constant regeneration. In Kansas, every spring the cicadas reappear. Small dime-sized holes appear in the surface of the soil near large tree roots. The males begin to sing performing an orchestra of low frequencies that pervade the evening until nightfall. Imbibed with themes of rebirth, immortality, and spiritual realization, the Cicada is symbolic of summer across the world. This project focuses on the cognitive dissonance present in the relationship between our antennaed counterparts and humans. It asks the question, why is it that insects are often objects of fear? The alien-looking cicadas are integral to the life cycles of the earth. They remove decay so that new life may form.

The art installation depicts scenes of people and insects in tranquil states. The viewer is then invited to interact with a plush cicada. This activates a force sensor which relays values to a visual coding environment called "Max." If the viewer becomes too forceful with the Cicada, the happy images of people and insects will become warped, and the Cicada's song will become chaotic. What began as creative inquiry to simulate interaction between one person and an electronic Cicada became a symbol of the human-insect relationship as a whole. This project can be used to teach children how to interact with insects in their real-life environment.

Poster #15

Student: Brandon Williams
Year: Sophomore
Department: History
Mentor: Dr. M.J. Morgan
Title: Cameras in the Streets: The Use and Evolution of Photography in Turn-of-the-Century Kansas

Cameras became a popular form of media across the world in the middle of the 19th century with the advent the daguerreotype: a box intaking light and exposing it to a glass plate coated in light sensitive chemicals that would burn the image onto the glass. Since then the use of cameras has increased and evolved, making them easier to use for a wide variety of documentation, from the carnage of war to the everyday life of small town America. The latter of the two, vernacular photography, is the primary focus of this project. Kansas is home to a surprising number of photograph collections taken and accrued by hobbyists. Two such hobbyists were the McColm siblings, from the area around Lawrence, Kansas, who took stunning and highly detailed photos of nature from 1899. For much of this project, the subject of research was the town of Clifton, Clay County, Kansas, one of the most visually documented towns in the Midwest. Several postcard companies were known to have traveled through Clifton taking photos for use in their postcards, resulting in a moderate-sized collection of town photos from the early 1900s. The area was also the home of an avid amateur photographer, Merrill J. Barnhard, who took many pictures in his spare time, resulting in a collection of over 1,000 glass plate negatives. These document the daily life of Clifton townsfolk from around the same time that the postcard companies passed through.

Pittsburg State University

Poster #16
Student: Courtney Blankenship
Year: Junior
Department: Communication
Mentor: Dr. Joey Pogue
Title: An Analysis of Social Stigmas Regarding Poverty

In this study, opinion regarding poverty on a national and international level as well as opinions pertaining to negative social stigmas around poverty were collected from students and faculty of all demographics and backgrounds at Pittsburg State University with the intent to identify and understand possible hypocrisies in the way society views people in poverty and the expenditure decisions that they may make. Survey-taking participants were between the ages of 17 and 80, represented various sexual orientations, races, ethnicities, socioeconomic backgrounds, genders, and religions, and there were 123 people who took the 30-question survey. Qualtrics survey system was used to record, analyze, interpret, and calculate the quantitative data that was collected from the survey responses, and trick questions were used in order to ensure that responses were accurate and intentional. Results found that participants were likely to condemn poverty stricken people for 'spending beyond their means' on materialistic, status items, however, participants were also likely to acknowledge the hypocrisies within their own opinions. The intent of this study was to prove that certain biases and environmental factors may shape a person's willingness or unwillingness to help those who are in poverty, as well as to prove how the stigmatization of poverty may prevent the system from changing.

Poster #17
Student: Laci Hadorn
Year: Senior
Department: Chemistry
Mentor: Dr. Santimukul Santra
Title: Drug Cocktail-Carrying Nanomedicine for the Treatment of Cancer

Prostate cancer is the most common cancer in men, with 1 in 7 men being diagnosed in their lifetime. Hsp90 is a key molecular chaperone involved in cell signaling, proliferation, and survival, and therefore a promising target for therapeutic intervention. Inhibition of Hsp90 suppresses androgen signaling, promoting degradation of client proteins resulting in apoptosis. Both gedunin and celastrol disrupt the function of Hsp90 through unique pathways. The co-chaperone Cdc37 mediates the loading of protein kinase onto Hsp90, and the natural product celastrol disrupts Cdc37-Hsp90 complex formation. The natural product gedunin inhibits p23 chaperoning activity, blocking its cellular interaction with Hsp90. Studies have shown the anticancer activities of gedunin on several lines of cancer including melanoma, prostate, and human breast cancer cells.

