2017 - 2018 YEAR IN REVIEW
TABLE OF CONTENTS

Schedule of Events.........................................................................................................................2
Welcome Letter.................................................................................................................................3
2018 Faculty Mentor of the Year Nominees.......................................................................................4
2017-18 Faculty Mentors of the Week...............................................................................................6
Schedule of Oral Presentations..........................................................................................................7
Oral Abstracts.................................................................................................................................8-15
Poster Abstracts...............................................................................................................................16-158

<table>
<thead>
<tr>
<th>Agriculture</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomy</td>
<td>18</td>
</tr>
<tr>
<td>Animal and Food Sciences</td>
<td>19</td>
</tr>
<tr>
<td>Anthropology</td>
<td>19</td>
</tr>
<tr>
<td>Appalachian Studies</td>
<td>20</td>
</tr>
<tr>
<td>Architecture</td>
<td>20</td>
</tr>
<tr>
<td>Art</td>
<td>21</td>
</tr>
<tr>
<td>Behavioral Science</td>
<td>21</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>22</td>
</tr>
<tr>
<td>Biology</td>
<td>24</td>
</tr>
<tr>
<td>Chemistry</td>
<td>55</td>
</tr>
<tr>
<td>Communication</td>
<td>59</td>
</tr>
<tr>
<td>Communication Sciences and Disorders</td>
<td>60</td>
</tr>
<tr>
<td>Computer Science</td>
<td>60</td>
</tr>
<tr>
<td>Design</td>
<td>62</td>
</tr>
<tr>
<td>Dietetics and Human Nutrition</td>
<td>68</td>
</tr>
<tr>
<td>Economics</td>
<td>84</td>
</tr>
<tr>
<td>Education</td>
<td>89</td>
</tr>
<tr>
<td>Engineering</td>
<td>93</td>
</tr>
<tr>
<td>English</td>
<td>103</td>
</tr>
<tr>
<td>Entomology</td>
<td>104</td>
</tr>
<tr>
<td>Finance</td>
<td>106</td>
</tr>
<tr>
<td>Forestry</td>
<td>108</td>
</tr>
<tr>
<td>Geography</td>
<td>109</td>
</tr>
<tr>
<td>Gerontology</td>
<td>109</td>
</tr>
<tr>
<td>Health Sciences</td>
<td>110</td>
</tr>
<tr>
<td>History</td>
<td>111</td>
</tr>
<tr>
<td>Honors</td>
<td>112</td>
</tr>
<tr>
<td>Landscape Architecture</td>
<td>111</td>
</tr>
<tr>
<td>Linguistics</td>
<td>115</td>
</tr>
<tr>
<td>Marketing</td>
<td>115</td>
</tr>
<tr>
<td>Mathematics</td>
<td>116</td>
</tr>
<tr>
<td>Microbiology</td>
<td>116</td>
</tr>
<tr>
<td>Modern and Classical Languages</td>
<td>117</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>118</td>
</tr>
<tr>
<td>Obstetrics and Gynecology</td>
<td>124</td>
</tr>
<tr>
<td>Pharmaceutical Sciences and Pharmacology</td>
<td>124</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>127</td>
</tr>
<tr>
<td>Physics and Astronomy</td>
<td>128</td>
</tr>
<tr>
<td>Physiology</td>
<td>130</td>
</tr>
<tr>
<td>Plant and Soil Science</td>
<td>131</td>
</tr>
<tr>
<td>Political Science</td>
<td>133</td>
</tr>
<tr>
<td>Psychology</td>
<td>134</td>
</tr>
<tr>
<td>Public Health</td>
<td>151</td>
</tr>
<tr>
<td>Rehabilitation Sciences</td>
<td>152</td>
</tr>
<tr>
<td>Sociology</td>
<td>154</td>
</tr>
<tr>
<td>Special Collections Research</td>
<td>154</td>
</tr>
<tr>
<td>Spinal Cord and Brain Injury</td>
<td>156</td>
</tr>
<tr>
<td>Theatre and Dance</td>
<td>156</td>
</tr>
<tr>
<td>Toxicology</td>
<td>157</td>
</tr>
<tr>
<td>Veterinary Science</td>
<td>158</td>
</tr>
</tbody>
</table>

Table Abstracts.............................................................................................................................159
Oswald Winners...............................................................................................................................161
Posters-at-the-Capitol Presenters.................................................................................................162
Presenter Index..............................................................................................................................163
Map..................................................................................................................................................Inside Back Cover
Showcase of Undergraduate Scholars

Wednesday, April 25, 2018
William T. Young Library
3:00 – 6:00 PM

Opening Remarks and Moderators
Evie Russell, Associate Director of the Office of Undergraduate Research

Welcome
Dr. Philipp Kraemer, Chellgren Chair for Undergraduate Excellence
Professor of Psychology

Comments
Dr. Lisa Cassis, Vice President for Research

Presentation of the Faculty Mentor of the Year Awards
Student Outreach Team

Closing Remarks
Esias Bedingar, Student Outreach Team member

Reception to follow in the Alumni Gallery
Catering by 3 Peas in a Pod

Poster Presentations (Basement, First Floor, Second Floor)
Oral Presentations begin at 3:40 PM (Auditorium, Keeneland Room, Active Learning Classroom)
Table Presentations (First Floor)
Welcome to the 2018 Showcase of Undergraduate Scholars!

“Tell me, and I’ll forget
Show me, and I’ll remember
Involve me, and I’ll understand”
- Chinese proverb

The Office of Undergraduate Research and all supporting partners welcome you to the 2018 Annual Showcase of Undergraduate Scholars. This UK academic tradition serves to honor the remarkable achievements of our undergraduate researchers and provides an opportunity to thank the dedicated faculty mentors and staff who work on behalf of these students.

As one of the nation’s leading research institutions, UK offers a breadth of experiences and opportunities that actively engage students in their education. Through undergraduate research and creative activities, students work closely with leading scholars to gain in-depth knowledge about their fields of study and have opportunities to apply classroom learning to real life situations. The Showcase of Undergraduate Scholars highlights the invaluable educational impact that undergraduate research can have on promoting student success.

Throughout the event, undergraduate students from diverse academic disciplines will present their faculty- mentored scholarly research and creative endeavors in poster, table, and oral formats. Attendees will also hear from administrators associated with undergraduate research campus-wide, enjoy a presentation from UK Faculty and Students currently engaged in research, and learn about the benefits of engaging in undergraduate research. The 2018 Faculty Mentor Awards will also be announced.

The Showcase demonstrates that true academic enrichment is best achieved by collaborations and partnerships among faculty, academic departments, colleges, units, and programs dedicated to academic excellence. We thank the many dedicated mentors who guided the research projects and creative activities presented today.

Please join us in welcoming and congratulating all the undergraduate student presenters at this year’s Showcase of Undergraduate Scholars. This event is truly an occasion for us to be proud members of the University of Kentucky.

Sincerely,

The Office of Undergraduate Research

Bessie M. Guerrant
Associate Director

Evie Russell
Assistant Director

Jesi Bowman
Student Program Specialist

Philipp J. Kraemer
Chellgren Chair for Undergraduate Excellence
Professor of Psychology
2018 FACULTY MENTOR OF THE YEAR NOMINEES

The Faculty Mentor of the Year Award recognizes UK faculty members who have demonstrated an outstanding commitment to mentoring undergraduate researchers, provided exceptional undergraduate research experiences, as well as supporting and promoting the undergraduate research initiatives on campus.

Luke Bradley
Neuroscience

D. Allen Butterfield
Chemistry

Philip Crowley
Ecology

Anastasia Curwood
History

Janice Fernheimer
WRD

Gail Hoyt
Economics

Peter Kekenes-Huskey
Chemistry

Kathy Kern
History

Cynthia Lawrence
Music

Gregory Luhan
Design

Kathryn Newfont
History

Julie Pendergast
Biology

Shannon Plank
Anthropology

Suzanne Smith
Engineering

Carol Street
Special Collections

Amy Taylor
History

Ellen Usher
Education

Thomas Zentall
Psychology
The Office of Undergraduate Research officially launched the Faculty Mentor of the Week recognition program in August 2017. Each week one of UK’s outstanding and very much appreciated undergraduate research faculty mentors was highlighted for their leadership and support of undergraduate student researchers.
# SCHEDULE OF ORAL PRESENTATIONS

## ORAL PRESENTATIONS A – UKAA Auditorium (1st Floor)

- 3:40 – 4:00 PM – Bustle, Emilia
- 4:00 – 4:20 PM – Chavez, Andrew
- 4:20 – 4:40 PM – Chipman, Avery
- 4:40 – 5:00 PM – Cloyd, Conner
- 5:00 – 5:20 PM – Crowner, John
- 5:20 – 5:40 PM – Dyment, Madison

## ORAL PRESENTATIONS B – Keeneland Room (1st Floor)

- 3:40 – 4:00 PM – Hacker, Stephanie
- 4:00 – 4:20 PM – Hagan, Katherine
- 4:20 – 4:40 PM – Johnson, Andrew
- 4:40 – 5:00 PM – Kintner, Sarah
- 5:00 – 5:20 PM – Martin, Isabelle
- 5:20 – 5:40 PM – McDaniel, Honour

## ORAL PRESENTATIONS C – Active Learning Classroom (2nd Floor)

- 3:40 – 4:00 PM – Mollette, Katie
- 4:00 – 4:20 PM – Ntakarutimana, Chimene
- 4:20 – 4:40 PM – Raley, Olivia
- 4:40 – 5:00 PM – Shuck, Jordan
- 5:00 – 5:20 PM – Tipsword, Jordyn
ORAL ABSTRACTS

ALL I EVER NEEDED: THE CHANCE TO DANCE. AN EXPLORATION OF DANCE AS A FORM OF COMMUNICATION IN THE MUSICAL A CHORUS LINE

Bustle, Emilia

Time: 3:40 PM – 4:00 PM; UKAA Auditorium

Faculty Mentor(s): Susie Thiel, Audrey Bachman

Discipline: Theatre and Communications

A Chorus Line is a musical about dancers auditioning for a Broadway show. In the audition, they give their personal stories about why they dance. In addition to verbally communicating these stories, they use dance as communication. Dancers (n = 13) who had previously been in a production of A Chorus Line were recruited through snowball sampling for personal structured interviews to explore their lives as dancers and their usage of dance as a form of communication within A Chorus Line. Interviews were conducted in a variety of formats (i.e., one-on-one, phone, and online) based on participants’ geographic location. Data from the interviews were analyzed using a framework analysis methodology, which is a qualitative method of successive, inductive inquiry (Ritchie & Spencer, 1994). Data were analyzed to explore why dance was needed to tell the story of A Chorus Line. Specifically, why was verbal communication simply not enough to successfully communicate a message to the audience? The interviews provided a primary theme with corresponding subthemes. The findings show that dance acted as a nonverbal complement to enhance the verbal communication employed by the actors. Subsequently, they felt as if their communication wouldn’t be fully understood without dance. Messages can be heard, but will not be as impactful without the visual element of dance. Dance also acted as an expression of the inner thoughts of the characters representing things that couldn’t be put into words. These findings present unique opportunities for communication researchers to include dance as a nonverbal kinesthetic. The current study provides formative data that underscores the importance of future research designed to explore how the physical embodiment of a message through dance can improve the receiver’s understanding of a message, which may be revolutionary for improving the communication of important messages like those featured in A Chorus Line.

