PROGRAM AND ABSTRACTS

Wichita State University

Seventeenth Annual

UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITY FORUM—URCAF

WICHITA STATE UNIVERSITY

APRIL 4, 2017

RHATIGAN STUDENT CENTER

2017 URCA FORUM

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Wichita State University
Seventeenth Annual Forum
Undergraduate Research and Creative Activity Forum—URCAF

SCHEDULE

9:00 am – 9:30 am: Registration, *Sage Lounge, Second Floor*
9:30 am – 12:00 pm: Oral Presentations

- Social Sciences and Humanities, *RSC, Rm 256*
- Natural Sciences and Engineering, *RSC, Rm 257*

10:00 am – 12:00 pm: Poster Presentations

- Social Sciences and Humanities, *RSC, Rm 264*
- Applied Learning, *RSC, RM 264*
- Natural Sciences and Engineering, *RSC, RM 262*

12:00 – 1:30 pm: Lunch, *RSC, First Floor*
1:30 – 2:00 pm: Awards Ceremony, *RSC, Rm 256*

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Social Sciences and Humanities Oral Presentations

Rhatigan Student Center Room 256

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9:45	**Drew Colcher**	Mark Twain and the Dialogic Imagination	12
10:00	**Jennifer Coslett**	Getting a Grip by Going Graphic: Using Graphic Novels to Enhance Student Engagement and Comprehension	13
10:15	**Donald Gering**	The Impact of Religion on Democracy, Transparency, and Gender Equality	15
10:30	**Drew Colcher**	Discrimination Against the Spanish Language in Kansas	12
10:45	**Aja Molinar**	The Effects of Cell Phone Interruptions on Students with Anxiety	21
11:00	**Elizabeth Ramirez**	The Relationship between Eating Behavior and Self-Perception	22

Natural Sciences and Engineering Oral Presentations

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9:45	**Mackenzie Friege**	A Synthetic Model of the Nickel Superoxide Dismutase Active Site	14
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Social Sciences and Humanities (UPSSH) Poster Presentations

Rhatigan Student Center Room 264

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UPSSH2	**Mercedes Lubbers-Payne**	The Colonization of Native American Reservations in "Tracks" in 21st Century America	19
UPSSH3	**Caleb Wiens**	Gender, Teacher Interaction Patterns, and their Effect on Student Achievement	23
UPSSH4	**Morgan Wilson**	Effects of Student vs. Teacher Grouping on Students Grades, Attitudes	24
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Rhatigan Student Center Room 262

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UPNSE2	**Fayez Alruwaili**	Biological Model and Quantification of Fluid Changes using an Electromagnetic Patch Sensor	9
UPNSE3	**Melinda Bahruth**	Zinc Contents of Micas from the Sterling Hill and Franklin AN-FE-MN Deposits, New Jersey	10
UPNSE4	**Brae Bigge**	Myopalladin's Role in Cardiac Muscle Function and Disease	10
UPNSE5	**David Bruce**	Elemental and Mineral Stratigraphy of Mixed Carbonate-Clastic System: Middle Jurassic Gypsum Spring Formation, Bighorn Basin, Wyoming	11

UPNSE6	**Josie Eck**	The Biomechanics of Bow Arm Violin Playing	13
UPNSE7	**Brandon Eckerman**	Electromagnetic Resonant Sensor Patch for Detection of Fluid Volume Shifts within Intracranial Space	14
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Rhatigan Student Center Room 264

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Exhibition/Performance Rhatigan Student Center Room 257			
Presentation	**Presenter's Name**	**Presentation Title**	**Abstract Page**
11:00	**Madison White**	Hyacinth Days: A Short Poetry Collection	23

Shaleh Ake
Faculty Mentor: RocÃ-o Del Aguila
Modern and Classical Languages and Literatures
Social Sciences and Humanities Oral Presentation

TEBEOS DURING THE YEARS OF FRANCOISM: THE BATTLE BETWEEN COMICS AND CENSURING

Abstract: During the 1920s, a new term appeared in Spain: the tebeo. The term referred to comics published by the magazine TBO, which began in the year 1917. This research deals with tebeos during the Francoist period, to uncover the battle between tebeos and censorship from the 1940s until the end of the Francoism during the 1970s. This research required findings on both sides, people who supported the censoring of comics and those who fought secretly to undo the strict censorship. The research for this project was done in both English and Spanish, as information about tebeos appears mainly in Spanish with less articles written about this subject in English. The findings reveal that for every person pro-censorship there was somebody against it. For example, while Padre JesÃºs M. VÃ¡zquez was strongly for the censorship, people like Conduela Gil Rosset de Franco worked quietly to keep propaganda out of their magazines. The children themselves played an important role in the decline of censorship with their unwillingness to relent, and the stubborn tenacity with which they continued to buy comics, such as Superman, on the black market. When the Spanish government conceded and brought Superman back (minus the classic Superman symbol) it clearly displayed the power of people in quiet protest.

Esther Alao
Faculty Mentor: Dr. Moriah Beck
Co-Authors: Logan Pohl, Allan Ayella, Moriah Beck
College of Engineering
Natural Sciences and Engineering Poster Presentation

IMPROVING PERSONALIZED MEDICINE BY MEASURING SEQUENCE VARIATION IMPACT ON DISEASE ENZYME MARKER LACTATE DEHYDROGENASE

Abstract: Personalized medicine, an approach to tailor the right medical treatment to the unique characteristics of a patient, relies on our ability to make predictions about disease susceptibility based on differences in gene sequences. Research has suggested that the non-conserved regions of proteins, where the gene sequence varies among species, may act as rheostats in protein function by adjusting protein function gradually. Whereas the conserved regions, where sequence variation is quite low, typically involve the active sites or regions that have a critical function. Mutation at a conserved region might result in a dramatic change in protein activity, however non-conserved regions may be more flexible in accommodating changes. The purpose of this research is to determine how enzymatic activity and stability are affected by mutations to nonâ€“conserved regions of the enzyme lactate dehydrogenase (LDH). LDH is a key enzyme in anaerobic respiration and is a marker of common diseases such as heart failure and cancer. We have focused on the non-conserved regions of LDH for this project and chose sites to mutate to determine what happens to the protein function, thermal stability, catalytic rate and substrate affinity. The methods used in our research have included site-directed PCR mutagenesis, enzyme kinetics measurement, and circular dichroism which was used to compare the conformation and stability of the mutants. We will present our results generated thus far, which have focused on glycine 68 that we have mutated to serine, alanine, aspartic acid, lysine and histidine. Developing a better understanding of the effects of protein substitutions at non-conserved sites could enhance our ability to distinguish between minor and major consequences of genetic alterations and thus impact our ability to diagnose disease.