Herein, a novel, folate functional magnetic nanomedicine encapsulated with Hsp90 targeting drug cocktail, gedunin and celastrol, will be used for effective treatment of cancer. This MR nanotheranostics will be specifically used as the targeted drug delivery platform to deliver drugs to tumor. In this study,

gedunin and celastrol carrying iron-oxide nanoparticles was formulated for the targeted treatment of prostate cancer. Effective drug delivery using targeted nanomedicine formulations, and various biomolecular and cellular anti-tumor activity will be discussed in this presentation.

Poster #18

Student: Ashley Jimenez
Year: Senior
Department: Chemistry
Mentor: Dr. Ram Gupta
Title: Polymer Supported Cobalt Oxides for Improvement Energy Storage Devices

Energy storage devices such as batteries and supercapacitors are very important due to their ability to store energy and deliver when needed. Various types of materials such as metal oxides, metal sulfides, polymers and crabons were used for these applications. Among these materials, carbon nanofibers are particularly attractive as they provide moderate energy storage capacity and cyclic stability. In this work, we have improved the Performance of carbon nanofibers by embedding cobalt oxides. Cobalt oxide imbedded in polyacrylonitrile was prepared using electrospun method. The synthesized materials were structurally and electrochemically characterized. Electrochemical measurements showed improvement in energy storage capacity after embedding cobalt oxide in polyacrylonitrile, e.g. specific capacitance improved from 360 F/g to 1100 F/g after imbedding cobalt oxide in polyacrylonitrile. It was also observed that the charge storage capacity depends on the electrolyte used. The cyclic stability test of the cobalt oxide embedded carbon nanofibers showed about 100% retention in charge storage capacity over 5,000 cycles of charge-discharge study. A supercapacitor device fabricated using these nanofibers showed that charge storage capacity increases with increase in temperature. We observed about 200% improvement in charge storage capacity on increasing temperature from 10 to 70^0 C. Our results suggest the cobalt oxide embedded polyacrylonitrile could be an attractive material for energy storage applications.

Poster #19

Student: Evan Noel
Year: Senior
Department: Chemistry
Mentor: Dr. John McAfee and Dr. Irene Zegar
Title: Destabilizing Metastasis Associated Lung Adenocarcinoma Transcript 1 (Non-Protein Coding)-MALAT1 RNA

MALAT1, a 9000 nucleotide, highly abundant, nuclear lncRNA found to regulate gene expression of metastasis associated genes. Unlike protein coding genes, most ncRNAs show low sequence homology among eukaryotes. This is not the case for MALAT1 which is found to be highly conserved in mammalian tissues. Specifically, high conservation among mammals is observed in the 3'-end A-rich Expression and Nuclear Retention Element (ENE-A) which has been shown to have a unique structural motif to adopt a Hoogsteen triple stranded U.A.U as well as C+.G.C interactions. It is strongly believed that this structural feature is the primary determinant of MALAT1's thermal stability and of its resistance to degradation. Because stability of RNAs is essential to their regulative functions, it is an intriguing idea that developing agents that target the triple stranded regions of MALAT1 can lead the way to the inhibition of its oncogenic activities. We have previously conducted molecular docking studies using small molecule databases in order to identify possible therapeutic agents that intercalate within the triple stranded region of MALAT1 and possibly act to destabilize the RNA. We identified 10 compounds with virtual free energy of binding between -10 and -14 kcal/mol. This range of interaction is considered tight and is expected to destabilize MALAT1 assuming intercalative binding. This work presents the results of MALAT1 thermal stability studies conducted in the presence of these compounds. Equilibrium binding studies to determine the extent of binding of these compounds to MALAT1 are also presented.