HYPEROXIC INFLUENCES ON INFLAMMASOME PRIMING IN BONE MARROW-DERIVED MACROPHAGES VIA THE ASK-1 PATHWAY

Chavez, Andrew

Time: 4:00 PM – 4:20 PM; UKAA Auditorium

Faculty Mentor(s): Dr. Christopher Waters

Discipline: Biology

Acute respiratory distress syndrome (ARDS) affects nearly 200,000 patients a year. Commonly, patients of ARDS are placed on oxygen and a mechanical ventilator. Both hyperoxia and ventilation can both independently induce lung injury. In combination, both hyperoxia and ventilation can produce accelerated lung injury by inducing damage of lung cells. As part of the lung defense, alveolar macrophages become activated in response to pathogens. Upon activation, the macrophages develop an inflammatory response that is partly mediated by a protein complex called an inflammasome. Inflammasomes contribute to the immune response by processing and promoting the release of cytokines such as interleukin-1β (IL-1β). Unregulated IL-1β can lead to increased lung injury. Hyperoxia may activate the inflammasome to promote an increase in the release of IL-1β that leads to greater injury. It was hypothesized that hyperoxia-induced activation of the inflammasome is mediated by a protein called apoptosis signal-regulating kinase-1 (ASK-1) that has been associated with this hyperoxia and ventilator induced lung injury. As a model for alveolar macrophages, it was investigated whether hyperoxia promotes inflammasome priming in bone marrow-derived macrophages (BMDMs) from ASK-1 knockout mice. BMDMs collected from wild-type and ASK-1 knockout mice were cultured then incubated in 90% oxygen for 2h, 24h, and 48h. The cell lysate was collected from these samples and analyzed by Western blot and densitometry. Expression of one component of the inflammasome, NLRP3, was decreased in BMDMs from ASK1 knockout mice after 24 and 48h of hyperoxia. Another component, caspase-1, decreased after 2h of exposure, but then increased by 24 and 48h in the BMDMs from knockout mice. This suggests that hyperoxia may activate inflammasomes with short exposure time, but the effect diminishes with time of exposure. The study of inflammasome activation is important for patients with ARDS as further lung injury could be avoided.
ORAL ABSTRACTS

FINDING SUSTAINABILITY WITHIN THE UNIVERSITY OF KENTUCKY'S COLLEGE OF DESIGN
Chipman, Avery
Time: 4:20 PM – 4:40 PM; UKAA Auditorium
Faculty Mentor(s): Helen Turner
Discipline: Interior Design

Through analysis of the College of Design's recruitment material, student surveys, student population, and budget, a proposition is made for what materials are ineffective and should be removed from College of Design recruitment packets, and how other materials could become more effective. The proposed changes result in a more effective and streamlined recruitment packet, which allows for the College of Design to become more socially, environmentally, and economically sustainable.

SILVER NANOPARTICLES IN MEMBRANES TO REDUCE BIOFOULING
Cloyd, Conner
Time: 4:40 PM – 5:00 PM; UKAA Auditorium
Faculty Mentor(s): Dr. Isabel Escobar
Discipline: Chemical Engineering

Membranes are thin layers of material that can be used in water purification and separation technology. However, fouling, especially biofouling, is a problem to restrict the lifetime of polymeric membranes. In this research, cellulose acetate membranes are functionalized by silver nanoparticles to alter the effects of biofouling. The silver nanoparticles were blended chemically into the dope solution before the membranes were cast. The blending process utilized thiol groups to attach the casein-coated silver nanoparticles with the use of glycidyl methylcryate (GMA) and cysteamine. This attachment immobilized the silver nanoparticles throughout the membrane. The membranes were subsequently tested with brackish water containing Pseudomonas Fluorescens bacteria. The membranes containing the silver nanoparticles showed consistent reduction of bacterial cells compared to membranes without silver nanoparticles. The anti-bacterial property will improve the anti-biofouling performance of polymeric membranes.

WAR AND COINAGE: AN ANALYSIS OF ROMAN- AND CARTHAGINIAN-ALLIED MINTS IN SOUTHERN ITALY DURING THE SECOND PUNIC WAR
Crowner, John
Time: 5:00 PM – 5:20 PM; UKAA Auditorium
Faculty Mentor(s): Dr. Paolo Visona
Discipline: Fine Arts

The Roman world was shaken to its core following news of the disastrous defeat at Cannae in 216 BCE. This dark chapter in Roman history saw the fortunes of the Republic grow ever more bleak, as many of Rome’s Italian allies, the cities and town she would depend on most in this time of chaos, would betray Rome and join the side of Hannibal Barca. Italian allies, particularly in Apulia and Bruttium, abandoned Rome in order to ally themselves with Hannibal and his apparently invincible army. Several of these cities exploited their new found independence to the fullest, with many creating their own unique identity through forms of government, foreign relations, and, most interestingly, coinage. The impacts of battles and politics are well studied for this time in history, but an examination of the coinages produced during the war can help to complete the picture of the political and economic climate that existed throughout Italy during the Second Punic War. The rebellious cities of Capua, Volcei and Arpi, as well as the Roman-allied cities of Luceria, Venusia and Canusium, serve as the focus of the research, with an analysis of coin types, weight standards, and styles for each mint city. This analysis helps to reveal some motives for cities to stay with Rome or leave the alliance, explanations of relations with other states such as Carthage or Rome, and cultural influences on the cities from within and abroad.
ESTABLISHING THE IMPORTANCE OF AGRICULTURAL COMMUNICATIONS IN EDUCATION AND THE WORKPLACE
Dyment, Madison
Time: 5:20 PM – 5:40 PM; UKAA Auditorium
Faculty Mentor(s): Dr. Lori Garkovich
Discipline: Community and Leadership Development

Agricultural Communications is a field of study that is underrepresented in North America in relation to rising need of agricultural communicators in the industry. The research by University of Kentucky student Madison Dyment with assistance from University of Kentucky Community and Leadership Development professor Dr. Lorraine Garkovich assesses the value of agricultural communications programs in higher education institutions across North America. While this is the general purpose of this research, ultimately the results will be used to support the need to establish an agricultural communications program for the Ontario Agricultural College at the University of Guelph. The research gathers and connects secondary data on occupational trends and projections in agricultural communications occupations and higher education programs. Then, qualitative interviews with agricultural communications alumni, professionals, students, institutional leaders and professors provide a more in-depth understanding of the meaning and professional implications of the secondary analysis. The agricultural industry is rapidly changing and increasingly critically scrutinized. More today than ever before there are numerous adversaries to the practice or methods of food production and livestock care regulations, or even outright bans. It would appear that this should be a time for graduates who have specialized in communicating agricultural procedures through journalistic, public relations, and multi-media outlets. This research suggests that agricultural communications is an increasingly in-demand but under-represented program in higher education institutions. Increasing the number of agricultural communications programs and graduates may be the answer to meet the projected industry needs of over 7,000 jobs annually. These jobs will require extensive communications, writing, or public relations skills combined with an understanding of agriculture. The research confirms this demand and the resulting importance of access to agricultural communications programs in North American universities. This is in stark contrast to the lack of access that students currently have to this educational opportunity.

EPIGENETICS OF THE STRIATUM: IMPLICATIONS FOR ADDICTION AND PARKINSON’S DISEASE
Hacker, Stephanie
Time: 3:40 PM – 4:00 PM; Keeneland Room
Faculty Mentor(s): Dr. Jennifer Osterhage
Discipline: Biology

In recent years, a boon of research into epigenetic modulation, the study of the environmental influence on DNA expression, has vastly expanded the possibilities for understanding disease development and creating novel treatments. Most notably, epigenetic studies have elucidated changes in DNA expression in offspring of mothers exposed to teratogens during pregnancy in order to understand developmental disorders in offspring. However, epigenetic changes do not occur solely during early development; even environmental conditions throughout adulthood can influence DNA expression. The striatum, the largest region of the basal ganglia, is central for a variety of cognition pathways, chiefly the motor and reward systems, and would be a model site to study epigenetic modification. The striatum has been implicated in several different diseases including addiction and Parkinson’s disease, but the importance of epigenetic modulations in these clinical manifestations has not been fully considered. I will review the epigenetic mechanisms implicated in striatal changes and discuss clinical relevance for conditions such as addiction and Parkinson’s disease.
MARGARET I. KING LIBRARY
Hagan, Katherine
Time: 4:00 PM – 4:20 PM; Keeneland Room
Faculty Mentor(s): Dr. Jennifer Osterhage
 Discipline: Biology
Several buildings on the University of Kentucky’s campus, including M.I. King Library, while historic, have outdated features and systems. This research, done as part of the undergraduate team for the Sustainability Grant is seeking to explore ways to utilize core campus buildings for more concrete student use. The university desires to update and maintain the M.I. King Library, a historical treasure located in the heart of the University of Kentucky’s campus, so that students and staff get the most out of their educational experience. Studies show that there is a correlation between students’ academic performance and the quality of a classroom building. However, many students and staff are dealing with scarce, inadequate, and unorganized classrooms and offices on campus. Poor quality educational environments can impair concentration and disrupt student engagement. The main purpose of this building is to house the Rare and Special Collections Library, where very few students are allowed to view or use. The addition attached to the original building houses the Science Library. Both entities are completely separated and there is very limited access between the two sides. As part of the research to investigate the building, the team used methods of observation, mapping, historical research and existing conditions documentation in order to gain empathy and understanding. Through observation and research, the team witnessed students navigating the building in order to propose new solutions. As a result of this study, it is proposed to provide much needed classroom space in the core of the main campus, that the M.I. King library collections move off-site with limited selections to be housed in the nearby Lafferty Building. The building can then be re-designed to house classrooms and student workspaces which meet contemporary pedagogical needs. Renderings and specifications for these new spaces will showcase designs to meet the university requirements.

KENTUCKY SLAVERY: THE HISTORIOGRAPHY OF HUMAN PROPERTY RECORDS
Johnson, Andrew
Time: 4:20 PM – 4:40 PM; Keeneland Room
Faculty Mentor(s): Dr. Kathryn Newfont
 Discipline: History
The domestic slave trade in the United States is generally condemned as an evil business. Nonetheless, many documents pertaining to this trade do not reflect the negative aspects. The reason for this lies in the simple fact that many of the primary source documents studied are written by those who took part in the trade - not those who were forcibly traded. To view the trade from the eyes of those who were lost in the abominable trade, historians are faced with the dilemma mainly stemming from a lack of literacy from those who experienced this narrative. With the extreme bias in the documentation of those who controlled the domestic slave trade, and the dearth of written slave accounts, a different approach must be taken to fully understand the experience of the slave trade. A great resource for this is the locally recorded human property deeds. Most county courts in the South today have deed books that date back to the antebellum period. These deeds, when looked at from a historical, cultural, and institutional angle provides a dark perspective into the experience felt by those in the slave trade. In addition, these deeds help to correct and update many historical foundations build upon the faulty presentations of the abundant documents written by those who dealt in the trade. Human property deeds identify the economic factors, but also help to identify cultural happenings that affected the Commonwealth on an institutional and cultural level. Furthermore, they help to demonstrate the interaction between the state, individuals, and the institution. Within this, the evolution of pro-slavery ideology is displayed as characteristics of the deeds transform around the constitution of 1850, which led to a stronger institutional hold on slavery. Academic research into slave deeds provides a new addition to the historiography of Kentucky slavery.
THE EFFECT OF APPLIED ELECTRIC POTENTIAL ON THE PERFORMANCE OF A NANOFILTRATION MEMBRANE
Kintner, Sarah
Time: 4:40 PM – 5:00 PM; Keeneland Room
Faculty Mentor(s): Dr. Isabel Escobar
Discipline: Chemical Engineering

The demand for freshwater is rising alongside global population and urbanization, but the current freshwater supply is being depleted faster than it can be restored by natural means. It has been estimated that by 2025, nearly 2 billion people will be living in absolute water scarcity. Membranes are favored over many other technologies for water treatment because, in principle, they require no chemical additives, can be used isothermally at low temperatures and they do not require regeneration of spent media. Membranes that can reject salts, maintain a nearly constant permeate flux operation and require minimal cleaning are highly demanded. In this study, we examined the effect of an applied electric potential on the surface of a polymeric membrane, sulphonated poly ether ether ketone (SPEEK). The synthesized membranes were characterized with respect to pore size and morphology, and their operational performance was evaluated through experiments to measure water flux and salt rejection.

OUTSIDE AND BETWEEN: NETWORKS OF INVISIBILITY IN DAVID HAMMONS'S CONCERTO IN BLACK AND BLUE
Martin, Isabelle
Time: 5:00 PM – 5:20 PM; Keeneland Room
Faculty Mentor(s): Dr. Miriam Kienle
Discipline: School of Art and Visual Studies

Performed at the Ace Gallery in New York in 2002, David Hammons's Concerto in Black and Blue was an interactive experience in which participants were thrust into a completely dark environment and given only a small blue handheld flashlight, used to both guide one's way and to alert others of one's presence in the pitch-black gallery space. While bringing them together for a shared experience, the total darkness of the installation also rendered participants completely invisible to one another, at once gathering and ostracizing them. With this total darkness and sense of alienation, Hammons implores participants to consider the social construction of race and the implications of skin color in an environment where physical signifiers of race are indiscernible. This paper considers the relationships between anonymity and visibility in Concerto in Black and Blue and social networking sites such as Myspace, Friendster, and Facebook, the releases of which Concerto preceded by only a few months. In both environments, identity is contingent upon one's decision to participate; however, in the total darkness of Concerto, one's identity is asserted through the use of an external object, the flashlight. Analyzing this work at the intersection of network theories and writings on participatory art and relational aesthetics, I will consider the relationships between identity, participation, and presence in these virtual communities and in Hammons's interactive space, wherein presence is asserted by light and race becomes mediated by visibility.
ORAL ABSTRACTS

PRELIMINARY ANALYSIS OF MALE ATTITUDES TOWARDS REPRODUCTIVE COERCION
McDaniel, Honour
Time: 5:20 PM – 5:40 PM; Keeneland Room
Faculty Mentor(s): Dr. Corrine Williams, Sarah Cprek
Discipline: Public Health

Reproductive coercion (RC) can be defined as actions relating to reproductive health taken by a partner in order to maintain power and control in a relationship. While multiple studies have looked at reproductive coercion’s role in unintended pregnancies and the correlation with interpersonal violence, this research has only examined the experiences of women. Further, the definition of RC has not addressed the experiences of reproductive coercion among men, though the anecdotal phenomenon of women getting pregnant to trap men is often discussed. This presentation will address the gap between collected RC data for men and women. Specifically, it will look at the questions: 1) What are the most common forms of reproductive coercion experienced by men? 2) How does previous pregnancy impact males attitudes? In a cross-sectional survey of college students from two large, public universities in 2015 (n=4,063), both men and women responded to questions relating to condom use, birth control sabotage and pregnancy discussions. During past surveys, men were either excluded or not looked at individually. Including men’s experiences in the conversation about pregnancy prevention programs as well as interpersonal violence (IPV) prevention programs will help us analyze factors contributing to unintended pregnancies and IPV. As well, decreasing reporting inequalities between male and female RC experiences will open doors to a broader discussion about healthy relationships and family planning.