Jessica Aldrich
Faculty Mentor: Dr. Kim Cluff
Co-Authors: Kim Cluff, Miriam Yassine, Jeremy Patterson
College of Engineering
Natural Sciences and Engineering Oral Presentation

ELECTROMAGNETIC RESONAUT SESNSOR FOR BONE HEALTH DIAGNOSTICS

Abstract: With an increasing aging population and the continual need for advancements in rural medicine, a simple way to diagnose degenerative bone diseases that affect approximately 30% of postmenopausal women in the United States and Europe is necessary. Bone fractures in the aging population are generally attributed to a loss in the bone mass density, these fractures often lead to other complications that aging adults may never fully recover from. The electromagnetic resonant bone health sensor skin patch was developed as a point of care technology for use in limited resource settings such as rural medicine or on the International Space Station (ISS) as a diagnostic device for common health parameters. This technology is a simple, robust sensor that, when interrogated by Radio Frequency (RF) waves, may be able to detect changes in bone density over a period of time. Using a vector network analyzer, an RF wave was sent to the sensor causing electric and magnetic fields to formulate about the patch and return frequency responses unique to the substrate it had been applied to. The shift in the sensor frequency response has been studied throughout the growth cycle of a cell culture and the shift has been correlated to cell growth. A biosafety evaluation has also been conducted and provided results of cell viability over 90% for cells cultured for one week. Using each of these studies the parameters of the sensor will be specified and impedance matched with bone. Future work will focus on studying the individual components of the bone matrix to determine the dielectric properties that contribute significantly to the matrix.

Fayez Alruwaili
Faculty Mentor: Dr. Kim Cluff
Co-Authors: Kim Cluff, Jacob Griffith, Jeremy Patterson
College of Engineering
Natural Sciences and Engineering Poster Presentation

BIOLOGICAL MODEL AND QUANTIFICATION OF FLUID CHANGS USING AN ELECTROMAGNETIC PATCH SENSOR

Abstract: Stroke volume (SV) is a critical cardiac output parameter that can offer critical assessments of cardiac function. Utilization of SV measurements can be a valuable tool for early detection for cardio-pathologies, and monitoring pharmacological stimuli in ill patients. Thus, the aim of this study was to develop a non-invasive mobile skin patch sensor - applied like an adhesive bandage which could potentially measure SV. The sensor was designed from a single baseline component comprised of a trace of copper configured into a square planar spiral patch. The sensor was energized by an external radio frequency and produced a resonant frequency response with oscillating magnetic/electric fields which surrounded the sensor. Changes in the magnetic/electric fields due to changes in fluid volume were used to collect stroke volume measurements. An elastic bladder was inserted into the left ventricle (LV) of a bovine heart and a 100 ml syringe was used to simulate stroke volume in the heart. Shifts in the sensorâ€™s resonant frequency were registered as fluid was pumped into the LV chamber. Furthermore, volumetric sensitivity study was conducted to investigate the sensor performance due to different fluid volume increments and to reveal the relationship between fluid volume changes and frequency shifts. An ANOVA analysis followed by a multiple comparison test adjusted for a Bonferroni (alpha =0.05) was done to determine the sensorâ€™s performance in measuring SV. A statistical correlation analysis between the shifts in principal resonance frequency and volume changes were determined through cardiac muscle (R2=0.9849) and in a beaker (R2=0.967). An ANOVA analysis revealed a p-value of <0.01 which indicates the statistical significance of the frequency shifts due to fluid volume increments. This

study provides promising data for the ability of an electromagnetic skin patch sensor to be a potential technology for SV measurements in a basic setting.

Melinda Bahruth
Faculty Mentor: Dr. Bill Bischoff
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Natural Sciences and Engineering Poster Presentation

ZINC CONTENTS OF MICAS FROM THE STERLING HILL AND FRANKLIN ZN-FE-MN DEPOSITS, NEW JERSEY

Abstract: The Sterling Hill and Franklin Zn-Fe-Mn deposits near Ogdensburg, New Jersey, are home to more than 360 known mineral species, many of them rare or unknown elsewhere. The deposits are hosted by the Franklin Marble and have been subjected to high-grade (granulite facies) regional metamorphism. Limited, prior research shows that many of the rock-forming minerals in and near the orebodies, particularly species of the pyroxene, amphibole, and mica groups, contain uncommonly high amounts of zinc. The Sterling Hill and Franklin micas, for example, have been shown to contain above-average Zn contents (Frondel and Einaudi, 1968), and Franklin is the type locality of hendricksite, a rare trioctahedral mica containing more than 20 wt.% ZnO. Even so, although this is one of the most mineralogically diverse areas in the world, many of the minerals have yet to be studied using modern analytical techniques.
We examined a variety of micas from the Sterling Hill and Franklin deposits with electron microprobe to determine their bulk compositions and, in particular, their zinc contents. Our results show that biotite and other micas contain 3-21 wt.% ZnO, and that the ZnO concentrations correlate positively with MnO. Zinc in mica also correlates negatively with MgO, SiO2, and F (ranging from 0.03 to more than 2.5 wt%). The micas appear to follow a complex Tschermakâ€™s substitution pattern but do not appear to have complete solid solution from the biotite system to the high zinc hendricksite.
Frondel, C., Einaudi, M. (1968) Zinc-rich micas from Sterling Hill, NJ. Amer. Mineral. 53, p. 1752.

Brae Bigge
Faculty Mentor: Dr. Moriah Beck
Co-Authors: Vinay Kadarla, Dr. Moriah Beck
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

MYOPALLADIN'S ROLE IN CARDIAC MUSCLE FUNCTION AND DISEASE

Abstract: Myopalladin is a muscle protein that is abundant in the heart and is thought to have an important role in maintaining muscle fiber structure, signaling and regulation of gene expression in response to muscle stress. Recently, mutations to myopalladin have been found in patients with cardiomyopathy. The highly organized structure of muscles that is required for proper contraction is maintained by a set of structural proteins that associate with the thin (actin) and thick (myosin) filaments. Our central hypothesis is that myopalladin plays a critical role in cardiac muscle integrity by directly regulating the stability and morphology of actin in thin filaments, and that these functions may be disrupted by the myopalladin mutations associated with cardiomyopathy. Myopalladin is closely related to palladin. Both belong to a family of immunoglobulin (Ig)-domain-containing proteins that have essential, but unclear roles in organizing actin in the thin filaments of muscles. The Beck lab has recently shown that palladin binds directly to actin and increases the rate of filament formation and the stability of actin filaments. A number of mutations in myopalladin are located within the analogous actin-binding region, which suggests that a disruption in actin regulation may occur in cardiomyopathy. Thus, we hypothesized that myopalladin also binds directly to actin. Our recent studies have established that actin binds directly to the Ig3 domain of myopalladin, but does not bind to the Ig4 domain. We have now analyzed the tandem Ig3-4 domains of myopalladin and our results indicate that the tandem Ig3-4

domains bind to actin as well. We also investigated the effect of the cardiomyopathy-associated mutations on actin binding, with the overall purpose of this project to be understanding the role of myopalladin in heart diseases, specifically cardiomyopathy.