Poster #20

Student: Hannah Thomas
Year: Senior
Department: Biology
Mentor: Dr. Virginia Rider
Title: The Spatial Expression of the T Cell Homing Receptor, CCR7, is Differently Regulated by Progesterone and Estradiol in the Rat Uterus

Few autoimmune disorders are as devastating as those that affect embryo. The C-C chemokine receptor type 7 (CCR7) is a T-cell homing receptor in many lymphoid tissues in humans. Expression of CCR7 could recruit T regulatory cells involved in localized uterine immune suppression that permits implantation of the semi-allogeneic embryo. The present study investigated the cell-specific expression of CCR7 receptors in the uterus. Sex steroid effects on CCR7 cell-specific expression were examined in ovariectomized (OVX) rats and OVX rats treated with progesterone (2mg) for three consecutive days (0hE). Some progesterone pretreated rats were given a single injection of estradiol (0.2µg) at day 4 and the uterine horns were removed 6 hours later (6hE). This hormone regimen stimulates a 5-fold increase in synchronously proliferating stromal cells. Uteri were fixed, embedded in paraffin and processed using standard histological methods. Progesterone pretreated uteri exhibited a significant ($p<0.05$, 27%) increase in antimesometrial pre-decidual cell CCR7 expression compared

with OVX uteri. Estradiol treatment did not further increase cell density at the antimesometrial region but significantly increased ($p < 0.003$, 29%) mesometrial CCR7 expression over that in OVX uteri. The results suggest that progesterone stimulates CCR7 expression in pre-decidual cells at the ventral region of the uterine horns where implantation occurs, while estradiol increases CCR7 expression at the dorsal region of the uterine horns where increased vascularity arises. Together the results suggest that recruitment of T regulatory cells could occur prior to embryo attachment and may be an essential step in the maternal preparation for pregnancy.

University of Kansas
Lawrence Campus

Poster #21
Student: Adebayo Bramiah
Year: Senior
Department: Chemistry
Mentor: Dr. Carey Johnson
Title: Dye-Protein Investigation with Circularly Polarized Light

Calmodulin (CaM) is a calcium binding protein seen in all eukaryotic cells. In this experiment, CaM has been labeled with fluorescent dyes bound to specific mutation sites to investigate the secondary structure of the protein in high and low calcium buffers. Previous experiments in our lab suggested that fluorescent dyes may interact strongly with the protein. The methods involve a novel use for circular dichroism by probing the dye's visible absorption region (500-650 nm) to investigate interactions of the dyes with the protein. In the present work for labeled proteins, we observed significant circular dichroism at the T34C mutation site when bound to either AF594 or Texas Red, as compared to the T110C mutation site which presented with weak to moderately observed circular dichroism for AF594 and Texas Red respectively. The dyes Texas Red and Alexa Fluor 594 had low optical activity in the absence of the protein.

Poster #22
Student: Courtney Coppinger
Year: Senior
Department: Ecology & Evolutionary Biology
Mentor: Dr. Ben Sikes
Title: The Effects of Small Mammal Burrowing on Nitrogen Pools in Restored Grassland Prairie Systems

A wide range of organisms, from invertebrates like earthworms to larger burrowing mammals such as moles, affect the structure of soils through a mechanism called bioturbation. These organisms affect soils by mixing nutrients in below-ground layers through burrowing. There is often a positive correlation between bioturbation and increased nutrient levels in soils, meaning that these organisms can increase plant growth in a prairie grassland. The objective of this research is to understand the important connections and processes affected by such physical disturbance. In the context of a prairie restoration experiment, I will determine nitrogen levels in soil samples with many different levels of mammal burrowing. My laboratory work will allow me to quantify the chemical forms of nitrogen.

Poster #23

Student: Billie Lubis
Year: Senior
Department: Physics
Mentor: Dr. Alice Bean
Title: X-ray testing of silicon forward pixel detectors for the CMS experiment

The University of Kansas Compact Muon Solenoid (CMS) group has tested over 300 silicon forward pixel modules for the Phase 1 upgrade of the CMS tracker. The tracker is a type of detector that enables researchers to reconstruct the paths of high-energy particles, by tracing the path of charged particles through a magnetic field. X-ray testing was an integral part of the testing process for the Phase 1 detector to be installed in the CMS starting in February 2017. We used an X-ray source to provide a high particle rate and also to calibrate the energy of the modules using fluorescence. For modules that were graded "A" from previous tests, we downgraded 16% primarily due to findings from the high rate testing.