THE RACIALIZATION OF ISLAM: OLDER THAN YOU THINK
Mollette, Katie
Time: 3:40 PM – 4:00 PM; Active Learning Classroom
Faculty Mentor(s): Dr. Ana Liberato
Discipline: Sociology

Race and Islam have been controversial topics in American politics and media throughout the past few decades. This project explores how race and Islam have intersected in legislation processes in the United States in the context that preceded September 11, 2001. The goal of this project is to examine how Islam became radicalized in the United States and to uncover how deeply rooted race is in how Americans view the religion of Islam. The research for this project illustrates how legislation set the stage for the racialization of Islam, how race has aided in the modern view of American Muslims, and what the impacts have been on the American Muslim community.
THE COMPANY WE KEEP: RACIAL MINORITIES’ PERCEPTION OF RACIAL IDENTITY AUTHENTICITY
Ntakarutimana, Chimene
Time: 4:00 PM – 4:20 PM; Active Learning Classroom
Faculty Mentor(s): Dr. Jazmin Brown-Iannuzzi
 Discipline: Psychology

People tend to use friendship groups for the basis of judgments about an individual within the friendship group. This facet of human processing is quite interesting when considering interracial relationships. Previous research has found that interracial relationships for White individuals is good - Whites with racial minority friends tend to have less prejudice and are regarded well by other White individuals than Whites who do not have racial minority friends. However, the benefit of interracial friendships may not be the same for racial minority individuals. In fact, previous research has found that Black individuals are suspicious of Black people who are friends with White people (Marcus, 2011; Johnson & Ashburn-Nardo, 2014). The present study investigated whether Blacks judge other Blacks as being inauthentic when presented in a group of White (vs. Black) people. To test this question, we asked Black participants to rate the authenticity of several pictures of Black individuals in different situations - either pictured in a group of two other Black people, or in a group of two other White people. Participants were told that these were photos of groups of friends. We hypothesized that the Black individuals pictured with two Black friends would seem more authentic than the Black individuals pictured with two White friends. Consistent with our hypothesis, we found that Black participants rated other Black individuals pictured with Black groups of friends as more authentic than Black individuals pictured with White groups of friends. These findings expand upon a growing area of research investigating diverse friendships. Specifically, diverse friendships may be helpful for White individuals, but may be harmful for signally authenticity for Black individuals.

OBJECT PERMANENCE IN PIGEONS
Raley, Olivia
Time: 4:20 PM – 4:40 PM; Active Learning Classroom
Faculty Mentor(s): Dr. Thomas Zentall
 Discipline: Psychology

Object permanence, viewed as a measure of human cognitive development, has also been used to assess animal cognition. Tests of object permanence have distinguished between visible displacement in which an object may be placed into one of two (or more) containers to be retrieve and invisible displacement in which after the object is placed into the container, the contained is moved before retrieval is attempted. In the present study we tested pigeons’ accuracy on both visible and invisible displacement using a rotational beam with a container at either end. In Experiment 1, the pigeons chose randomly on an initial visible displacement test and with training, their accuracy improved but only to about .70. When tested on a 900 invisible displacement (rotation) accuracy rose to about .70 but then dropped with further training. In Experiment 2, a 5-s delay was inserted between container baiting and choice. Although choice accuracy was not much better than in Experiment 1 on the first session, with training, choice accuracy improved greatly. Furthermore, the pigeons showed good transfer when they were tested on the 900 invisible displacement. Finally, they also transferred well to a 1800 invisible displacement, a displacement that proved very difficult for dogs.
ORAL ABSTRACTS

THE NEIGHBOR-TO-NEIGHBOR SLAVE TRADE
Shuck, Jordan
Time: 4:40 PM – 5:00 PM; Active Learning Classroom
Faculty Mentor(s): Dr. Amy Taylor
Discipline: History

It is far too common in the United States today to go to a historical site and learn nothing about the slaves that contributed to its success. In my research, I have uncovered stories of the slaves that once lived and worked on the hemp fields of the plantation, now known as the Waveland State Historic Site. Through research into the lives of particular slaves a common theme has arisen; the instability in the lives of slaves as they moved through the Lexington community through neighbor-to-neighbor trade. Property deeds at both the Fayette and Jessamine County Clerk’s offices in Kentucky have revealed that the Bryan family that once owned Waveland participated largely in neighbor-to-neighbor slave transactions, and the enslaved had to live with its disruptive effects. The domestic slave trade that connected Kentucky to the South was one of the more horrendous parts of the system of slavery in the United States and there has been much research into it. Neighbor-to-neighbor slave trading within the state may have been just as common, but is not as well researched although it had the same dreadful impacts on slaves. Slaves were still uprooted from their homes, taken away from family and friends and forced to live and work on another plantation. Although the plantation may have been closer in proximity, it still broke up family dynamics. Timelines I have created of the slaves that lived at Waveland helped track the movement of slaves throughout the community as they were traded among neighbors. I am now working to create an exhibit at the Waveland State Historic Site to share with the public the instability that existed in the lives of slaves as a result of the neighbor-to-neighbor slave trade.

THE IMPACT OF PERCEIVED DIVERSITY ON ATTITUDES TOWARD IMMIGRANTS
Tipsword, Jordyn
Time: 5:00 PM – 5:20 PM; Active Learning Classroom
Faculty Mentor(s): Dr. Jazmin Brown-Iannuzzi
Discipline: Psychology

Immigration is one of the most highly debated topics in contemporary American politics. Scholars have previously asserted that opposition toward immigration may be driven, in part, by racial prejudice (e.g., Citrin et al., 1997; Kinder, 2003). However, this psychological leap had never been directly tested. In two previous experiments investigating people’s mental images of immigrants, participants created composite images representing the average immigrant and American. The present study used those images to investigate the impact of perceived diversity on support for legal immigration and endorsement of negative stereotypes associated with immigrants. We hypothesized that participants would be less likely to support the legal immigration of an individual who presented as non-White and that greater perceived diversity of that individual would also motivate increased endorsement of negative immigrant stereotypes. To test this hypothesis, we presented a naïve sample with the average immigrant and American images and asked them to rate each image on perceived race and personal characteristics. A separate sample also indicated the extent to which each image represented a series of immigrant stereotypes and the likelihood that they would support each individual immigrating to the U.S. legally. Consistent with our hypothesis, participants perceived the immigrant image to be overwhelmingly non-White and were therefore more likely to endorse negative immigration stereotypes and oppose legal immigration for that image relative to the American image. Taken together, these findings suggest that negative attitudes toward immigrants are influenced by perceived race. This raises further questions concerning the treatment and expectations of immigrants that might stem from judgments made on the basis of race.
** DOSES FEED PUSH-UP FREQUENCY INFLUENCE DAIRY CATTLE PHYSIOLOGY AND BEHAVIOR?**

**Poster: 1**

Adamczyk, Michelle  
**Faculty Mentor(s):** Dr. Joao Costa

Feed push-up is the practice of moving feed closer to the feed bunk, aimed at improving feed access. The aim of this study was to investigate the effects of feed push-up frequency on cattle physiology and behavior. Feed was pushed-up using an automatic feed pusher (Jun, Lely, Maasluis, Netherlands) at frequencies of 2 and 12 push-ups/d. Forty-eight lactating Holstein dairy cows (mean ± SD: 173 ± 101 days in milk (DIM); 73.6 ± 23.3 lbs/d; 1.3±0.5 parity) were split into two groups balanced by parity and DIM. The cross-over design ran April to June 2017; cows experienced 2 or 12 push-ups/d for 3 wk, with a washout of one week between treatments where frequency returned to farm protocol (22 push-ups/d). Two behavior-monitoring ear tags (SmartBow, Smartbow GmHb, Jutogasse, Austria; and SensOor, Agis Harmelen, the Netherlands) monitored rumination and eating time. Rest time was monitored by a leg tag (Afi Act II, Afimilk, Afikim, Israel). Milk yield and milk components were monitored by an in-line milk assessment tool (AfiLab, Afimilk, Afikim, Israel). The relationship between feed push-up frequency and these variables was determined using a mixed linear model (SAS 9.4) with fixed effects of DIM, parity, treatment, sequence of treatment, and 2-way interactions. The results showed daily resting was greater when feed was pushed up 2x/d compared to 12x/d (640±12 vs 615±12 min/d; p<0.001). Rumination time was also greater when feed was pushed up 2x/d compared to 12x/d (366±9 vs 359±9 min/d; P=0.06). There were no differences in daily eating time, milk production, or milk components between treatments. Future research involving push-up frequency could use more frequencies of feed push-up, and include other variables such as intake rate or feeding bouts.

** ISOLATION OF PROTEINS INTERACTING WITH NITRIC OXIDE ASSOCIATED (NOA) 1 AND THEIR ROLE IN NITRIC OXIDE ACCUMULATION**

**Poster: 2**

Authors: Gavin Brackett, Aaron Clayton, Hiba Khan, Sarah Lau, Sarah O’Brien, Humza Piracha, Emma Seccombe, Alexander Sobieski, Brandon Trasmonte, Sierra Voshell  
**Faculty Mentor(s):** Dr. Pradeep Kachroo

Nitric oxide associated 1(NOA1) is a chloroplastic protein involved in nitric oxide (NO) biosynthesis/accumulation in response to biotic and abiotic stress responses. NOA1 encodes a GTPase and its role in NO biosynthesis or accumulation remains unknown. To determine factors regulating NOA1-mediated NO biosynthesis/accumulation a yeast-two hybrid screen was initiated to identify NOA1 interacting proteins. NOA1 was used as a bait protein and screened against the entire cDNA library from Arabidopsis thaliana. Thirty putative interactors were identified based on their growth on selective media and DNA from these yeast colonies was transformed into E. coli. Polymerase chain reaction and sequence analysis identified two putative interactors, Nuclear Diffusion Defective 3 (NFD3; a ribosomal protein) and Methionine Sulfoxide Reductase 2 (ATMSRA2; involved in redox regulation). These proteins might play a role in regulation of NOA1 dependent proteins in the chloroplast and/or NOA1-mediated NO biosynthesis/accumulation.
FERTILIZER AND ITS IMPACTS: WHY SOIL TESTING IS IMPORTANT AND HOW OVER-FERTILIZATION AFFECTS CROPS, SOIL, AND WATER
Poster: 3
Eades, Allison
Faculty Mentor(s): Dr. David McNear

First, this project will look at a brief history of the county extension program, before taking a closer look at one of the ways the University of Kentucky fulfills their extension duties. The College of Agriculture’s Regulatory Services offers a variety of services, but only the soil lab will be discussed in detail. Information on the multiple soil tests the lab at the University of Kentucky offers, how to take a proper soil sample, and the importance of soil testing will all be included. Soil testing can be used to indicate what resources are already present in the soil, and can give farmers and homeowners a more accurate picture of what their soil needs, preventing over-fertilization. Ag-point sources (such as over-fertilization) are a major cause of water pollution. Added fertilizer in water ways can lead to eutrophication, which, with time, can cause dead zones where plants and animals are unable to prosper. Though fertilization can have many benefits to crops and yields, this project aims to explain both the pros and cons of heavy fertilizer use.