Laura Brockmeyer
Faculty Mentor: Dr. Daniel Bergman
Co-Authors: Brett Kaiser
College of Education
Social Sciences and Humanities Poster Presentation

MEDITATION IN THE CLASSROOM

Abstract: Our presentation is about using meditation in the classroom to gear student's minds towards learning and prepare them for the instruction. Based on the ideas of B.F. Skinner, we hypothesize students will be more mentally engaged in the class material after a 1 minute session of meditation. During the 1 minute session of meditation the students will sit in silence, focusing on clearing their mind of any distractions. To measure the effectiveness of the meditation session we will count the number of outburst and inappropriate talking times in each class period.

David Bruce
Faculty Mentor: Dr. William Parcell
Co-Authors: William Parcell
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

ELEMENTAL AND MINERAL STRATIGRAPHY OF MIXED CARBONATE-CLASTIC SYSTEM: MIDDLE JURASSIC GYPSUM SPRING FORMATION, BIGHORN BASIN, WYOMING

Abstract: X-Ray diffraction (XRD) and x-ray fluorescence (XRF) analyses aid in refining stratigraphic correlations across the mixed carbonate-clastic Middle Jurassic Gypsum Spring Formation. Variability in elemental and mineral content of the units supplement traditional lithostratigraphic interpretations of paleoenvironmental change through time and space. The Gypsum Spring has been a challenge to correlate due to lithologic similarity of units and thick, monotonous mudstone sequences barren of diagnostic fossils.

The Gypsum Spring Formation was deposited along the margins of a cratonic forebulge in a retro-arc foreland basin associated with the Nevadan Orogeny. The Gypsum Spring Formation is divided into a lower unit of gypsum, shales and siltstones, a middle unit of carbonates and variegated shales, and an upper unit primarily consisting of shale and siltstones.

XRF analyses of 284 samples from nine outcrops define chemostratigraphic zones in the Middle Jurassic Gypsum Spring Formation. Two depositional sequences and ten chemostratigraphic zones are recognized from observed elemental patterns of Al, Si, K, Ca, Ti, Fe, V, Cr and Zr. Preliminary results from XRD analyses of these samples are building a picture of the â€œmineral stratigraphyâ€ □ of the Gypsur Formation. XRD is particularly useful in identifying the fine-grained minerals that make up much of the Gypsum Spring Formation. Knowledge of both elemental and mineralogic makeup of the units will also help distinguish between depositional and diagenetic patterns across the basin.

Drew Colcher
Faculty Mentor: Rocio del Aguila
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Oral Presentation

MARK TWAIN AND THE DIALOGIC IMAGINATION

Abstract: Mark Twain is often read as a somewhat provincial realist or naturalist whose works are commonly disseminated in simplified versions as children's stories or, at best, seen as humorous social criticism of the southern United States and its dialects. Indeed, Twain's role as a public intellectual, literary and social critic, touring speaker and humorist do much to support this view. This article focuses on two of Twain's novels - A Connecticut Yankee in King Arthur's Court (1889) and No. 44, the Mysterious Stranger (published posthumously in various versions and with various titles) - in order to form an argument in favor of the more modern, less provincial, novelistic aspects of Twain's writing. The theories and writings of Mikhail Mikhailovich Bakhtin provide the background for a characterization of the novelistic nature of these two works, in an effort to re-focus Twain criticism away from purely realist or naturalist analysis and toward more semiotic and structural considerations. This essay is meant to function as an introductory-level presentation of Bakhtinian analysis and Twain criticism. Of paramount importance to this argument are the temporal, spatial, formal and thematic coordinates of the two books, and the assertion that they conform to Bakhtin's conception of what the true novel is and how it radically differs from other forms in both purpose and effect.

Drew Colcher
Faculty Mentor: Dr. Rachel Showstack
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Oral Presentation

DISCRIMINATION AGAINST THE SPANISH LANGUAGE IN KANSAS

Abstract: Local organizations and previous studies laud the high level of cultural integration of immigrant and established Latino communities in Garden City, Kansas (Krings 2016; Stull 2016), but anecdotal evidence and recent occurrences (e.g. an FBI-foiled plot to bomb a Muslim worship center) seem to suggest that some racial tension exists in the area. Part of a larger study on language maintenance and ideologies in Kansas, the goal of this research is to analyze perceptions of linguistic discrimination in public services in Garden City. Data will include a series of 30-60 minute recorded interviews with 30 Spanish-speaking participants who reside in Garden City, half from the first sociolinguistic generation (individuals who arrived in the US after age 12) and half from the second generation (born in the US to a first-generation parent or who arrived before age 12; â€œheritage speakers'). Interview questions will explore participants' conception of the role of Spanish in and outside of the home and the ways Spanish is used in different spheres of their lives; participants will also be asked to share memories of discrimination they may have experienced based on language practices while using public services. Additionally, a written questionnaire will be administered to provide information on participants' language backgrounds and quantify their experiences with discrimination using Likert scale survey questions. Recordings will be transcribed and subjected to sociolinguistic discourse analysis focusing on interaction, power and discrimination; written questionnaires will be analyzed statistically to find correlations between background, language use and discrimination. This study contributes to sociolinguistics by providing information about language attitudes in Kansas, and by describing the sociopolitical contexts in which many young Latinos in Kansas use Spanish. Additionally, the study will help build a sociolinguistic database and establish Kansas as a new sociolinguistic region for Spanish speakers in the US.

Jennifer Coslett
Faculty Mentor: Dr. Katherine Cramer
College of Education
Social Sciences and Humanities Oral Presentation

GETTING A GRIP BY GOING GRAPHIC: USING GRAPHIC NOVELS TO ENHANCE STUDENT ENGAGEMENT AND COMPREHENSION

Abstract: Students in a Class Within a Class (CWC) English classroom have been identified as struggling with engagement and comprehension related to texts and novels as part of the course curriculum. What methods or adaptations can be made to increase engagement and comprehension without minimizing or limiting students' exposure to texts?

A 2001 study focusing on a drawing to learn teaching method indicated increased comprehension and retention of information presented in text (VanMeter, 2001). Such methods address the need for attention to multiple intelligences and multiple modalities within the classroom. Applying a similar method, students struggling to express written and verbal engagement, as well as comprehension and retention, related to Elie Wiesel's Night were given a summative assessment project in which they created graphic novel panels to represent the scenes depicted in the memoir. Each student selected a minimum of 3 scenes to depict---each scene represented in its own panel. Over the course of the three panels, students were required to include specific graphic novel traits and elements. In addition, each panel was required to have at least one direct quote from the text and a scene title.
Findings and Interpretations:

- Students struggling to express engagement and comprehension related to the text received an average score of 94% or higher on the graphic novel project. Scores averaged 40% higher than previous assessment scores (traditional test-type assessments).
- 95% of students completed the assessment in its entirety.