Poster #24

Student: Mexixi Wang
Year: Senior
Department: Economics
Mentor: Dr. John Keating
Title: It Takes a Nation—or Many Nations: The Cross-Country Analysis of the Effects of Family and Social Factors on PISA Scores

A nation's family policies and social factors inevitably influence the well-being of its students. However, it is more difficult to pinpoint exactly what types of policies and factors positively or negatively affect children's academic performances. Given the growing interdisciplinary research on the relationship between social and family factors on early childhood education and student performance in the global economy, it is more important now than ever to identify and to implement effective policy to ensure that a nation's children have the greatest chance for thriving at global economy. The objective of my research project is to use PISA (Program for International Student Assessment) scores from dozens of countries over a span of 15 years to analyze the effects of different social and family factors on PISA test performance. Through my analysis, I hope to provide a holistic overview of the different family and social factors that are correlated with high PISA test performance.

Poster #25

Student: Lirian Ziegelman
Year: Senior
Department: Psychology, Medicine
Mentor: Dr. Joseph Donnelly
Title: The impact of classroom based physical activity on time-on-task and academic achievement in elementary school children

This study aims to explore the influence of classroom based physical activity on classroom behavior and its relationship with academic achievement.Seventeen elementary schools were cluster randomized to A+PAAC (i.e., physical activity, N=9) or control (i.e., no physical activity, N=8) for a 3-year trial. Teachers were trained to deliver academic instruction with moderate-to-vigorous physical activity (MVPA) with a target of 100+ minutes of activities per week. Outcome measures included academic achievement (Weschler Individual Achievement Test-III, WIAT-III), administered at baseline and repeated each spring for 3 years, time and intensity of academic lessons, and time spent on task pre-and post-physical activity. Multilevel modeling was utilized to estimate overall group difference, change rate over the study period, and group difference in this change separately for each outcome, accounting for the dependency among observations and covariates including age, gender, race, free or reduced lunch, BMI and fitness.

This study found that participation in the A+PAAC lessons was significantly associated with a greater percentage of time-on-task behavior time throughout the entire 3-year period. A greater percentage of time spent at a MVPA level was significantly associated with more time spent in on-task behavior following physical activity participation. Finally, results showed that spending a greater percentage of time doing on-task behavior after the physical activity was significantly associated with higher math scores and spelling scores. These findings provide support that physically active classroom lessons do not have a negative impact on academic achievement in elementary aged children.

Poster #26

Student: Cassie Caedo
Year: Senior
Department: School of Nursing
Mentor: Assistant Professor Martha Baird, PhD, APRN, CTN-A.
Title: A Survey of Psychiatric Mental Health Advanced Practice Nurses' Attitudes and Experiences in Telemental Health

Introduction: One out of every five adults in the US suffers from mental illness. In Kansas, 100 out of all 105 counties have a mental health provider shortage. Yet, Kansas has cut $19 million in funds for mental health services since 2008. Mental illness costs the state an estimated $1.17 billion annually. Telemental health (TMH) is an efficient and cost-effective way to provide mental health services, particularly to those in rural or restricted areas such as prisons and schools.
Purpose: To determine the number of psychiatric mental health advanced practice nurses (PMH-APNs) who provide TMH services, and to learn about their experiences, attitudes, and training in TMH delivery.
Methods: 83 members of the American Psychiatric Nurses Association (APNA) online discussion board completed a 9-item survey. Questions included: length of time practicing as a PMH-APN; TMH use in practice, populations served, and whether they had training or education in the delivery of TMH.
Findings: A majority (n=52) provide TMH services, and 71% of participants reported no prior training. Most participants reported serving either rural or a combination of rural and urban communities, 70% of all participants indicated a desire for TMH education.
Relevance to Kansas: PMH-APNs providing TMH extends the reach of mental health services to rural and underserved communities. PMH-APNs can use TMH to fill provider gaps and increase access to psychiatric care. This data will contribute to an educational program for PMH-APN students to learn safe and effective TMH delivery methods.