USE OF TAIL MOVEMENT TO PREDICT CALVING TIME IN DAIRY CATTLE: VALIDATION OF A CALVING DETECTION TECHNOLOGY IN DAIRY CATTLE
Poster: 4
Mac, Sarah
Faculty Mentor(s): Dr. Joao Costa

Early detection of calving time allows the farmer to manage the calving process, to be present during calving and to monitor cases of dystocia in dairy cattle. Dystocia, when not assisted has the potential to increase calf mortality, decrease milk yield, lower conception rate, and increase uterine disorders consequently negatively affecting the cow and the calf. The objective of this study was to evaluate the ability of a precision technology (Moocall, Dublin, Ireland) to detect and alert the onset of calving in dairy cattle. Data from 73 cows were collected from September 2016 to January 2017 at the University of Kentucky Coldstream Dairy. The calving detection device was attached to the tail 4 ± 3 days (mean ± SD) before expected due date, and video was recorded for behavior analysis. The tail mounted technology sends 2 SMS alerts per calving, one at 2 h and the second at 1 h before calving. Accuracy of the calving device was evaluated by comparing the alert times to the actual time of calving. Tail behavior was monitored and analyzed for frequency and duration of tail lifts two hours prior to the first alert (baseline period), the hour prior to the first alert, and the hour prior to the second alert. Using PROC TTEST (SAS Institute Inc., Cary, NC) a lower one-sided (H0=150) analysis for significance was performed. The average time interval between the first alert and calving was 107 ± 10 minutes (mean ± SEM, P &lt; 0.01) and the average time interval between the second alert and calving was 71 ± 10 minutes (mean ± SEM, P &lt; 0.01). Video was evaluated for the frequency and duration of tail lifts during the control period, hour prior to the first alert, and the hour prior to the second alert. Mean frequencies were 3.37, 7.95, and 8.47 (lifts/h), respectively. Mean durations of tail lifts were 55, 124, and 134 seconds, respectively. The calving detection device has the potential to alert farmers approximately two hours before calving. The farmer being present during birth has the potential to reduce dystocia problems and increasing timely delivery of colostrum, improving cow and calf health.

** Denotes STEMcats project
VALIDATION OF AN AUTOMATED BODY CONDITION SCORING TECHNOLOGY FOR LACTATING DAIRY CATTLE
Poster: 5
Mullins, Israel
Faculty Mentor(s): Dr. Joao Costa

Body condition scoring (BCS) is the management practice of visually estimating subcutaneous fat reserves in dairy cattle. A commercial automatic BCS technology is available for dairy cattle (DeLaval International AB, Tumba, Sweden). The objective of this study was to evaluate the agreement of the automated scores in comparison with conventional manual scoring. The study was conducted on a commercial farm in Indiana in April 2017. Trained researchers scored cows manually, using a 1 to 5 BCS scale, with 0.25 increments. All analyses were performed using SAS 9.3 (SAS Institute Inc., Cary, NC). Pearson’s correlation was calculated to assess interobserver reliability, the correlations being 0.85, 0.87, and 0.86. The automated scores were compared with two datasets of manual scores. One dataset (MAN1) consisted of cows with ≥2 manual scores averaged by cow into one score per cow (n = 343). The second dataset (MAN2) included cows that ≥2 scorers agreed on the score (n = 237). The mean was 3.38 ± 0.48 and 3.38 ± 0.78 (mean ± SD) for MAN1 and MAN2, respectively. The average automated score was 3.27 ± 0.27. Correlations were calculated for MAN1 and MAN2. Resulting coefficients were 0.78 and 0.77 (P<0.001). The results from the T-test demonstrated equivalence between automated and manual datasets (P<0.001). When scores were separated into categories, 3.00, 3.00 to 3.75, and 3.75, the low and high BCS categories were shown to not be equivalent (P<0.001). A Bland-Altman plot was constructed and demonstrated that the technology underscored cows as their manual score increased. The system tends to be inaccurate at determining the extreme low and high BCS, although these categories represent a small proportion of cattle.

Keywords: automatic measurement, technology, precision dairy

ANATOMY

TISSUE OXYGENATION FOLLOWING SPINAL CORD INJURY
Poster: 6
Spears, Allison
Faculty Mentor(s): Dr. James Geddes

Spinal cord injury damages not only the underlying tissue, but also the vascular supply to the spinal cord. This may result in reduced oxygenation of spinal cord tissue and a resultant impairment of neural activity. Maintenance of tissue oxygenation and cerebral blood flow is standard of care for traumatic brain injury. Surprisingly, however, there is a paucity of information regarding effects of spinal cord injury on tissue oxygenation and neural activity in the first few minutes to hours following the injury. Using a single Bioflex carbon-fiber based microelectrode array (Anal Chem 89: 12383-90,2017), combined in vivo amperometric oximetry and electrophysiology were measured pre- and post-spinal cord injury using a rat contusion injury model. Following anesthesia and laminectomy, the electrodes were inserted into the rat spinal cord at T10, caudal to the impact site. Recordings were obtained pre-injury, during contusive injury, and for 2h post-injury. The results demonstrate a decrease in the oxygenation of spinal cord tissue post-injury, accompanied by alterations in neural activity. The results suggest that monitoring and maintenance of tissue oxygenation following spinal cord injury should be incorporated into post-injury clinical care, similar to current standards for traumatic brain injury.
** DO CALVES PLAY WITH A BALL? EFFECTS OF INTRODUCTION OF A NOVEL OBJECT ON CALF SOCIAL AND PLAY BEHAVIOR  
Poster: 7  
** Authors: Carla Elliott, Emma Higgins, Colton Lane, Luke Morris, Michael Scharden, Madison Schardein, Emily Snow, Madison Sydnor  
** Faculty Mentor(s): Dr. Joao Costa

Young animals are naturally motivated to play. However, dairy calves on most farms are raised in an environment that limits their ability to interact and play with novel objects. The introduction of a novel object that can serve as a toy, such as a ball, may increase their instinctual play behavior motivation. This study aimed to characterize the social behavior between young calves when in the presence of a novel object, focusing on mutual interactions. On two different days, a 30” ball was introduced into two calf pens and a video recording system was used to monitor social interactions. Interactions were recorded for the hour prior to the ball introduction, the hour that the ball was present, and the hour after the balls were removed from the pens. After all of the interactions were recorded, four individuals watched the videos from the two pens and documented each social and physical interaction with the ball according to an ethogram. On average, each calf interacted with the ball 12.97 (± 1.72) seconds. Inclusion of the ball did increase movement in the pen. The average social interaction before introduction of the ball lasted 32.12 (± 2.73) seconds, and occurred 58 times. Mutualistic behavior while the ball was in the pen, lasted shorter, 24.91 (± 2.46) seconds, but occurred more often at 85 times. Post ball removal, interactions were similar at 28.83 (± 3.35) seconds, and occurred 88 times. A novel object introduction influenced calves social behavior and may be an interesting way to motivate calves to play. Future implication of the results are that dairy producers can utilize a novel object to stem interactions and play behavior of their young calves, which may help to improve their living conditions in an artificial environments.

ANTHROPOLOGY

LESSONS LEARNED FROM LITHIC USE-WEAR ANALYSIS  
Poster: 8  
Tepe, Leah  
** Faculty Mentor(s): Shannon Plank

Part of the Canton site, located in western Kentucky and recorded as 15TR1, was originally excavated by archeologists of the William S. Webb Museum of Anthropology in 2014-2015. As a result of these excavations, it was determined the location was occupied about 8,000 years ago and held a vast amount of important lithic material. Analyses of these stone tools can lead to the understanding of the types of activities conducted by the site inhabitants. While larger stone tools were initially pulled for closer observations, the majority of material at the site was "lithic debitage", or the flakes created as a result of tool manufacturing. For this research, to provide more evidence and a clearer description of their activities, this material was analyzed. First, flakes from one excavations unit (619) were sorted by material type, flake type, and size. The flakes over Â½ inch were analyzed under low power magnification for prehistoric use. Items that showed indications of ancient damages were documented by the type of damage and the level of magnification on standard forms. These analyses suggest that using magnification to observe flake edges identified more flakes as expedient tools than observations without using magnification. These results can identify specific activities such as cutting and whittling of soft material, which are not previously known indications of human activity focusing on the utilization of available material. Therefore, microscopic research can lead to new ideas and information about the use of lithic material not originally seen in the first sorting of material. Future archaeological research can consider if through detailed analyses expending more time and resources are of value.
APPALACHIAN STUDIES

PRINCIPLED PROGRESS? ENVIRONMENTAL REGULATION IN PRINCIPLE, POLICY, AND PRACTICE AS SHAPED BY THE PRINCIPAL-AGENT PROBLEM
Poster: 9
Ashton, Erica
Faculty Mentor(s): Dr. Chris Barton

Decades of research on environmental policy-making have produced a consensus that successful enforcement encourages regulators to work cooperatively with firms while strictly enforcing baseline environmental-protection rules. This study applies that perspective to the Surface Mining Control and Reclamation Act (SMCRA) as implemented in four coal-producing states - West Virginia, Virginia, Pennsylvania, and Kentucky - to determine whether they are, in theory, poised for success. It then offers a case study of enforcement on nine mining sites in Kentucky to demonstrate how the principles articulated by the state’s environmental policies are enforced on the ground. The resulting analysis demonstrates a classic example of the principal-agent problem: the principles that lawmakers (acting as principals) wrote into Kentucky enforcement policy become lost when regulators (acting as agents) actually carry them out. Although policy failure in Kentucky fits with what scholars would have hypothesized given the regulatory regime in place, evaluating the shortcomings from a principal-agent framework gives additional insight how both policy and policy research might improve.

ARCHITECTURE

LEARNING FROM UKY | A VERTICAL FARM AS AGRICULTURAL URBANISM PROTOTYPE
Poster: 10
Maggiorani, Freddy
Faculty Mentor(s): Gregory Luhan

According to University of Kentucky Dining Services, the students, faculty, and visitors consume 7.5 million pounds of vegetables a year. What if the University’s South Farm could meet and exceed those demands and as a result, have a more significant impact beyond the immediate needs of the campus and address an even more pressing issue, the considerable reduction of farmable land in the United States and an ever-increasing population. Vertical Farming could be an ideal and futuristic solution to meet the horticultural needs of the University of Kentucky and the surrounding community. The proposed design enables the South Farm to take advantage of 2.5 acres of underutilized and currently non-farmable land and transform it into a vibrant and sustainable twenty-five-acre vertical farm. The structure enhances the University’s land-grant mission, contributes to the South Farm’s living and learning program, and increases seasonal vegetable growth from 30% to 100%. While the primary goal is to produce enough vegetables to satisfy the University of Kentucky community, the research demonstrates that one indoor acre of land can produce ten times more than an outdoor one and also cultivate a larger variety of fruits and vegetables. The research also supports the possibility of extending the program in ways that benefit an even more extensive scale community to positively benefit public health issues related to poverty, obesity, and homelessness. The potential for this 21st-century farm-based research lays at the intersection of imagination and technology and its capability of changing lives. The proposed structure incorporates facilities that educate UKY students and the vulnerable members of our society and provided them with the necessary tools to reinsert them into the community as self-sufficient contributors to society. This research is a scalable solution that can cater to the needs of other communities across Kentucky and beyond.
**ART**

**CRITICAL MASS II: A DISCUSSION ON REGIONAL CRITICAL DISCOURSE**

*Poster: 11*

Wills, Savannah

*Faculty Mentor(s): Dr. Jane Jensen, Christine Huskisson*

This project was formed with one of the driving questions to try and understand the practical impact that UnderMain is making in the community, and further to understand the notion of accessible art criticism, and what role that may have in the Lexington and Louisville communities. Critical Mass II was a continuation of the conversation which was started in 2016 when Critical Mass I happened at the University of Kentucky. Critical Mass II was organized to delve deeper into issues of authority and audience; as well as how an artist's geographic place may impact perception of the work. Research prior to the event was conducted by the student, including interviews with most of the previous panelists, and research into relevant questions about the local artistic community. The panelists on Critical Mass II were artist, Vinhay Keo, local curator and art critic, Emily Elizabeth Goodman, artist and professor at the University of Louisville, Tiffany Calvert, and independent curator, Dan Cameron. Moderated by Joey Yates, this event provided a platform for the community to come together to critically consider the changing landscapes of the "art world," and the role that Kentucky communities can potentially have in the larger artistic conversation.