In contrast with traditional objective comprehension tests, the graphic novel medium allows students who struggle with written and verbal expression to fully engage with the subject matter, increasing overall comprehension.

Josie Eck
Faculty Mentor: Gary Brooking
Co-Authors: Khoi Lam
College of Engineering
Natural Sciences and Engineering Poster Presentation

THE BIOMECHANICS OF BOW ARM VIOLIN PLAYING

Abstract: A transradial amputation causes loss of forearm rotation and the entire range of motion of the wrist. Although many transradial amputees fare better without prosthetic devices for daily activities, some tasks consist of intricate movements, such as playing musical instruments. Violin bowing involves complex techniques that prevent amputees from fluidly and comfortably play the violin. In such cases, a prosthetic may enhance a player's performance. The following study focuses on the biomechanics of specific violin movements of the bow forearm. With motion analysis software, five fundamental movements were used to assess the range of motion of the bow arm: wrist flexion and extension, radial and ulnar deviation, and forearm rotation. Across these five movements, wrist flexion and extension contributed the greatest to the movement of the lower arm with an average of 30.3Âº and 35.3Âº across the five movements, respectively. In comparison, the forearm rotated an average of 29.5Âº, while ulnar and radial deviation averaged to 5.25Â° and 6.50Â°, respectively. There is evidence, based on the variable range of motion across three trials, that the biomechanics of violin bowing are influenced by anthropometrics and personal playing styles. This study can give further guidance on the development of a prosthetic arm for a transradial amputee for the specific purpose of the playing the violin.

Brandon Eckerman
Faculty Mentor: Dr. Kim Cluff
Co-Authors: Jacob Griffith, Jessica Aldrich, Kim Cluff
College of Engineering
Natural Sciences and Engineering Poster Presentation

ELECTROMAGNETIC RESONANT SENSOR PATCH FOR DETECTION OF FLUID VOLUME SHIFTS WITHIN INTRACRANIAL SPACE

Abstract: Elevations in intracranial pressure (ICP) can result in a number of neurological complications and even death in patients who have had stroke, traumatic brain injury, or have undergone neurosurgical or neurological treatments. These complications can include cerebral hemorrhage, stroke, and irreparable brain damage. The current gold standard in measuring ICP requires implanting an intraventricular catheter into the patientâ€™s skull, requiring invasive surgery and creating unnecessary health risk. Noninvasive methods are also available, but require highly specialized equipment, such as magnetic resonance imaging (MRI), computed tomography (CT), and transcranial Doppler ultrasonography (TCD). These methods are limited to a clinical setting, which hinders their use as a point-of-care technology. This study focuses on developing a point-of-care electromagnetic resonant sensor that can detect a shift in intracranial fluid volume, and then utilize this volume change to estimate pressure. The experimental protocol has been approved by the Institutional Review Board (IRB) of Wichita State University. The electromagnetic resonant sensor is unique in comparison to conventional monitoring systems because it is not made up of electrical components, connections, or batteries. Instead, this biomedical sensor uses a combination of radio frequency waves (RF waves), electromagnetic fields, and a Vector Network Analyzer (VNA) to measure and record physiological parameters that would otherwise require invasive or highly technical methods to detect. In this study, a fluid volume shift was induced by reclining a human subject past horizontal using a commercial grade inversion table. A bio-fluid shift was successfully detected and recorded using the sensor and was validated against TCD measurement calculations. The results suggest that the sensor patch may be capable of measuring intracranial pressure shifts in a point-of-care manner eliminating the need for specialized training and invasive equipment.

Mackenzie Freige
Faculty Mentor: Dr. David Eichhorn
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Oral Presentation

A SYNTHETIC MODEL OF THE NICKEL SUPEROXIDE DISMUTASE ACTIVE SITE

Abstract: Superoxide dismutase (SOD) is an enzyme that facilitates the disproportionation of the superoxide ion (O2-) into molecular oxygen and hydrogen peroxide. In living organisms, the O2- radical is produced during cellular respiration, and the SOD enzyme is essential to break down this toxin. SODs are classified by the metal ion at their active sites, and one class contains a nickel ion (Ni2+/Ni3+). Nickel superoxide dismutase (NiSOD) is the most recently identified SOD. This project aims to synthesize model complexes of the active site of NiSOD in order to better understand this class of protein. Using 2,2’-dithiodibenzaldehyde (DTDB) as a reactant, a new complex with a Ni(II)-N2S2 active site and a thiolate donor was produced. The model complex will be analyzed to determine its structure and properties.

Donald Gering
Faculty Mentor: Dr. Dinorah Azpuru
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Oral Presentation

THE IMPACT OF RELIGION ON DEMOCRACY, TRANSPARENCY, AND GENDER EQUALITY

Abstract: How does religion influence secular values and modernization? I test several models where religious identity is examined as a possible predictor to support for secular values and modernization. Using a dataset I built in SPSS with data for 170 countries, I employ linear regression to test whether nine measure of religiosity and religious identification correlate with secular values such as freedom, democracy, transparency, and gender equality. I find that those values are less prevalent in countries that give more importance of religion and those where religion is restricted by the government. In contrast, social hostility toward religious minorities and religious identity are not significant factors in explaining those values.

Ethan Grennan
Faculty Mentor: Dr. Mary Liz Jameson
Co-Authors: Morgan Trible, Emmy Engasser, Rachel Stone
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

PRAIRIE OR WOODLAND: DOES HABITAT INFLUENCE BIOMASS OF GROUND BEETLES?

Abstract: As members of the ground dwelling insect guild, ground beetles (Carabidae: Coleoptera) are important in suppressing invertebrate pests, controlling weedy plant species, and as food for vertebrates. In fact, carabid beetles are preferentially consumed by pheasant chicks, making up 20-26% of their diet. Survival of wild gamebird chicks has been shown to be positively correlated with insect prey availability. Within habitats, carabids rely on diverse vegetation and physical complexity that create heterogeneous structure and preferred microclimates. Vertebrate foragers that rely on carabids likely track prey abundance, thus positively influencing their success and fitness. But what grassland habitats better predict carabid beetle abundance and thus vertebrate foragers such as game birds? We test two alternative habitat hypotheses that account for carabid diversity in the Flint Hills:

1) Ground beetle diversity and abundance are higher in woodland habitats
2) Ground beetle diversity and abundance are higher in prairie habitats

We sampled 3 sites in the Flint Hills ecoregion and examined the effects of habitat by using pitfall traps (16 traps per site), 8 positioned in a woodland habitat and 8 positioned in a prairie habitat (48 total). Traps were placed 10m apart on north-south transect in each habitat.

The total carabid beetle biomass was higher in prairie habitats than in woodland habitats. The underlying mechanisms of this correlation may be related to abiotic factors. We found that soil temperature, light penetration, and maximum wind speed are significantly different between woodlands and grasslands. It is likely that these factors promote microsites for oviposition and shelter from predators.