Poster #27

Student: Kathryn Noble
Year: Senior
Department: School of Nursing
Mentor: Associate Dean for Research, Marge Bott, PhD, RN
Title: Relationship between Family Caregiver Burden with Time Involved in Caregiving and Satisfaction with Care for Residents in the Nursing Home

Introduction: Family caregivers are crucial in the end-of-life (EOL) care of nursing home (NH) residents. As the population ages and requires NH care at the EOL, families experience increased burden and less satisfaction with care. While time involved in caregiving has been studied, little is known about how the time involved affects family caregivers' burden and satisfaction with EOL care.

Purpose: The study aims are to describe and explore the relationships among the time spent in caregiving, satisfaction with care, and the caregivers' perceived burden (strain & distress) during the resident's EOL.
Methodology: From a larger study examining EOL in nursing homes, data were collected for a descriptive secondary analysis from families of deceased residents (N=1,282). Descriptive statistics depicted the *Caregiver Strain/Distress Indexes*, the *Satisfaction with Care Scale*, and *Time Spent in Caregiving.* Pearson (r) correlations were used to explore the relationship among the variables.
Findings: Caregivers were involved an average of 9.11 hours per week (range 0 to 120). Time spent in caregiving was positively related to strain (r=.17, p<.01) and distress (r=.18, p<.01) and negatively related to family satisfaction with care (r=.07, p<.01).
Implications: As time spent in caregiving increases, it is important to identify ways (e.g., communication, support, or palliative measures) that assist family members in reducing the strain and distress they perceive during the EOL experience for residents.
Relevance to Kansas: Understanding the EOL experience can guide interventions for improving EOL care quality in NHs for residents and their caregivers in Kansas and elsewhere.
Disclosures: The original study was funded by NIH NINR, NR009547

Poster #28

Student:	Annie Yungmeyer
Year:	Senior
Department:	School of Nursing
Mentor:	Professor Karen Wambach, PhD, RN
Title:	Self-Reported Experiences of Breastfeeding Adolescent Mothers Participating In a Pilot Intervention Focused On Promoting Healthy Behaviors

Introduction: Adolescent mothers have lower rates of breastfeeding initiatiosn and shorter duration than adult-age mothers.
Purpose: Our purpose is to explore the breastfeeding experiences of adolescent mothers participating in a feasibility study of a multi-behavioral intervention.
Methodology Participants, 15 to19 years of age, from academic medical center prenatal clinics will participate during eight antepartum and twelve postpartum weeks. Participants receive electronic health education on breastfeeding, healthy lifestyle and stress management, and virtually attend peer and research team support groups. Postpartum, participants complete surveys addressing coping, infant feeding and maternal diet/activity. At five weeks postpartum, teens who breastfeed evaluate their experiences by completing the 30-item Breastfeeding Experience Scale (BES), which measures breastfeeding events/experiences measured on a rating scale (Section 1) and feeding practices/patterns and duration of breastfeeding (Section 2). Section 1 will be evaluated for internal consistency using Cronbach's alpha. Previous samples demonstrated alphas ranging .72-.82. Breastfeeding problem severity will be calculated as a mean score 1-5. Descriptive statistics and content analysis will be used to analyze section 2.
Findings: We will report types and severity of breastfeeding problems during the first month postpartum, continued breastfeeding and/or duration of any and exclusive breastfeeding, and timing and frequency of use of formula substitutes.
Relevance to Kansas: This research is a one-group feasibility study of intervention and measurement protocols that will contribute to the refinement of a larger future study. This research will lead to

conclusions about the feasibility, acceptability, usability and relevance of interactive education and support interventions and allow description of breastfeeding experiences of these teens. Education and support to promote healthy behaviors among teens is an essential component to building healthier communities across Kansas.