**BEHAVIORAL SCIENCE**

**** TWO RIGHTS MAKE A LEFT

*Poster: 12*

Authors: Shane Hutchins, Lauren McColgan, Nicole Mitchell, Michelle Sydnor

*Faculty Mentor(s): Dr. Yang Jiang*

The right and left hemispheres of the brain have specific functions; however, limited studies exist that explain the differences in brain physiology between a dominantly right and left handed person. Therefore, the purpose of this study is to determine how one’s dominant hand affects brain wave frequencies and reaction time during a task. It is hypothesized that one’s dominant hand should produce faster reaction rates than the non-dominant hand. Understanding the frequencies of certain brain areas can help better explain how the brain functions. Out of the group taking the Bluegrass Test, one student had a dominant left-hand (female-18 years old) wold. To record brain activity, an electroencephalogram(EEG) measured the electrophysiology of each participant while the remainder of the study population was right-handed (one female-19 years old and 3 males-19 years) during the Bluegrass Test- a short-term memory task measuring the participant’s reaction time and brain areas being stimulated. Therefore, it’s hypothesized that there should be no change in the frequencies in the occipital brain waves during this specific task; however, changes should be seen in the F3, F4, FC5, and FC6 site. For each participant, the F3 (left frontal site), F4 (right frontal site), FC5 (left frontal site), FC6 (right frontal site), O1 (left occipital site), and the O2 (right occipital site) brain waves were measured (in Hertz) to analyze the different frequencies throughout the Bluegrass Test. Overall, the average results showed that the dominant hand produced faster reaction times than the non-dominant hand. In addition, the O1 and O2 signals were relatively similar while the other sites showed changes as anticipated. For future direction, one could interpret this data in order to individualize medicine, such as for surgery.
** ARE YOU MORE MENTALLY FIT THAN AN OLDER MUSICIAN?**

**Poster: 13**

**Authors:** Davis Collins, Nicole Mitchell, Gbutue Vorkpor

**Faculty Mentor(s):** Dr. Yang Jiang

Music training enhances people's cognitive ability and is a growing literature. However, it is also known that cognitive ability deteriorates over time. The current study is interested to compare the cognitive ability of college students (average of nineteen years old) and older musically talented individuals (average of sixty-one years old) to see if there is correlation to a more enhanced cognitive reserve. With the coming development of analysis of the brain using the Montreal Cognitive Assessment (MoCA), researchers have gained a better understanding of how the mental fitness of an individual is maintained. Also how playing certain instruments professionally can further enhance the ability to prevent the decline in mental fitness over the span of an individual's life. Through the study of the MoCA, it was hypothesized that individuals with high MoCA scores in two specific categories would also receive a high score for the cumulative assessment. For the experiment, subjects were brought in varying in age and varying in music ability and had each one performed the MoCA test. There seemed to be a strong correlation between the scores in the language section of the test compared to their total scores. Upon further analysis of the data feedback, it was found very surprising that the older individuals scored higher in every category of the MoCA compared to the younger individuals. This could also give further backing that musicians tend to have a greater mental capacity to uphold their mental fitness.

---

**BIOCHEMISTRY**

**RIN GTPASE REGULATES NEURONAL APOPTOSIS**

**Poster: 14**

**D’Souza, Shane**

**Faculty Mentor(s):** Dr. Douglas Andres, Dr. Sajad Mir

The Ras family of small GTPases serve as molecular switches to regulate a wide range of cellular signaling cascades, playing essential roles in diverse physiological processes, with dysregulation of Ras-superfamily G-protein-dependent regulatory cascades found to underlie the development of numerous human diseases. However, the physiological function for many "orphan" Ras-related GTPases remain poorly characterized. These include members of the Rit subfamily GTPases, including Rin (RIT2 gene) and Drosophila dRic GTPases. Here, we identify an unexpected role for the Rin GTPase in neuronal cell death. To expand upon earlier Rin expression studies, we generated a RIT2 KO–LacZ knock-in transgenic mouse that expresses LacZ in place of RIT2. Using this mouse and LacZ immunofluorescence, we demonstrate that Rin is expressed widely in the CNS, but specifically in neurons. To explore the neuronal function of Rin, we engineered a recombinant lentivirus expressing a constitutively active (GTP-bound) Rin mutant (RinQ78L). Following lentiviral transduction of cultured primary cortical neurons we find that RinQ78L significantly increased neuronal apoptosis relative to control virus. The C-terminus of Rin has been shown to direct plasma membrane association, and deletion of the C-terminus domain of activated Rin (RinQ78LΔCT) was found to significantly blunt RinQ78L-mediated neuronal apoptosis. Taken together, these data suggest that Rin functions to regulate a pro-apoptotic signaling pathway in neurons, and that the Rin C-terminus domain is necessary for its function. The importance of this work is highlighted by recent genome-wide association studies implicating Rin signaling in disorders from Parkinson’s disease to autism and schizophrenia. Studies are planned to explore whether Rin-dependent neuronal death contributes to these neurological disorders.
PROTEIN TYROSINE PHOSPHATASE INHIBITORS AS A TARGETED THERAPY FOR T-CELL ACUTE LYMPHOBLASTIC LEUKEMIA

Poster: 15
Lammers, Sydney
Faculty Mentor(s): Dr. Jessica Blackburn

Acute Lymphoblastic Leukemia (ALL) is a cancer of the blood and bone marrow, characterized by the proliferation of malignant, immature lymphoid cells in the blood and bone marrow. Approximately 6,000 cases of ALL are diagnosed each year in the United States, and about half of those cases occur in children. Representing about 25% of all pediatric cancers, ALL is the most common childhood cancer. Current treatment regimens for ALL include cytotoxic induction therapy, which induce long-term, adverse side effects. It is vital that new molecular targets are identified and investigated for use in targeted cancer therapy. Protein tyrosine phosphatases (PTPs), enzymes that catalyze the removal of phosphate groups from tyrosine residues of protein substrates, represent a new therapeutic target. PTPs are generally deregulated in acute lymphoblastic leukemia, and one PTP in particular, PTP4A3, is significantly overexpressed in patient B-ALL and T-ALL samples. This study investigates the use of FDA-approved protein tyrosine phosphatase (PTP) inhibitors as a potential targeted therapy via inhibition of PTP4A3. Pentamidine, Aledronate, Curcumin, Emodin, Suramin, and Sodium Stibogluconate were studied for use directly against PTP4A3 to determine their potential for diminishing the phosphatase activity of the protein. Further, they were tested in vitro against human ALL cell lines, both independently and in combination with standard chemotherapy drugs. Each PTP inhibitor diminished the phosphatase activity of PTP4A3, and Pentamidine and Emodin were the most successful in reducing the viability of leukemia cells.

DEVELOPING A GLOBAL HOMOLOGY AND COLLINEARITY ANALYSIS FRAMEWORK FOR COMPARATIVE GENOMICS

Poster: 16
Sovacool, Kelly
Faculty Mentor(s): Dr. Hunter Moseley

Gene duplication is an important evolutionary event that can allow genomes to acquire new functions or delegate distinct functions to different gene copies. Identifying gene duplication events in gene-specific phylogenetic trees first requires identifying homologous genes within and between species. Many databases exist for browsing canonical homologous genes, but these are not suitable for conducting analyses on unpublished or non-canonical genomes. We set out to develop a computational tool for identifying sets of orthologous and paralogous gene products across any set of whole genomes and corresponding transcriptomes to facilitate collinearity analysis and detection of gene duplication events. To handle the presence of gene and protein isoforms, our methods work at the gene-product level and define a homolog as a collection of gene products that have highly similar function within the same genome. Our methods include conducting an all-vs-all BLAST analysis and leveraging protein sequence similarity scores to identify protein isoforms, paralog sets, and ortholog sets organized at the transcript level. We handle orthologous domains by splitting gene products where orthologs align to discrete regions, then creating multiple ortholog sets from those regions. Using an initial limited testset consisting of partial transcriptomes, 98% of the ortholog sets identified by our analysis matched canonical ortholog sets downloaded from OrthoDB. While this test was limited in size and scope, these results indicate that our analysis appears comparable to existing ortholog detection methods with respect to sensitivity, while handling a wider range of homology-based issues like the presence of orthologous domains in multi-domain proteins. Next, we will improve protein isoform identification, accurate splitting of multi-domain proteins, and the overall computational speed of the algorithms, while increasing the size and rigor of testing to include dozens of whole genome sets of gene-products. The completion of this tool is expected to contribute to comparative genomics by providing a robust global homology analysis at the gene-product level that will be useful for conducting a wide range of analyses such as the detection of gene duplication events.

** Denotes STEMcats project
** TO STRONGLY DISAGREE OR TO NOT STRONGLY DISAGREE: COLLEGE MALES’ RESPONSES TO ACT ON COERCIVE BEHAVIORS**

**Poster: 17**

**Authors:** Landyn Abner, Rebecca Bailey, Olivia Davis, Jada Phillips, Emily Simpson

**Faculty Mentor(s):** Dr. Philip Crowley

Do males with sexually coercive behaviors perceive a female’s fertility differently than non-coercive males? In previous studies, it has been shown that men can perceive women’s fertility through sense of smell. Previous experiments have shown that when males smell shirts worn by ovulating females, that the scents from the shirt are perceived as more pleasant and attractive. However, the ability to perceive the scent of an ovulating female has not been tested against personality characteristics of coercive and noncoercive males. In this study, males were asked to complete a survey to reference their responses to reproductive behaviors using metrics from “The Short Dark Triad”, “Illinois Rape Myth Acceptance Scale” and the “Ambivalent Sexism Inventory”. A random sample of those males were selected to smell different t-shirts; shirts were worn by a fertile female, worn by a menstrual female, treated with artificial pheromone, or controlled (no manipulation). This comparison showed that males with sexually coercive behavior perceive the scents differently than non-coercive males.

**A WOMAN’S PERCEPTION AND SELF DECEPTION OF HER OWN FERTILITY**

**Poster: 18**

**Authors:** Izah Ahmed, Jordan Corley, Jaida Garrett, Hannah Jolly, Katie Land, Hannah O’Day, Loren Shelley, Alyssa Vance

**Faculty Mentor(s):** Dr. Melody Danley

A woman’s fertility varies cyclically, but there is evidence that women may have evolved to hide their own fertility from themselves. In 1979, Dr. Nancy Burley published a paper on the evolution of concealed ovulation and fertility self deception. The hypothesis explains that human females avoid pregnancy due to the dangers from gestational complications. So, to combat the avoidance of pregnancy, concealed ovulation ensures a woman’s reproductive success by hiding her own fertility from males, and from herself. Following up on Burley’s research, the purpose of this study is to test this hypothesis by analyzing how truly accurate women are in detecting their own fertility. Fertility was determined by analyzing urine for luteinizing hormone (LH), which indicates the initial peak in ovulation. Women would provide urine samples on the days in which they perceived themselves to be fertile, and samples two days after their initial perception. These samples were then tested for the presence of luteinizing hormone using LH ovulation kits to indicate how accurately they perceived their ovulation window. This study was conducted over the course of eight weeks, which allowed a subject’s perception of their fertility over a full cycle to be tested. It was anticipated that women will not be able to accurately predict when they are fertile. This research could be followed up with a longitudinal analysis of multiple women over the lengths of multiple cycles.
DAILY RHYTHMS OF BEHAVIOR IN OBESITY-RESISTANT BALB/C MICE
Poster: 19
Archer, Luke
Faculty Mentor(s): Dr. Julie Pendergast

Daily rhythms are 24-hour cycles of the body's physiological processes and behaviors, such as eating and sleeping. Abnormalities in daily rhythms, such as those caused by shift work, increase the risk for obesity. Previous studies have also found that eating a high-fat diet disrupts daily rhythms and this is a mechanism contributing to diet-induced obesity. These previous studies were performed in male C57BL/6J mice, which are obesity-prone because they gain weight on high-fat diet. Other strains, such as BALB/c mice, are obesity-resistant because they do not become obese when fed high-fat diet. The aim of my experiment was to determine if daily rhythms in obesity-resistant BALB/c mice were protected from disruption by high-fat feeding. At 7 weeks old, male BALB/c mice were single-housed in light-tight boxes in 12h light/12h dark and their daily rhythms of activity and eating behavior were recorded. At 8 weeks old, the mice in the experimental group were switched to high-fat diet (45% kcal fat) and the control mice were maintained on low-fat diet (10% kcal fat). Body weights were measured weekly throughout the experiment. Consistent with previous studies, body weights did not differ between BALB/c mice fed low-fat diet and high-fat diet. There was also no effect of high-fat diet consumption on the phases, amplitudes, or mesors of locomotor activity rhythms in BALB/c mice. In addition, eating behavior rhythms in BALB/c mice were partially protected from disruption by high-fat feeding. Together, these findings show that daily rhythms of activity and eating behavior were not altered by high-fat diet consumption in obesity-resistant BALB/c mice. In future experiments, other strains of obesity-resistant mice will be analyzed. If we find that the daily rhythm of eating behavior is not disrupted by high-fat diet in obesity-resistant strains, then we will search for the genes responsible for this protection.