Gisela Guzman
Faculty Mentor: Gary Brooking
Co-Authors: Gary Brooking
College of Engineering
Natural Sciences and Engineering Poster Presentation

A REMOTE EQUINE HEALTH MONITOR FOR THE DETECTION AND MONITORING OF VITALS SIGNS

Abstract: The most common equine disorders are Colic, Influenza, and Rhinopneumonitis with colic alone affecting over 40% of horses. These illnesses are typically diagnosed and monitored with the observation of various vital signs. Veterinarians are required to check vital signs frequently for diagnosis, prognosis, and to determine new physiological conditions. Common vitals monitored in horses are; respiration rate, heart rate, and temperature. Other vital signs like mucous membranes, capillary refill time, and gut sounds require the presence of the veterinarian or the owner to be monitored.
This study investigates the importance of remote monitoring of vital signs in the equine patient for the most common equine illnesses. It is proposed that by constant monitoring of certain vital signs of the animal, the outcomes can be better estimated, which will assist the veterinarian in determining the health condition and make quicker interventions when required.
A solution to this problem is a device that can be worn by the horse as a belt, which will detect vital signs such as temperature, breathing and heart rate. This data will be transmitted to a web portal via a mobile internet device. The portal can be accessed and will provide vital signs to remote locations without the need for human intervention. This will allow for more effective monitoring as well more stable vital signs that are not affective by the presence of a human monitor. Alerts will be sent if data falls under normal standards of the vital signsâ€™ parameters, which can be programmed in to the device. Additional monitoring that could be added include; trackable steps and sleep patterns within a 24-hour period. The device will be tested on a sick and as well as normalized healthy horse. Values of vitals will be compared with the data obtained by the veterinarian.

Sara Harms
Faculty Mentor: Dr. Kathy Strattman
College of Health Professions
Applied Learning Poster Presentation

WHAT IS A LATE TALKER: A CASE STUDY OF TWIN BOYS

Abstract: Present research is inconclusive on whether or not children who are nonverbal at 2½-years, considered late talkers, will catch up, or if their language development will remain behind that of peers causing them to become known as language impaired. Language impairment greatly affects literacy development and school success.
A review of the literature found that at 2½-years, late talkers used fewer than 50 words and had a restricted phonetic inventory, fewer speech sounds. Twins are more at risk for becoming late talkers. Studies of the language of twins, in general, revealed use of fewer words and a more limited expressive vocabulary, than singletons.
The purpose of this study was to determine whether or not two twin boys were at risk for becoming late talkers or more seriously, language impaired. Characteristics of late talkers were applied to the communication of two 2-year old twin boys who were nonverbal. Results of standardized tests administered prior to enrollment in a language-based preschool and test results one year later were compared.
The twin boys were found to fit the criteria for late talkers. They met the criteria in six of the eight late talker characteristic areas: phonetic inventory, syllable structure, variability in consonant production, error patterns, expressive vocabulary, and use of gestures for communication. Specific results will be presented in this poster.

Bethany Heintz
Faculty Mentor: Dr. Kathy Strattman
Co-Authors: Rachel Bosley
College of Health Professions
Natural Sciences and Engineering Poster Presentation

DOES A SECOND LANGUAGE CHANGE THINGS? OPINIONS OF FUTURE TEACHERS, SLPS, AND AUDIOLOGISTS ON BILINGUALISM

Abstract: As the number of culturally and linguistically diverse children in schools increases, a greater understanding of second language learning proves crucial for their success. Pre-service educators and Communication Sciences and Disorders (CSD) pre-majors at Wichita State University (WSU) will be working with diverse populations of children. Accordingly, our study sought to find the attitudes and opinions of pre-service educators and CSD pre-majors at WSU when it comes to: learning a second language, non-native speakers of English maintaining their native language, and the importance of bilingual education.
Data obtained from a review of current literature regarding second-language learning, native language use, and bilingual education were used to create a survey for 79 pre-service educators and CSD pre-majors. The results from these data showed that the participants from both groups were very supportive of learning a second language and maintaining native language. Both groups agreed on the importance of bilingual education, however, they were more neutral with regard to English-only instruction. Data from our survey results and their implications for educators and CSD students will be the focus of our presentation.

Megan Hill
Faculty Mentor: Dr. Kathy Strattman
College of Health Professions
Natural Sciences and Engineering Poster Presentation

AGE RANGES OF THE /R/ PHONEME AMONG TYPICALLY DEVELOPING TODDLERS AND PRESCHOOLERS

Abstract: The purpose of this study was to investigate the age range typically developing children acquire (or show emergence of) the /r/ sound in words. Speech language pathologists provide therapy to children, who are not developing or implementing speech sounds properly. Norms have been established to qualify a child for speech therapy; however, there is a wide range of age norms from a very small number of studies which vary somewhat and may be misleading when diagnosing speech sound errors. There may potentially be children that are overlooked or not referred for speech evaluations due to the differences presented in these studies. There is a very common misconceptions that children will grow out of speech errors, which in actuality leads to difficulty relating to peers and behavioral outbursts.
In this study the participants' ages ranged from 2;0 - 4;11 years of age attended a fee-based early childhood center. All 46 participants were of a term birth gestation, had no prior speech/early childhood special services, or any factors relating to speech and language deficits. The /r/ sound is the focus of this study because of its complexity, as it requires simultaneous vocal production and manipulation of the tongue, jaw and soft palate to be produced correctly. It is also the most misarticulated sound in the English language. The /r/ sound was tested in 6 words where /r/ occurred as an initial and consonant cluster (e.g., red, train) and 5 words in the stressed and unstressed vocalic positions (e.g, flower, ear). The findings of the study showed an increasing emergence of the correct /r/ sound in both consonant and vocalic positions in words as children progressed in age. These results provide additional evidence that the /r/ sound is emerging in the age groups tested.

Rachel Jones
Faculty Mentor: Dr. Nils Hakansson
College of Engineering
Natural Sciences and Engineering Oral Presentation

COMPARISON OF FORCE PRODUCTION OF SINGLE TO MULTIPLE PNEUMATIC ARTIFICIAL MUSCLES

Abstract: The future of rehabilitative medicine will involve robotics. Human therapists, by their very nature, differ one from another even when using the same techniques and movements. Conversely, robotic therapists can be programmed to give uniform therapy and thereby produce more uniform results. One of the drawbacks to using robotic therapy devices is that the actuators and battery packs necessary for them to run are traditionally very cumbersome, which presents a significant challenge to patients with muscle weakness. Pneumatic artificial muscles (PAM) are a good alternative; while not providing the raw force of traditional actuators, like hydraulics, PAMs are significantly lighter and cheaper to replace, making them better suitable for home-use therapy devices, such as soft robotic glove. Because actuators act as the muscles of a robotic system, there could be merit in taking cues from the physiological structure of muscles in the design of PAMs. Specifically, this study focused on investigating the merits of fiber bundling, as seen in biological muscles, to discover if PAMs could be used in parallel in order to produce more force than just one larger muscle fiber. The study was performed empirically with manufactured PAMs of different sizes as well as via computer modelling with multiphysics systems for fluid structure interaction testing (COMSOL).