Poster #29

Student: Ethan Alquist and Trung Nguyen
Year: Seniors
Department: Respiratory Care Education
Mentor: Clinical Assistant Professor, Karen Schell
Title: Art Speaks: Using Art to Enhance Interprofessional Communication in Respiratory Care Students Through Visual Assessment and Interpretation

BACKGROUND: Looking deeply at visual art, Respiratory Care students can practice observation skills, reflection and develop ideas to help solve problems in clinical practice. Based on previous work, visual art training may help improve ability to notice details and begin to use all senses to exam the patient. However, a review of the literature has shown that research has been done with medical students, none has been done specifically with Respiratory Care students. The purpose of this study is, by listening to others in the group activity, Respiratory Care students can reflect their own thoughts and meaning which can identify new problems and possible solutions while improving their interprofessional communication. By learning in depth observational skills, students can learn to deliver safe and effective care by looking at the big picture including the "whole patient" and the environment.
METHODS: This study involves six junior Respiratory Care students over a three week time frame and uses a single cohort design for assessing the feasibility and effectiveness of the Art Speaks intervention. Pre and post self- assessment with the Mindful Attention Awareness Scale (MAAS) was used to measure a receptive state of mind. In addition, a pre and post the SBAR (Situation, Background, Assessment, and Recommendation) tool recorded their observations of a single case study.
RESULTS: Quantitative data obtained with the MAAS survey demonstrated significant improvement from the baseline pre score. Qualitative data with SBAR tool demonstrated student improvement to communicate applicable patient information.
DISCUSSION: Learning models for the development of visual skills to enhance the physical exam are presenting a novel approach to educating students and healthcare providers. Respiratory Care student engagement through practicing visual observation, communication, and reflection during the three sessions demonstrated the ability to take works of art and apply them to the clinical settings.
CONCLUSIONS: This small pilot study with the six Respiratory Care students demonstrated that visual learning, visual observation, and reflection guided by a skilled art educator showed an increase in sensitivity, team building, and collaboration as demonstrated by the student's narrative reflections and pre and post results in MAAS and SBAR.

Poster #30

Student: Kim Kaberline and Brandon Conrade
Year: Seniors
Department: Health Information Management
Mentor: Dr. Murad Moqbel, Assistant Professor
Title: Factors Contributing to Kansas "Brain Drain"

Objective: The objective of this study was to examine if rural background, current view of declining Kansas economy, perceived availability of external employment opportunities (outside of Kansas), conservatism values, collectivism values, and out-of-state student status had a significant relationship with intention to leave Kansas (KS) post-graduation.
Method: A multiple regression test was conducted to analyze 80 survey data and identify statistically significant predictors of intention to leave KS post-graduation.
Results: The multiple regression analysis indicated that current view of declining KS economy (β=.54, $P<0.001$), perceived availability of external employment opportunities (β=.17, $P<0.05$), collectivism values (β=.18, $P<0.05$) and out-of-state student status (β=.65, $P<0.001$), were statistically significant predictors of intention to leave KS post-graduation. These factors explained 73% of intention to leave KS post-graduation.
Conclusions: Current view of declining KS economy and perceived availability of external employment opportunities had a positive relationship with intent to leave KS post-graduation. Collectivism values had a positive relationship with intent to leave KS post-graduation, suggesting that emphasis on the needs and goals of the group as a whole may negatively affect an individual's decision to leave KS post-graduation. There was a positive relationship between being an out-of-state student and intent to leave KS post-graduation.

Washburn University

Poster #31
Student: Stephanie M. Brown
Year: Senior
Department: Psychology
Mentor: Dr. Mike Russell
Title: Using echolocation to detect the existence of openings and object location

Echolocation refers to the emission of sound by a perceiving-acting organism and the use of reflected sound to judge the presence and position of objects. The ability to echolocate is particularly useful when one considers the need to be able to navigate through a cluttered world. In short, previous research has shown that sighted and blind humans can accurately locate objects using echolocation. However, to echolocate successfully in the world, individuals must be able to detect openings (the space between objects) as well as objects. The ability to perceive openings is considered essential to perceiving-acting organisms since, according to James J. Gibson, openings permit opportunities for action. To date, no known study has investigated the ability of individuals to use echoes to detect openings. Participants in the present study were instructed to walk along a wall until they were standing adjacent to an opening or adjacent to a panel. Participants were exposed to six target positions. The results revealed sighted- but-blindfolded individuals were largely unable to detect the gap location but were fairly accurate at judging object location. Gap location was affected by the sound signal but unaffected by experience. Object location ability was tied partially to experience. Discussion is given to the manner with which the acoustic structure is informative about an opening and how that acoustic information enhances our understanding of spatial layout.