HOW CRAYFISH DOMINANCE INFLUENCES BURROW SELECTION AND BEHAVIOR
Poster: 20
Authors: Evelyn Bahena, Samantha Brothers
Faculty Mentor(s): Dr. Melody Danley

Procambarus clarkii, also known as red swamp crayfish, were used to determine how dominance affects burrow selection and construction. Crayfish construct simple single opening burrows during periods of drought. It was predicted that the smaller crayfish would be submissive to the larger crayfish when establishing dominance. Dominant crayfish would then select preferred burrow sites in the clay when stimulated with removal of surface waters. To minimize past dominance relationships, individual crayfish were transferred from a common stock tank to individually housed 1.5-L aquaria with oxygenated, carbon-filtered tap water for at least 72 h. At the start of the experiment, two randomly selected crayfish were weighed, measured, and then placed in the experimental tank together. Experimental tanks (28 cm x 25 cm x 30 cm) contained medium grain sand in half of the tank bottom, and clay in the other half of the tank bottom, to a depth of 4 cm. An additional 4 cm of surface water was also present, for a total depth of 8 cm of substrate + water. Experimental crayfish were then allowed to establish a dominant-submissive relationship for 48 h. After 48 h, the surface water was removed to prompt burrowing behavior. Crayfish activities were recorded for a total of 72 hours (48 hours with surface water + 24 hours with surface water removed). Although results are still being analyzed, we predicted that the larger crayfish will burrow in the clay and guard its burrow against the smaller crayfish. Such results are important because the subordinate crayfish would not be able to burrow in the preferred substrate. This could cause the subordinate crayfish to be unable to obtain preferred substrate during periods of drought.
** PARADOXICAL EFFECTS OF CoCl2 ON AXOLOTL TAIL REGENERATION**

**Poster: 21**

**Authors:** David Beyerle, Justin Bolin, Tabbi Coffman, Caroline Delpuech, Lilly Do, Noah Franklin, Julie Hancock, Natalie Hahs, M’kensie Johnson, Mirindi Kabangu, Lindsey Long, Asim Movania, Sarah Ritter, Sydney Sheldon, Evelyn Turnbaugh

**Faculty Mentor(s):** Dr. Randall Voss

The Mexican axolotl provides a powerful model to investigate mechanisms that are associated with tissue regeneration. A recent chemical genetic screen showed that HDAC inhibitor romidepsin administered for only one-minute post amputation (1 mpa) blocks axolotl tail regeneration. Also this study showed that transcripts for Cited 2, a negative regulator of Hif1α transcriptional activation, increased in response to romidepsin treatment. Looking at this mechanism further, we tested the potential for cobalt chloride (CoCl2), a chemical stabilizer of HIF1a, to rescue romidepsin-inhibition of tail regeneration. Tailfin regeneration was rescued when amputated tails were co-treated with romidepsin and CoCl2 for 1 mpa, however extending the CoCl2 treatment time either inhibited regeneration (30 mpa) or was lethal (24 hours post amputation; hpa). Other chemical stabilizers (DFO, 1,4 DAPC) resulted in no rescued tailfin regeneration, suggesting CoCl2 affected regeneration via a hypoxia-independent mechanism. CoCl2 treatment 1 mpa was associated with an increase in epithelial cell death mainly at the wound site, but also found in other regions of the body. A longer 0-30 mpa CoCl2 treatment disrupted the formation of the wound epidermis, causing epithelial cells at the distal tail tip to die and visibly ‘flake’ off into the media CoCl2 treatment of non-amputated embryos or amputated embryos that had completed wound re-epithelialization (60 mpa) did not cause significant epithelial cell death, disrupt the wound epidermis, or inhibit tail regeneration. These results show that acute, CoCl2 treatment 1 mpa can partially rescue HDAC inhibition of tail regeneration, however, prolonged CoCl2 treatment inhibits wound re-epithelialization and tail regeneration. The amputation-restricted effects of CoCl2 involves an injury response mechanism that rapidly induces cellular level changes that are necessary for tissue regeneration.

**EXAMINING THE ROLE OF MUSCARINIC ACETYLCHOLINE RECEPTORS**

**Poster: 22**

**Bhutto, Umair**

**Faculty Mentor(s):** Dr. Robin Cooper

Acetylcholine is the excitatory transmitter in sensory neurons as well as among neurons in the CNS of Drosophila melanogaster larvae. Activity of neurons and communicating with target neurons are important in sculpting the developing neural circuitry as well as maintaining established connections. We are interested in investigating the role of muscarinic subtypes in regulating sensory-motor circuits. We will report on the effect of muscarine, an acetylcholine agonist, on the sensory-CNS-motor circuit. Genetically modified lines will be used to knock down type A and type C muscarinic receptors in different sets of neurons: cholinergic neurons, motor neurons, and all neurons. A pharmacological approach will be taken in order to assess behavioral and sensory motor circuit physiology changes in the experimental groups. For behavior, locomotion and feeding will be assessed. For sensory-motor circuit physiology, we will test the modulation of neural circuits in an open preparation. Isolating the CNS in this preparation allows for examination of modulation of motor activity without the influence of confounding variables. A stimulating electrode will be used to activate a sensory neuron, and EPSP activity will be recorded by an electrode inserted in muscle 6. Information regarding the expression of specific receptor subunits within the larval CNS is limited. This research will aid in identifying which muscarinic receptor subtypes are important in modulating sensory-motor circuits.
DEATH BY DATING: BEHAVIORAL TRADE-OFF BETWEEN MATE SEARCH AND DEATH-FEIGNING BASED ON FOOD AVAILABILITY
Poster: 23
Blanford, Evan
Faculty Mentor(s): Dr. Chuck Fox

In limited resource environments, individuals must make decisions on how to allocate personal resources, resulting in behavioral tradeoffs. Death-feigning and mate search is an example of a behavioral trade-off: an organism avoids harm from predators but simultaneously restricts their ability to move in search of mates. For female insects, this trade-off can be further pronounced by the transferring nuptial gifts during mating, which provides the female with crucial nutrients for both her and the offspring, making re-mating in food-limited environments a priority for females. Therefore, in species that provide nuptial gifts, food availability and previous mating should interact to determine how an individual allocates time to the predator avoidance and mate search behavior trade-off. We studied a bean beetle (Callosobruchus maculatus), where males provide females with nuptial gifts. We provided females with or without food in their environment and females received a small, large, or no nuptial gift. To quantify mate search movement, we placed females in a behavior arena filled with cowpea beans (Vigna unguiculata). We predicted that virgin females (no nuptial gift) without food will move farther than females without food and that received either a large or small nuptial gift. Additionally, we predicted that virgin females with food will move less than females with food and that received a small or large nuptial gift. Our results show a trend that females with a small or large nuptial gift moved farther when environmental food was not available than when it was available. However, females with no nuptial gift displayed the opposite trend (moved farther when food was available). This may signify that females prefer to avoid re-mating if environmental food is available or that virgin females prefer to mate more if previously given environmental food. Further research is underway to understand the predator avoidance aspect of the trade off.

IDENTIFYING THE SIGNAL THAT INITIATES INDIVIDUALIZATION IN SPERMATIDS
Poster: 24
Breetz, Katherine
Faculty Mentor(s): Dr. Douglas Harrison

Spermatogenesis is evolutionarily conserved in animals, with similar steps in DNA reduction by meiosis and dramatic changes in cell form during sperm differentiation. In Drosophila melanogaster, the fruit fly, sperm develop in a cluster of 64 interconnected germ cells surrounded by two somatic support cells known as cyst cells. Spermatid differentiation requires several steps, including individualization, during which the 64 spermatids must separate and have excess cytoplasm removed. This is completed through an individualization complex (IC) that progresses from the head of the spermatid near the base of the testis to the spermatid tail at the tip of the testis. The activation of the JAK/STAT signaling pathway in somatic cells is needed for the formation and progression of ICs as the cyst cells must communicate to the spermatids to begin individualization. The purpose of this project was to determine which genes in the somatic cells relay the individualization message onto the germ-line. We tested two sets of genes previously identified as down regulated in testes where the JAK/STAT pathway was impaired. The Wnt pathway has roles throughout development and in regulation of the JAK/STAT pathway. However, because spermatids lack transcription, several ion regulators were also tested because they do not require transcription to signal. Candidate genes were genetically tested by knocking down activity in testis cells, with the expectation that individualization will be impaired if the gene is needed in this process. The knockdowns were created using RNA interference, a method of encoding a hairpin-forming transcript in each gene. After scoring basal, non-basal and total ICs, the results were compared to the negative and positive control. Although change in IC number per testis for some candidates was statistically significantly different from the controls, the magnitude of these differences was very small and may not represent biological significance.
** DAILY RHYTHMS OF EATING BEHAVIOR ARE NOT AFFECTED BY HIGH-FAT DIET FEEDING IN OBESITY-RESISTANT MALE MICE**

**Poster: 25**  
**Buckley, Tiffany**  
**Faculty Mentor(s):** Dr. Julie Pendergast

Abnormal eating behaviors, like skipping breakfast and late-night snacking, are associated with obesity in humans. Disruption of daily eating rhythms also contributes to obesity in mice. We and others found that male C57BL/6J mice fed high-fat diet have low-amplitude or arrhythmic eating behavior and become obese. In contrast to obesity-prone C57BL/6J mice, some strains of mice are resistant to high-fat diet-induced obesity. In this study, we determined if daily rhythms of eating behavior were resistant to the effects of high-fat diet feeding in obesity-resistant mice. At 7 weeks old, male obesity-prone (C57BL/6J) and obesity-resistant (SWR/J) mice were individually housed in light-tight boxes in 12hL:12hD. All mice were fed low-fat diet (10% kcal fat) for 1 week. At 8 weeks old, mice were given either low-fat or high-fat diet (45% kcal fat) for 7 weeks. We recorded eating behavior with infrared video cameras. Consistent with our previous studies, the amplitude of the daily rhythm of eating behavior was markedly attenuated in male C57BL/6J mice fed high-fat diet. In contrast, male SWR/J mice had high-amplitude daily rhythms of eating behavior during both low-fat and high-fat diet feeding. In addition, the phases of the eating behavior rhythms were not altered by high-fat feeding in SWR/J mice. Even after 6 weeks of high-fat diet feeding, the SWR/J mice still had high-amplitude eating behavior rhythms. This study shows that daily rhythms of eating behavior were resistant to the effects of high-fat diet consumption in SWR/J mice. Future studies will determine if protection of the daily rhythm of eating behavior confers resistance to diet-induced obesity. If so, then identifying the genetic loci regulating this protection could provide insight into genes contributing to obesity.

** THE EFFECT OF LOW TEMPERATURE ON NEURAL MUSCULAR FUNCTION IN SEA TURTLES**

**Poster: 26**  
**Authors: Aziza Burney, Hunter Mulloy, Rachel Taylor**  
**Faculty Mentor(s):** Dr. Elizabeth Debski

In January of 2018, the Tampa Bay Times reported over 1000 sea turtles were rescued from drowning in the cold waters of the Florida Panhandle. Affected animals included green turtles, Kemp’s ridleys, loggerheads, and hawksbills; most of which were juveniles. The temperature of the water was 39 degrees Fahrenheit at the time of this incident and the turtles were said to suffer from “cold-shock.” The effects of cold shock has not been defined. We hypothesize that at low water temperatures, action potentials at the neuromuscular junction fail to fire, resulting in a loss of motor function and drowning. In order to test this hypothesis, we utilized the NEURON program developed at Yale University. The NEURON program is a computational simulation that integrates various parameters affecting neuronal excitability including ion equilibrium potentials, channel conductances and neuronal morphology. To make our model as accurate as possible, we searched the scientific literature for values of these parameters in turtle motor neurons. To test our hypothesis, a range of low temperatures were entered into the program to see if action potential generation was affected. The results of our study will be presented at a later date. We expect to find that the cold temperature prevents action potentials from firing, clarifying why the turtles have lost swimming ability and drown.

** Denotes STEMcats project
** BEHAVIORAL RESPONSES OF CRAYFISH DURING AND AFTER EXPOSURE TO THE ANESTHETIC EUGENOL**

**Poster: 27**

**Authors:** Austin Caudill, Hunter Filley  
**Faculty Mentor(s):** Dr. Melody Danley

Red swamp crayfish (*Procambarus clarkii*) were used to test behavioral responses before, during, and after exposure to eugenol. Eugenol is an anesthetic that suppresses the nervous system and has been shown to slow response times. Eugenol is not yet federally approved for use on food animals, but more testing is necessary. The purpose of our experiment was to determine the changes in crayfish behavior when exposed to 300 mg/L eugenol for different exposure times (15, 30, or 45 minutes). For each replicate trial, two experimental tubs were set-up. Each rectangular tub was filled with 5 liters of carbon-filtered tap water. One tub was used during eugenol exposure and the second tub was used as a eugenol-free pre-exposure acclimation and post-exposure recovery bath. During each replicate trial, one crayfish was transferred to the pre-treatment acclimation tub. Behavioral responses were then checked after a 10-min acclimation period. The experimental crayfish was then transferred to the eugenol exposure tub and exposed to the eugenol for the appropriate treatment time. At the end of the exposure time, behavioral responses were again quantified. Finally, crayfish were transferred back to the eugenol-free tub and allowed to recover for 30 min. During recovery, behavioral responses were checked every 10 min (10, 20, and 30 min) were exposed to the eugenol for 15-minute intervals with the maximum exposure time being 45 minutes. Crayfish were tested for responses to a tail tap, eye tap and cheliped tap. It was initially predicted that as exposure time increases, response to physical stimulation would decrease. This is due to eugenol’s anesthetic properties. The test was done to create the parameters for treatment and the results establish affective treatment concentrations for both future research and commercial applications.