Vy Lam
Faculty Mentor: Gary Brooking
College of Engineering
Natural Sciences and Engineering Poster Presentation

THE DESIGN OF LOWER PROSTHETIC ARM FOR PLAYING THE VIOLIN

Abstract: As per the Orthopaedic Trauma Institute, below-elbow prosthetic devices are used for patients with transradial amputation, or amputation through the forearm. This study will focus on designing a prosthetic that will allow an eight-year-old female subject to more closely accommodate specific violin movements. The angles of each violin movements were obtained from a previous violin motion analysis study (Eck). This study showed that the wrist flexion and extension has the greatest movement with an average angle of 30.3° and 35.3°, respectively, the forearm rotation is 29.5°, and the average angles of the radial and ulnar deviation was small, in the range of 5.25° and 6.50°. Based on anthropometric data from literature review, the range of the forearm length for an eight-year-old female is between 13.76 and 17.06 cm and the hand length is between 12.85 and 16.15 cm. The subject, who will be fitted with the prosthetic, is an eight-year-old female and has a partial lower arm amputation, with one quarter of her lower arm intact. This gives, the total dimension for the forearm length and the hand length as 15.41 cm and 14.5 cm, respectively. Taking the most significant movement data (65° wrist flexion-extension and 30° forearm rotation) as well as using the anthropometric data, a prosthetic device to accommodate violin playing was developed using SolidWorks CAD software. A functional prototype prosthetic was printed in ABS plastic using a 3-D printer, which is used to examined the functionality and suitable attachment points for elastic locators and rigid movement fasteners. The revised prototype will be printed and tested with the subject to determine if suitable range of motion has been achieved to accommodate useful playing of the violin.

Mercedes Lubbers-Payne
Faculty Mentor: Dr. Jean Griffith
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Poster Presentation

THE COLONIZATION OF NATIVE AMERICAN RESERVATIONS IN 'TRACKS' AND IN 21ST CENTURY AMERICA

Abstract: 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.

Jasmine Mayorga
Faculty Mentor: Dr. James Bann
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

pH SENSITIVE CONFORMATIONAL CHANGE MONITORED BY TRYPTOPHAN QUENCHING OF FLORESCENSE

Abstract: The Anthrax bacterium secretes a toxin that is ultimately responsible for the sentence and death that can occur from exposure to Anthrax. The component of the toxin that interacts with the host is protective antigen (PA). Protective antigen binds host to host cells and forms a membrane spanning pore. This pore formation is critical for the pathogenesis of the toxin and the bacterium as a whole. We aim to understand how PA pore formation works. To do this, we have used fluorescence combined with genetic mutational studies to monitor the pore formation. In our fluorescence study of this mutant protein D425A, we have found that this mutant recently shown to block pore formation can actually form a partial pore structure which we have called an intermediate pore. This intermediate structure is a new understanding of pore formation. Which will further us in our goal of creating a new therapeutic drug with a mechanistic understanding of pore formation.

Kory McLinn
Faculty Mentor: Dr. Leland Russell
Co-Authors: Leland Russell
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

WHITE-TAILED DEER HERBIVORY PREFERENCE OF TREE SAPLINGS IN THE RIPARIAN ZONES OF KONZA PRAIRIE

Abstract: White-tailed deer (Odocoileus virginianus) populations throughout the Midwestern United States greatly exceed historical levels. Extensive deer browsing may be a concern in Kansas as it has altered tree species composition in forests of eastern North America. Little is known about effects of deer browsing in Midwestern woodlands. The objectives for this study are to determine browsing preferences of white-tailed deer among tree species within Kansas Flint Hills riparian woodlands and to quantify spatial variation in browsing intensity in relation to distance to the woodland edge. Hypotheses include H1: White-tailed deer prefer to browse oak species, e.g. burr oak (Quercus macrocarpa) and Chinquapin

Oak (Quercus muehlenbergii), over all other riparian tree species, H2: Deer browsing in the riparian zones most commonly occurs near the edge of the woodland-grassland transition and H3: Deer expand their browse range away from deer trails within the wooded areas more than the open prairie as shown in comparable studies. Preference was established by identifying woody plant species and quantifying to what extent the plants have been browsed. Data was collected along transect extending from the stream edge to the woodland-grassland transition. I collected data on variables such as distance of plot to grassland, tree species composition within plots, and proximity to established deer trails. Findings reject the hypothesis that oak species are preferred over other tree species. Browse evidence indicates a preference for bitter-nut hickory (Carya cordiformis). Browsing intensity did not change with proximity to grassland. Browsing was more intense <3 m from deer trails than >3 m from trails. As a step in assessing the impact that growing deer populations have on riparian zone biodiversity, this research into the browse preferences and behavior of deer at Konza Prairie provides a more complete view on the impact deer have on riparian plant communities.

T'Essence McNeal
Faculty Mentor: Dr. Mara Alagic
College of Education
Applied Learning Poster Presentation

WILD ROSE: LEARNING MATH AND IMPLEMENTING TILFORD DIVERSITY OUTCOMES

Abstract: I was inspired by my cultural background to make a symbolic Wild Rose for this interdisciplinary research Digital Math-Art Project. In our home, we grow several plants and flowers and have many gardens. One of the flowers that we grow is a rose. In Native American culture a rose symbolizes life, roses are put in things like quilts to represent survival and vitality and were also put in food and used as a medicine. When people think of Native American art the first thing that they usually think of creating is a dream catcher or jewelry. But in Native American culture nature and life is very sacred and I wanted my project to be about what was most significant to this culture. Before I started this project I never thought that math could play a role in art. I always thought that art was too abstract and it was too fluid and flexible to have any math in it. When I think of math I tend to only think that itâ€™s a set of numbers and formulas that are inflexible and donâ€™t have any imagination in it. However, after doing this project it made me realize that there are certain mathematical qualities that can be used in art like symmetry, angles, and geometric shapes.
I created Wild Rose as an interactive digital artifact using Geogebra software: I created several 5 sided polygons and I stacked them all on top of each other rotating each one in a counter-clockwise fashion and making them smaller each time. When they were on top of each other, they created triangles that look like rose petals. The math concepts that I used were geometric shapes: a five-sided polygon and scalene and obtuse triangles to create the shape and the petals of the rose. The result was an interactive, dynamic object that can be manipulated and animated.
This project relates to several of the Tilford learning outcomes; the first one being that it promotes students' understanding of their own and other cultures that go beyond stereotypes. In addition to elaborating on Tilford outcomes, in my full paper, I provide more details about other significant aspects of this project: (a) properties of math concepts used in this project, (b) what I have learned using dynamic geometry; (c) artistic value of the collection of associated images; and (d) Tilford diversity learning outcomes in my future classroom. A list of references for literature review regarding this project is also included in my paper. My poster will include my creative artwork in addition to more details about my research for this creative project.