Poster #32
Student: Mallory Lutz
Year: Senior
Department: History
Mentor: Dr. Rachel Goossen
Title: "The Hidden Cost of *Brown v. Board*: African American Educators' Resistance to Desegregating Schools"

My research focuses on the black community in Topeka during the first half of the twentieth century. Using archival sources such as the black press, letters from educators and administrators to state officials and newspapers, and correspondence from black teachers in Topeka, I examine the reasons some African American teachers, administrators, and families were hesitant to desegregate the public school system. Additional sources include the Kansas Historical Society's archival holdings, including governors' files and court cases, as well as the papers of Mamie Williams, an African American teacher. Some black Topekans feared desegregation because they believed it would harm students physically and emotionally. They also believed desegregation discouraged racial pride and forced children into environments where they were "merely tolerated." Many black teachers emphasized the unique perspective they brought to their classrooms, stating that they were better able to empathize with their students. Desegregation spelled the possibility of demotion for black teachers, yet if they voiced

concerns about potential job loss and desegregation, they risked being seen as hypocrites in the fight for racial equality. With their schools, teachers, and livelihoods at stake, blacks in Topeka initially resisted the efforts of white school boards and lawyers to take their schools away from them. In 1954, however, the U.S. Supreme Court ruled "in the field of public education the doctrine of 'separate but equal' has no place." Both the positive and negative consequences of desegregation continue to affect black students, communities, and the field of education over half a century later.

Poster #33

Student: Ryan Kelly
Year: Senior
Department: Leadership
Mentor: Dr. Michael Gleason
Title: Learning through the Aleshire Venture Grant: An analysis of the impact on former students and community recipients

The Aleshire Venture Grant Project is a cooperative effort between the United Way of Greater Topeka, the Washburn University Leadership Institute, and Joe and Janet Aleshire to teach students about the value of servant leadership, civic engagement and giving back to one's community. As the program has now entered its seventh year, these organizations have sought to understand the impact that the grant has had and search for possible improvements to the process. This analysis is an amalgamation of the personal accounts of both students and organizations that have participated in the program throughout the past. Through a mixed method of an online survey and interviews with past students, along with interviews with past organizations, the results of community impact of the were to be analyzed and better understood. Initial findings provide evidence that the Venture Grant program has increase the civic engagement of students involved, enhanced their educational experience in tangible ways, and contributed to the reach of the United Way of Greater Topeka's efforts to improve Shawnee County.

Poster #34

Student: Lori Magnuson
Year: Senior
Department: Communication
Mentor: Dr. Tracy Routsong
Title: Adoption Triad: Whose story is it?

The journey of adoption impacts more than the individual or couple intending to adopt. The story is more than when paperwork is filled out. There are multiple stories in play, most importantly, the story triad between the birth parent/s, adoptive parent/s, and the adopted child. Using concepts from Sandra Petronio's Privacy Management Theory, the researcher located adoption stories told by various participants of the adoption triad. These stories were coded for concepts of information ownership and positivity or negativity of the adoption story. Of the coded stories, the birth mother story was framed by the adoptive parents and the adopted children positively. Additionally, all parties of the triad seemed to assume ownership of the biological parent story if known. Future research might include personal interviews instead of crafted video stories.