**DO COLLEGE STUDENTS HAVE IRREGULAR EATING RHYTHMS?**

**Poster: 28**

**Authors:** Ayinde Charles, Samantha Eversole, Mario Maitland, Justin Perpar, Andre Rodriguez, Kennedy Sabharwal  
**Faculty Mentor(s):** Dr. Julie Pendergast

Circadian rhythms are 24-hour rhythms of behavior and physiology. They determine when you feel tired and when you are hungry. Disruption of circadian rhythms increases the risk for health problems. For example, a previous study showed that late-night eating was associated with hyperglycemia. In addition, breakfast skipping was associated with increased prevalence of obesity. The goal of this study was to characterize eating rhythms in college students and determine if irregular eating rhythms, such as breakfast skipping and late-night eating, were associated with circadian timing and disruption. We first surveyed 187 college students and asked about their eating rhythms and circadian rhythms. We used the Munich Chronotype Questionnaire (MCTQ) to analyze circadian rhythms. We analyzed chronotype as the mid-point of an individual’s preferred sleep timing. We also analyzed social jetlag, which is the difference in sleep timing on school vs. free days. Social jetlag occurs when an individual’s internal circadian rhythm does not coincide with his social and work schedules and is associated with obesity. We found that 40% of college students never ate breakfast. Neither chronotype nor social jetlag were associated with breakfast skipping. In addition, 80% of students we surveyed ate after 11pm at least one night per week. Moreover, students with later chronotypes ate late at night more days of the week. Late-night eating was not associated with social jetlag. Next, we examined eating rhythms in 6 (3 male) undergraduate students. Students logged the content and timing of food for 2 weeks using the MyFitnessPal smartphone app and completed the MCTQ to analyze circadian rhythms. We found that among these 6 students, neither chronotype nor social jetlag were significantly associated with breakfast-skipping or late-night eating. In summary, we found that breakfast skipping and late-night eating were common in college students. In our large dataset, late chronotypes were more likely to skip breakfast and eat late at night.
EXPOSURE TO CHROMIUM (VI) ENHANCES THE MOTILITY OF COLORECTAL CANCER CELLS THROUGH ACTIVATION OF FAK

Poster: 29
Chen, David
Faculty Mentor(s): Dr. Xianglin Shi

Colorectal cancer (CRC) is the second leading cause of cancer-related death in the United States. The incidence and mortality of CRC are high in the Appalachian region, including Kentucky. CRC patients in this region are mostly in advanced stages at diagnosis. In addition, high concentrations of heavy metals, such as hexavalent chromium [Cr (VI)], are found in the drinking water and soil in rural Appalachian Kentucky. Since Cr (VI) is a carcinogen, we hypothesize that chromium (VI) enhances the motility of CRC cells. Moreover, focal adhesion kinase (FAK) has been well known in regulating cell motility. Therefore, the role of FAK in Cr (VI)-enhanced motility of CRC cells was examined. Two CRC cell lines, DLD-1 and HT29, were exposed to Cr (VI). The cell motility was determined by wound healing assay. Cellular viability was examined using MTT assay and western blot was performed to investigate the cell signaling. Exposure to Cr (VI) at 0.5 or 1 M for 24 or 48 hours significantly increased the motility of CRC cells in a dose-dependent manner compared with the control groups. MTT results indicated that Cr (VI) treatments did not increase cellular proliferation. In addition, Cr (VI) activated FAK and its downstream signals, Src, p130cas and paxillin. Co-treatment with a specific FAK inhibitor blocked the activation of FAK-Src signaling and attenuated Cr-enhanced cell motility. Similar results were observed in both DLD-1 and HT29 cells. Exposure to chromium (VI) activated FAK and enhanced the motility of CRC cells. Inhibition of FAK attenuated Cr (VI)-enhanced cell motility. Therefore, activation of FAK signaling may be a mechanism underlying colon cancer aggressiveness observed in the patients of Appalachian Kentucky, a region with a high content of heavy metals.

THE EFFECT OF LIGHT QUANTITY ON SEX RATIOS IN A PLANT POPULATION

Poster: 30
Cornett, Justin
Faculty Mentor(s): Dr. Nicholas McLetchie

There are few studies that document the association between sex ratio variation and environmental gradients. Parents are expected to equally invest in male and female offspring. Previous studies have shown that bryophyte (non-vascular plants) populations tend to have a female bias. In this study, we documented the sex ratio of a species belonging to the most specious genus, in the second most diverse group of bryophytes, Plagiochila Dumort. Considering that females tend to be more water stress tolerant than males, we tested for a relationship between sex ratio and light exposure. The goals of this research were to 1) determine the sex ratios of Plagiochila porelloides (Torr. ex Nees) Lindenb. across several populations, within one drainage system in a deciduous forest, and 2) test for an association between sex ratio and two levels of light measurement, canopy openness and light quantity. Sex ratios of 29 populations were estimated using randomly selected transects. The sex of each ramet was identified by examination under a dissection microscope. Hemispherical photos were analyzed with WinScanopy software to calculate canopy openness and light quantity. Sex ratios varied from all male, to all females, and was generally male bias. The average proportion of males was 0.5478. The overall proportion of males was 0.7242. Linear regression tests were performed to examine the relationship between sex ratios and the two light measures. Both relationships were not significant. Interestingly, while most studied bryophytes species are found to be female bias, this study shows P. porelloides with a male bias. The lack of a relationship between exposure (light measures) and sex ratio suggest that the sexes do not respond differently to this environmental factor. Further research on sex ratios and environmental gradients could help us understand how sex ratios, environmental factors, and population persistence are potentially connected.
** FEMALE RESPONSES TO FACIAL COMPOSITES

**Poster: 31**

**Authors:** Destiny Coleman, Mackenzie Graebe, Shaylla Shelton

**Faculty Mentor(s):** Dr. Philip Crowley

Previous studies have shown that certain facial structures in men may be an indicator for personalities high or low in narcissism, psychopathy, and Machiavellianism, known as the “dark triad.” We looked at whether male composite images would be rated differently by women at different points in their menstrual cycle based on the personality characteristics which those men possessed. Is it possible that females perceive males differently throughout their ovulatory cycle based on differing facial structures associated with varying personality traits? A survey was sent to the female students at the University of Kentucky to investigate this question. Their responses were based on likeliness to be in a long-term relationship, short-term relationship, one-time hookup, and how attractive they find the male composite. It was determined that for images of males who ranked high or low for certain personality traits, fertile and menstrual women responded significantly different. It can be concluded that women might perceive male facial features differently depending on where they are in their menstrual cycle.

**THE EFFECT OF TEMPERATURE ON LH VIABILITY IN URINE SAMPLES**

**Poster: 32**

**Authors:** Mark Crane, Gabrielle Evers, Corbin Harris, Malgorzata Krolikowska, Hannah O’Day, Dakota Smith

**Faculty Mentor(s):** Dr. Philip Crowley

Female ovulation can be determined by the presence of luteinizing hormone (LH) in a woman’s urine; however, methods on how to properly store urine to preserve LH remain inconclusive. This study investigates temperature as a factor which might influence the detection of LH in a sample over time. This study utilized three different temperature environments: storage at room temperature, storage in the refrigerator, and storage at refrigerated temperature that was slowly brought to room temperature (variable temperature). Our anticipated results signify that refrigerating the urine samples provides the most consistent results in comparison to the other storage methods.
EXPLORING THE USE OF PCN TREATMENT IN AMELIORATING COGNITIVE DYSFUNCTION IN HAPP-OVEREXPRESSING MICE

Poster: 33  
Ding, Yujie  
Faculty Mentor(s): Dr. Anika Hartz

The accumulation of amyloid-beta (Aβ) in the brain is a distinct characteristic of Alzheimer’s disease (AD) and has been attributed to the impaired clearance of Aβ at the blood-brain barrier (BBB). Furthermore, P-glycoprotein (P-gp), a BBB transport protein involved in the clearance Aβ from the brain, has been demonstrated to be significantly reduced in AD. Here, we evaluate the therapeutic benefit of activating the nuclear receptor PXR with PCN to restore P-gp function reduce brain Aβ levels and improve the cognitive function in a transgenic AD mouse model. Over the course of a long-term feeding study, we treated male transgenic mice that overexpress the human amyloid precursor protein (hAPP) with the PXR activator pregnenolone-16-carbonitrile (PCN). A treatment control group was fed Cyclosporin-A (CsA), a P-gp antagonist. Doses of PCN (50 mg/kg) and CsA (25 mg/kg) were administered in their feed and mice were allowed to feed ad libitum. Cognitive and motor function in hAPP mice was measured utilizing a behavioral battery composed of the following assays: accelerating rotarod, open-field activity, Y-Maze, and Morris Water Maze, and the Radial Arm Water Maze. Significant genotypic differences in motor function between wild type (WT) mice and hAPP mice were found in rotarod and open field test performance. Furthermore, trends demonstrating partially restored cognitive function in PCN treated mice, as compared to hAPP untreated mice at 18 and 21 months of age in the Radial Arm Water Maze. Western blot analyses of BBB capillaries display both a restoration of p-gp expression and function across all age groups. These findings suggest that PCN may help mitigate the cognitive dysfunction present in the hAPP transgenic mouse model by restoring P-gp transport of Aβ from the brain.

** STUDIES OF SEX LETHAL GENE REGULATION THROUGH GFP REPORTERS

Poster: 34  
Authors: Layne Elmore, Elizabeth Grau, Eleanor McCaffrey, Mackenzie Ott, Danielle Peterson, Jada Thompson, Katherine Tobin, Makayla Triplett, Mikayla Vanhoose, Katelyn Via, Constance Woodard  
Faculty Mentor(s): Dr. Rebecca Kellum

In Drosophila melanogaster, the Sex lethal gene affects males and females differently, and when expressed inappropriately, the gene is lethal. In females, the gene must be expressed, and it must not be expressed in males. What determines whether or not the sex lethal gene is turned on or off is the early embryonic promoter, SxIpe. In females, SxIpe is active when the ratio between X and autosomal chromosomes is one, and in males, SxIpe is inactive when the ratio between X and autosomal chromosomes is one half. The ratio of activating transcription factors expressed from the X chromosome to repressing transcription factors expressed from the autosomes in early embryos is what actually determines if SxIpe is expressed. The heterochromatin proteins HP1 and HOAP also regulate SxIpe. When paired together the two proteins act as repressors; HP1 alone acts as an activator. When looking into how HP1 can switch from repression to activation mode, genetics was used to identify other activators of SxIpe that might help allow the switch. Two potential activators (Rbp9 and Rapgap1) were identified through a genetic assay. A SxIpe-GFP line was used to assay mutants for these proteins to determine if they are needed to activate the promoter. The fraction of mutant Rbp9 embryos expressing the SxIpe-GFP was significantly lower than 50%. One mutation for Rapgap1 also had a significant reduction in GFP-positive embryos, but the other one did not. Both Rapgap1 mutations are deletion mutants; PCR assays are being used to compare their deletions to understand why they behaved differently in the SxIpe-GFP assay.

** Denotes STEMcats project
SEX DIFFERENCES IN ADULT NEUROGENESIS IN SONG CONTROL NUCLEI UNDER DIFFERENT PHOTOPERIODS
Poster: 35
Eversole, Samantha
Faculty Mentor(s): Dr. Vincent Cassone

Songbirds are known to sing predominantly in the spring. In most species, the males sing the most, but females also show patterns of vocalization depending on the time of year. Interestingly, the increase in singing is paralleled with an increase in the size of brain structures controlling song (song control nuclei). Part of the change in structure size occur because of new neuron growth in the high volume center (HVC) and other song control nuclei. Previous research has shown that this change in growth does occur in males. No previous research has been performed on females. We wanted to determine if there were new neuron growth in both male and female house sparrows, Passer domesticus. We simulated both long and short days in male and female birds. Once six weeks were completed, the birds were euthanized, and brains were removed. The brains of all of the house sparrow birds were sectioned, fixed, and labeled with anti-mouse Doublecortin, a microtubule-associated protein expressed by neuronal precursor cells and immature neurons. and BCIP/NMY Alkaline Phosphatase substrate. The results are currently being analyzed.