Aja Molinar
Faculty Mentor: Dr. Greg Meissen
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Oral Presentation

THE EFFECTS OF CELL PHONE INTERRUPTIONS ON STUDENTS WITH ANXIETY

Abstract: This study examines university students perceptions of cell phone interruptions during face-to-face communication. Cell phone use has steadily increased over the years and has become a major facet of communication, especially for university students. However, daily cell phone use affects personal interactions. It is hypothesized that both female students and students who exhibit mild to severe anxiety are more likely to have negative perceptions of cell phone interruptions. As cultural variations between minority and majority groups play a role in communication, the perceptual differences between ethnic groups will also be analyzed. Participants enrolled at a university aged from 18 ¬ 64 years old will participate in a 23-item survey used to gauge demographics, levels of anxiety, and perception toward cell phone interruptions. The survey is distributed to a maximum of 400 participants through the experiment participation system, SONA.

Phillip Osu
Faculty Mentor: Dr. Viswantha Madhavan
College of Engineering
Natural Sciences and Engineering Poster Presentation

MICROSTRUCTIONAL OBSERVATION OF ADDITIVE MANUFACTURED MATERIAL

Abstract: The major study of this project involves the structure inspection of the nickel-based super alloy Inconel. A proper understanding of how this material differs structure-wise when used in conjunction with 3D printing applications is obtained through this study. The additive manufactured type of this material is observed for microstructional data. The following data will be compared to its commercially produced counterpart. In this study, samples of the additive materials are prepared for nano-indentation. Each specimen is grinded down to a smooth, polished surface. With a clean surface, the indentation tool will be able to record the surface data of the additive Inconel material. With the use of microscopic surface mapping, the specimen can be further observed should issues rise with unstable surfaces with holes. The data collected from the additive material samples will be compared to conventionally made Inconel material. These results will show the structural changes the material goes through for proper additive manufacturing processes.

Hooloomann Ramdial
Faculty Mentor: Dr. Atri Dutta
College of Engineering
Natural Sciences and Engineering Oral Presentation

INITIAL CONDITIONS FOR PERIODIC AND QUASI-PERIODIC ORBITS IN THE CIRCULAR RESTRICTED THREE BODY PROBLEM

Abstract: The Circular Restricted Three-Body Problem provides an insight of the trajectory of a third body moving under the gravitational influence of two major bodies. This paper investigates the initial conditions that produce periodic and quasi-periodic solutions in the Circular Restricted Three-Body Problem. The scenario being analyzed is that of a small spacecraft in the Earth-Moon system. An algorithm is being written to provide the required initial velocity given the initial position of the spacecraft. This paper also investigates the velocity increments required to provide a quasi-periodic solution for a satellite starting from an orbit around the Earth. An extension of this concept involving CubeSats is also being analyzed. Because of the periodicity of the motion, such a satellite will only

require fuel burns for station keeping. It can also provide a means of obtaining data around the moon and transmit the information during its close approaches to Earth.

Elizabeth Ramirez
Faculty Mentor: Dr. Barbara Chaparro
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Oral Presentation

THE RELATIONSHIP BETWEEN EATING BEHAVIOR AND SELF-PERCEPTION

Abstract: Eating behaviors and self-perception affect a wide variety of people. Does a person's eating behavior reflect on one's self-image? By exploring one's eating behaviors and self-perception, a potential link between eating disorders and mental state can be established. The current study examines the relationship between self-perception and eating behavior among college students at Wichita State University. An online survey was completed by 66 participants. Participants were recruited through on campus, through social media advertisements, and the SONA portal. The 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). Contributing to research with these variables can help determine students who are at risk to things such as eating disorders. Understanding the factors that lead people into making these unhealthy choices can aid in the production of effective treatment programs. This study explores the relationship between -perception and eating behavior among college age males and females, two variables that can easily disrupt someone's mental health and lifestyle. If research can gain a better understanding on these risk factors, it can bring society closer to reducing suicide rates, eating disorders, and self-esteem issues. Findings showed self-esteem to have significant relationships with 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.

Hien Tran
Faculty Mentor: Dr. Li Yao
Co-Authors: Li Yao
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Poster Presentation

THE EFFECT OF TRANEXAMIC ACID ON ASTROCYTE-INDUCED FIBRINOLYSIS AND ASTROCYTE MIGRATION IN FIBRIN HYDROGEL

Abstract: The use of biomaterial scaffolds as a growth-permissive substrate and carrier for therapeutic cell transplantation into injured areas of the spinal cord has shown great potential for recovery after spinal cord injuries (SCI). Fibrin hydrogel offers some benefits because cells can bind to the materials via cell surface integrin receptors, and the degradation of fibrin is a natural protease-dependent process in vivo. This study utilizes astrocytes, which are nerve cells responsible for providing support to the neuronal circuit in the central nervous system (CNS). Transplantation of astrocytes into injured areas of the spinal cord possesses great potential for repair and recovery. The difficulty in utilizing Fibrin hydrogels is their tendency to degrade at a rapid rate. Therefore, measures should be taken to decrease the rate of Fibrin hydrogel's degradation while keeping the astrocytes alive and functional. Tranexamic acid (Cyclohexanecarboxylic acid; AMCA; TXA) is an antifibrinolytic agent that inhibits plasmin-induced fibrinolysis by binding plasmin. The migration study of astrocytes seeded in hydrogel after 48 hours shows that astrocytes are able to migrate in the Fibrin hydrogel with and without TXA, although with decreasing speed as TXA concentration increases. The degradation study shows that Fibrin hydrogel's rate of degradation, evaluated at various time intervals for 9 days, decreases with increasing TXA concentration.

Madison White
Faculty Mentor: Dr. Sam Taylor
Fairmount College of Liberal Arts and Sciences
Exhibition/performance

HYACINTH DAYS: A SHORT POETRY COLLECTION

Abstract: This short poetry collection, roughly titled â€œHyacinth Daysâ€ follows my ow through womanhood and search for an adult identity. Embedded within images, the symbolic process of growing takes place through other things natural and good. These poems aim to serve as a truth without the shadow of many years gone by. As a young woman writing about being and becoming a young woman, my poems attempt to capture feeling, doubt, and life without inhibition. The poems featured narrow in on subjects like virginity, being a daughter, finding an artistic voiceâ€"and possibly losing it. My poetic voice often ranges from whimsical and hopeful to ambivalent and anxious. While many center upon a feminized struggle, the collection encapsulates a very universal human one as well. From love to loss to growing indefinitely, this is one form of looking at life. The works are influenced most directly by my own experiences, but also on the works Iâ€™ve studied in my numerous literature courses. The poems themselves typically go through a process of editing over a span of months which involves trimming most of what is written initially. Many of the poems featured in this collection have also been workshopped by my fellow peers and staff.