Poster #35

Student: Mackenzie Walls
Year: Junior
Department: Anthropology
Mentor: Dr. Alexandra Klales
Title: Testing the reliability of morphological sex estimation methods used in forensic anthropology

Biological profile estimation from the human skeleton is one of the primary roles of forensic anthropologists. Multiple methods are used in order to create a biological profile that law enforcement can then use to narrow the list of potential victims and make a positive identification. Recent court cases and the seminal report by the National Academy of Sciences (NAS) in 2009 has pushed for a reevaluation of the methods used in all forensic sciences, including forensic anthropology.
Two morphological methods have been developed in the last decade to more accurately and reliably estimate sex from the human skeleton in light of the *Daubert* proceedings and the NAS report. The Walker (2008) method uses five skull traits, while the Klales et al. (2012) method examines three pelvic traits. The practitioner examines each trait using the methods, scores them, and then enters these scores within a statistical framework to calculate the probability of sex. Both methods have been well received however, there has yet to be a wide-scale examination of the role experience plays. This research examines if the methods could be applied accurately by individuals with varying degrees of experience. Three observers with varying levels of experience scored over 100 individuals. Observer agreement was measured using the intraclass correlation coefficient. Results varied by trait, but overall, each observer could reliably and accurately apply the methods; however, accuracy and reliability increased with greater training and experience. This research is part of National Institute of Justice grant #2015-DN-BX-K014 (PI: Dr. Alexandra Klales).

Wichita State University

Poster #36
Student: Hooloomann Ramdial
Year: Senior
Department: Aerospace Engineering
Mentor: Dr. Atri Dutta
Title: Optimal Orbits of CubeSats for Space Missions

CubeSats (miniaturized satellites) provide a cost-effective method to acquire scientific data from space and to demonstrate new technology, because they are launched into orbit as secondary payloads. This study analyzes CubeSat orbits and maneuvers in the presence of gravitational perturbations. An investigation was carried out to obtain the range of possible orbits around the Earth and around Jupiter, in which inclination changes could be performed using minimum fuel burns. The effects on the CubeSat of the gravitational field of each non-spherical planet were analyzed. Parametric studies were performed to analyze the impact of orbit selection on the fuel expenditure of the mission. Two applications of the findings were considered: 1) an orbit around Jupiter that will enable the search for dark matter in proximity to the giant planet, and 2) orbits around the Earth, in which CubeSats can be utilized for weather imaging, space archeology and seismic investigations. For the state of Kansas, CubeSats can provide a low-cost way to perform missions benefiting the agriculture and aviation industries, and is also useful for STEM education.

Poster #37
Student: Elizabeth Ramirez
Year: Senior
Department: Psychology
Mentor: Dr. Barbara Chaparro
Title: The Relationship Between Eating Behavior and Self-Perception

This study explores a relationship between self-perception and eating behaviors among college-age males and females at Wichita State University. Self-perception and eating behaviors are two variables that strongly affect one's mental health and lifestyle. Research may therefore provide better tools to identify students at risk for self-esteem issues, eating disorders, or suicide, as well as aid in the production of effective treatment programs. An online survey was completed by 66 participants recruited through on-campus communications, social media advertisements, and the SONA portal. Participants' self-perceptions were assessed using Rosenberg's Self-Esteem Scale and Mendelson's Body-Esteem Scale; eating behavior was determined using the Three-Factor Eating Questionnaire (TFEQ-R18). Findings showed self-esteem to have significant relationships with uncontrolled eating behavior, emotional eating behavior, and the BE-attribution subscale within the Body-Esteem Scale. Significant relationships were also found between the BE-appearance subscale and BE-weight subscale. A strong correlation was found between two of the TFEQ-R18 subscales: Emotional Eating subscale and Uncontrolled Eating subscale.

Poster #38

Student: Mercedes Lubbers
Year: Senior
Department: English
Mentor: Dr. Jean Griffith
Title: The Colonization of Native Americans in "Tracks: and in 21st Country America

This study is a comparative analysis of the novel "Tracks" by Louise Erdrich to events surrounding the current Dakota Access Pipeline (DAPL) project at the edge of Tribal reservation land, which has spawned the NODAPL movement led by Native Americans. By comparing a story of ongoing colonization and destruction of Native Americans and their reservations with real-life events, this study seeks to show the importance of diverse literature and the influence of literature in depicting the experiences of the minority, while arguing that Native American literature cannot be analyzed through a post-colonialist lens because colonization and "Americanization" of Native Americans is still taking place. Primary sources include the novel "Tracks" and articles pertaining to the NODAPL movement, as there is currently little academic research on the matter. Secondary sources include journal articles on Tracks that analyze the significance and history of Native American reservations.