Jonathan Whitford
Faculty Mentor: Dr. Kim Cluff
Co-Authors: Kim Cluff
College of Engineering
Natural Sciences and Engineering Oral Presentation

TOWARDS CUFFLESS MEASUREMENT OF BLOOD PRESSURE

Abstract: All clinical methodologies to measure blood pressure require constriction of an artery by an inflation cuff. As the cuff is deflated, mechanical or audible responses of the artery are measured using electronic sensors or a stethoscope. Several limitations associated with these standard techniques exist. For instance, patients will often experience increased stress levels while sitting in doctorâ€™s offices, producing artificially high blood pressure. Also, one time measurements are not indicative of long term patterns or fluctuations in cardiac activity, thus there is a need for a cuff-less, continuous, stroke-stroke blood pressure measurement device. This study aims to evaluate the efficacy of a self-resonating sensor, capable of measuring volume changes within a segment of artery, to monitor blood pressure without the use of an inflator cuff. A mathematical model of an artery segment was derived to find blood pressure as a function of volume, which will be validated against a benchtop model of an artery having controlled pressure and flow velocity. A series of pressure and velocity combinations will be simulated and measured, and the same inputs will be applied to the mathematical model. Statistical analysis will involve linear regression analysis comparing the two models.

Caleb Wiens
Faculty Mentor: Dr. Daniel Bergman
College of Education
Social Sciences and Humanities Poster Presentation

Gender, Teacher Interaction Patterns, and their Effect on Student Achievement

Abstract: The classroom is a very messy place. Students come from wildly different backgrounds. People get sick, students have bad days, things happen at school, in short there are a multitude of factors that affect student achievement at school. Many of these factors are outside of teacher control. However some are not, such as how a teacher designs their lessons, or how that teacher may interact with their students.

This study attempts to quantitatively analyze the effect of gender on teacher-student interactions and in turn how those interactions patterns affect student achievement. This problem was addressed by observing several classes, of teachers with either gender, by coding their interactions as positive, negative, or neutral and if those coded actions were with male or female students. In order to analyze if and how these interaction patterns affected student achievement, data from teacherâ€™s unit tests was taken and analyzed to search for a pattern. The data for was taken by one observer over the period of several months by visiting a number of high school science classes for one period where the teacher reported they would be asking a large number of questions.

Morgan Wilson
Faculty Mentor: Dr. Daniel Bergman
Co-Authors: Crystal Mccarthy
College of Education
Social Sciences and Humanities Poster Presentation

EFFECTS OF STUDENT VS. TEACHER GROUPING ON STUDENTS GRADES, ATTITUDES AND

Abstract: In two schools in usd 259 we examined the effects of "student chose groups" vs "teacher chose" or "random assigned groups" on students behavior, grades and attitudes over a six week period. We examined several high school and middle school class rooms and the students behavior during group projects and assignments. We tracked "off task" behavior for each activity making a tally for every student that was off task during an activity every 5 to 10 minutes. We also tracked student grades and academic progress to determine if the different types of groupings had any effect on student academic achievement. Finally after the study was concluded we conducted a short survey to gain insight into the students perceptions of the different types of groups and their effectiveness. While our study is not yet completed preliminary findings are mixed at best. The data shows no significant difference between the two models on a macro scale. There does seem to be some correlation between students' academic achievement and the effect of the two different models. High tier students (students in the top 25% of the class) seem to benefit from random assignment and were generally off task more when allowed to pick their own groups. Low tier students (those within the bottom 25% of their grade level) seemed to have no apparent change from one system to the other. The middle of the pack students (middle 50% of their class) had mixed results that varied from student to student. Students academic grades progress did show mesearable increase from random to self assigned groups. While the findings remain inconsistent we expect further data may help clear up the issues.

Samuel Womack
Faculty Mentor: Dr. Moriah Beck
Co-Authors: Moriah Beck, Ravi Vattepu,
Fairmount College of Liberal Arts and Sciences
Natural Sciences and Engineering Oral Presentation

CONFORMATIONAL CHANGE IN PALLADIN ACTIN-BINDING DOMAINS MEASURED BY FLORESCENT RESONANCE ENERGY TRANSFER

Abstract: The fundamental goal of our research is to understand how cell motility in both normal and metastatic cells is regulated by palladin, an actin binding protein that plays a key role in remodeling the actin cytoskeleton. Our recent work has established that palladin regulates actin dynamics and organization by enhancing the polymerization rate and stabilizing filaments in an orthogonal meshwork. Palladin family members all utilize immunoglobulin-like (Ig) domains to bind and crosslink actin filaments. Our previous results indicate that the Ig3 domain of palladin is directly involved in binding and crosslinking of actin and also promotes actin polymerization, whereas the Ig4 domain of palladin does not interact with actin directly. Nevertheless a tandem Ig3-4 domain protein exhibits dramatically more

efficient actin binding, crosslinking, and polymerization than the isolated Ig3 domain. To further narrow the gap in our understanding of palladin's role in actin assembly, we need to demonstrate the palladin can bind directly to monomeric actin. Our current efforts are aimed at combining fluorescence resonance energy transfer (FRET) to analyze the interactions of palladin and actin. These experiments will also enable us to investigate the dynamic intra- and intermolecular interactions through the use of sophisticated fluorescent probes. Our first goal was to use site-directed mutagenesis to replace six cysteines in two tandem immunoglobulin-like domains of palladin before confirming that these mutations do not interfere with actin binding and bundling functions of palladin. We will share our results that the mutated Ig domains of palladin bind to actin.

Jamie Wooley-Snider
Faculty Mentor: Dr. Jodie Hertzog
Fairmount College of Liberal Arts and Sciences
Social Sciences and Humanities Poster Presentation

A FORK IN THE ROAD: INTERSECTIONALITY AND WOMEN'S PATHWAYS TO POLITICAL POWER

Abstract: This investigation explores the pathways to power that women navigate in their pursuit of political office. Drawing from published research studies and public data reports, this historical review examines variations in pathways, election rates, and level of office held (local/state/federal) based on women's unique positions within the matrix of domination, indicating intersections of gender, race, and class when possible. Three research questions guide this study. 1. What are the current levels of representation of women holding political office? 2. What obstacles have been found that hinder women's entry into public service? 3. What are the various pathways that facilitate women's entry into political office? Based on data reviewed, while women's participation in politics has increased, there continues to be a gap in electoral representation, especially among women of color. Pathways to power can be hindered by factors such as media portrayals of female candidates and candidates of color, but may be facilitated through education and/or involvement in activism. Existing research suggests women of color tend to craft less direct pathways to political power, facilitating their entrance through community activism and participation in organizations that advocate social change. Crafting political careers carefully using this experience and leadership, female candidates of color report more confidence in their qualifications for election and ability to lead than their white female counterparts. A higher degree of racial/ethnic identification is demonstrated to produce a higher level of confidence in qualification and ability to lead for female candidates seeking electoral office per the data examined in this study. Conclusions will discuss the need for data about more diverse women.