** COMPARING SOFT-BODY TISSUE AND GUT PROKARYOTIC DIVERSITY IN FRESHWATER MUSSELS FROM THE LICKING RIVER IN KENTUCKY
Poster: 36
Authors: Jason Flynn, Madelyn Harris, Emily Hogan, Derek Larkin, Gavin Norman, Adriana Ramos Ramirez, Casey Ratterman, Zack Scott, Nicholas Strobl, Taylor Williams, Tyler Williamson
Faculty Mentor(s): Dr. David Weisrock, Luke Moe

Freshwater mussel diversity in Kentucky rivers is remarkable, with at least 103 species known to be native to the state. However, many of these are endangered with at least 20 species known to have been lost from the state in recent years. These species can be found in the same physical locations and environments along the bottom of rivers and streams. All species are filter feeders potentially consuming the same basic dietary resources. This project focused on the identification of prokaryotic diversity in the guts of mussels across ten species sampled from two locations in the Licking River. DNA was extracted from sample swabs taken from gut tissue and PCR was used to amplify a fragment of the 16S rRNA gene from prokaryotic genomes present in each swab. PCR fragments were then sequenced using an Illumina MiSeq. Sequence data were used to quantify prokaryotic diversity using a range of metrics. To test the hypothesis that a particular mussel species has the same level of gut prokaryotic diversity across both locations, measures of alpha diversity were compared from each site. If environmental and aquatic conditions are similar across sites, similar levels of alpha diversity for each species were expected. Similar levels of alpha diversity may reflect different taxonomic compositions; therefore, measures of beta diversity were calculated between sites in order to determine if the gut prokaryotic makeup was the same. Until now, little has been known about the microbiome of freshwater mussels and how it varies across species and environments. Prokaryotes have increasingly been shown to be important factors in the biology of eukaryotes and understanding how this diversity is shaped over space and evolutionary time may be important in understanding the evolution of diversity in this aquatic organism.
SEX DIFFERENCES IN THE DISTRIBUTION OF MELATONIN RECEPTORS IN THE BRAINS OF ZEBRA FINCHES, TAENIOPYGIA GUTTATA

Poster: 37
Gantcheva, Slavi
Faculty Mentor(s): Dr. Vincent Cassone

Circadian rhythms regulate multiple processes in the human body including body temperature, sleep-wake cycle, and hormone production, so understanding how they work can give insights on proper body functioning. Many species possess this internal, entrainable clock that is synchronized to the 24-hour day and provides a rhythmic basis for biological processes. The avian circadian clock daily and seasonally regulates avian song, among other behavioral and physiological processes. This behavior is sexually dimorphic with only males singing or at least predominantly singing. The hormone melatonin, which is secreted on a circadian basis by the pineal gland, regulates the circadian rhythm of song and many other behaviors in songbirds. This study compares the distribution of melatonin receptor proteins in male and female zebra finches, Taeniopygia guttata, by immunohistochemistry using three antisera directed at the three known melatonin receptor proteins: Mel1A, Mel1B and Mel1C. Brains of male and female zebra finches were sectioned at 30 μm through the rostrocaudal extent of the brain and processed for immunohistochemistry. The first antibody employed was one against the Mel1C receptor, and analyses of the other receptors is ongoing. (Results are still being processed and so will be added to the abstract later on).

INFLUENCING FACTORS OF PUBIC BONE REABSORPTION IN MAMMALS

Poster: 38
Gibbs, Mary Virginia
Faculty Mentor(s): Dr. James Krupa

In 1924, Frederick Hisaw discovered female pocket gophers (Geomys bursarius) reabsorb their pubic bones. This was explained as an adaptation to life below ground. This also led to Hisaw's discovery of relaxin and oxytocin. Interestingly, it appears that other non-subterranean mammals also exhibit pubic bone reabsorption. This being the case, the question why other mammals exhibit this phenomenon arose. Consequently, this project was, in part, to examine a diversity of mammal taxa to quantify which species exhibit pubic bone absorption. In addition, several measurements were made for each pelvis to determine if any morphological traits correspond with pubic bone absorption. Each pelvis was measured for maximum length and widths at both the acetabula and crests. 293 were examined representing 36 genera from 13 families of shrews, moles, rodents and bats. 87 females of 10 genera exhibited complete pubic bone reabsorption, while 12 males representing 3 genera exhibited pubic bone reabsorption. Females exhibited either complete absence (55%) or lack of fusion (23%) of the pubic bone, while males either exhibited reduced pubic bones (22%) or fully fused pubic bones (47%). Species of the pocket gopher family (Geomyidae) exhibited the greatest frequency of pelvic abnormalities. Rats and mice (family Cricetidae) and shrews (family Soricidae) also exhibited these abnormalities to a lesser extent. When broken down by genera, this pattern held true. Geomys, Peromyscus, and Blarina showed similar ratios to those seen at the familial level. Several hypotheses potentially explain why non-subterranean species lack pubic bones. Lack of vitamin D could result in signaling for bone reabsorption. Subterranean and nocturnal animals receive less vitamin D than terrestrial, diurnal mammals. As Hisaw originally hypothesized, there is clearly a physiological adaptation, but the causes of pubic bone absorption are more complex than originally thought.
OPEN-EYES SLEEP BEHAVIOR IN AFRICAN SPINY MICE (ACOMYS CAHIRINUS)
Poster: 39
Giles, Jesse
Faculty Mentor(s): Dr. Bruce O’Hara

Most mammalian species sleep with their eyes completely closed, or mostly closed. Through a previous study using Electroencephalograph (EEG) and electromyograph (EMG) data in conjunction with Infrared (IR) camera data and piezoelectric technologies, Acomys cahirinus, the Spiny Mouse, was observed to sleep with their eyes fully open. To further investigate these findings, an IR camera set-up was used to monitor the eye behavior of both A. cahirinus and Mus musculus, the common laboratory House Mouse, which sleeps with its eyes closed or mostly closed. We confirmed that A. cahirinus never fully closed their eyes during sleep but sometimes sleep with half-way closed eyes. Interestingly, it was observed through IR camera recording data that A. cahirinus pupil size fluctuates when sleeping as was recently observed in laboratory M. musculus (et al., 2018) when their eyes are partially open. Another experiment was set up to explore how fully open-eye sleep might be affected by light flashing, by adding an adjustable light to the IR camera setup. The EEG, EMG, and piezoelectric technologies were also used to monitor sleep during light flashing. Bright light flashing during sleep caused a decrease in rapid-eye movement (REM) sleep percentage and increase in non-rapid eye movement (NREM) sleep percentage. Notably, there was no significant change in overall sleep percentage. We confirmed that A. cahirinus do sleep with their eyes open and can continue to sleep when exposed to light.

** THE EFFECTS OF A BACTERIAL ENDOTOXIN ON SENSORY PERCEPTION IN LARVAL MODELS
Poster: 40
Authors: Alyssa Amaya, Abigail Greenhalgh, Oscar Istas, Will Casto Jr, Sam Gilbert, Prateek Katta, Gerald Conrad, Olivia Criswell, Sara Hieneman, Jason Middleton, Jaylee Murphy, Carrie Ordone, Zachary Paneitz, Hayley Roach, Hannah Thornberry
Faculty Mentor(s): Dr. Robin Cooper

Humans experience lethargy both during bacterial sepsis and after treatment. The prolonged effects of sepsis make it difficult to distinguish the cause as many factors are involved including immunological actions, treatment protocols, and even potentially direct actions of the bacteria endotoxin on cells. Insects can detect some forms of LPS and avoid eating foods tainted with LPS and even avoid laying eggs in contaminated environments. This suggests a direct action of being able to sense the bacteria. Larvae of blow flies, which are used as therapy for debriding dead tissue in wound care, are exposed to bacterial endotoxins, and few studies have investigated the actions of forms of LPS endotoxins on therapeutic blowflies to assess survival and physiological function. In this study, behavioral responses in larvae of Drosophila melanogaster and larvae of blowfly with and without exposure to LPS in their diet over various time periods (24 to 48 hrs) were examined. While LPS is known to increase nerve sensitivity in humans and other mammals, it is hypothesized that the larvae of Drosophila and blowfly will similarly exhibit heightened reception to stimulation following their exposure to LPS. Behavioral HAT assays have been developed to assess the reaction to such tactile stimuli. Food tainted with 100 µg/ml of LPS from two common strains (Pseudomonas aeruginosa and Serratia marcescens) were used. These are the specific bacterial strains which afflict humans and other mammals who have septicemia or potentially may be receiving maggot therapy for a wound care. Studies are still ongoing. This presentation will include the results of these studies.

** Denotes STEMcats project
** THE EFFECTS OF LPS ON CARDIAC FUNCTION IN DROSOPHILA AND BLOW FLY LARVAE

**Poster:** 41  
**Authors:** Alyssa Amaya, Abigail Greenhalgh, Oscar Ista, Zachary Paneitz, Will Casto Jr., Gerald Conrad, Olivia Criswell, Sam Gilbert, Sara Hieneman, Jason Middleton, Jaylee Murphy, Carrie Ordone, Prateek Katta Hayley Roach, Hannah Thornberry  
**Faculty Mentor(s):** Dr. Robin Cooper

The bacterial endotoxins lipopolysaccharides (LPS) are known to have direct effects on immortalized mouse myocardial cell line (HL-1 cells) and pacemaker “funny” current ($I_f$) related to human HCN2 ion channels. But few studies have used invertebrate models to investigate direct actions of LPS on cardiac function. Insects can detect some forms of LPS and avoid eating foods tainted with LPS and laying eggs in contaminated environments. Direct effects on nerve terminals are assumed to be due to an increase in Ca$^{2+}$ influx within the presynaptic terminals (Calcium “leak”) followed by blockage in the voltage gated Ca$^{2+}$ channels. Since the heart rate in larval Drosophila is very dependent on extracellular Ca$^{2+}$ (due to the depolarization of voltage gated Ca$^{2+}$ channels), the goal is to examine the effect of LPS on cardiac function in larvae. Larvae of blow flies, which are used as therapy for debriding dead tissue in wound care, are exposed to bacterial endotoxins, but their mechanisms of LPS resistance are not entirely clear. In this study, comparative effects on heart rate will be examined for both *Drosophila melanogaster* and blowfly (*Phaenicia sericata*) larvae. Acute exposures will be used with saline containing 100 µg/ml and 500 µg/ml of pure LPS from two common strains (*Pseudomonas aeruginosa* and *Serratia marcescens*) which afflict humans and other mammals who have septicemia. Thus far, a dose-response effect has been noticed on hearts exposed to LPS. In addition, potential for recovery by rinsing LPS exposed hearts with pure saline solution will be examined.

** THE EFFECTS OF BACTERIAL ENDOTOXIN ON NEURAL CIRCUITS IN A DROSOPHILA MODEL

**Poster:** 42  
**Authors:** Abigail Greenhalgh, Zachary Paneitz, Oscar Ista, Alyssa Amaya, Will Casto Jr., Gerald Conrad, Olivia Criswell, Sam Gilbert, Sara Hieneman, Jason Middleton, Jaylee Murphy, Carrie Ordone, Prateek Katta Hayley Roach, Hannah Thornberry  
**Faculty Mentor(s):** Dr. Robin Cooper

The bacterial endotoxins lipopolysaccharides (LPS) are known to have direct effects on synaptic transmission at neuromuscular junctions in some invertebrates and mammals. Generally, LPS increases Ca$^{2+}$ loading and random fusion of synaptic vesicles resulting in enhanced transmitter release in a sporadic nature. In some cases, enhanced evoked release, but the effects have been known to vary depending on the synaptic preparations. The effects of sepsis are complex from immunological responses to the direct actions of LPS on cells. In humans, the effects of having bacterial sepsis and being treated can have long term effects in neural function and mobility. We tested the effect of LPS endotoxin on two different neural circuits in larval Drosophila as a model organism. One involved with locomotion and one with an eating assay. Larvae of blow flies, which are used as therapy for debriding dead tissue in wound care, are exposed to bacterial endotoxins and few studies have investigated the actions of forms of LPS endotoxins on therapeutic blowflies to assess survival and physiological function. Larvae of *Drosophila melanogaster* (24 to 48 hours) were investigated in their locomotion and eating function. Food tainted with 100 µg/ml and 500 µg/ml of LPS from two common strains (*Pseudomonas aeruginosa* and *Serratia marcescens*) were used. 24-hour exposure with LPS did not show an altered function with either assay for Drosophila. We are now examining longer exposure times. The results of these studies will be presented.

** Denotes STEMcats project
** DETERMINATION OF THE RELATIONSHIP BETWEEN THE PVF PATHWAY AND SPERMATID INDIVIDUALIZATION IN DROSOPHILA

Poster: 43

Authors: Bria Heard, Kiana Norsworthy, Brittney O’Neill, Alicia Rivera

Faculty Mentor(s): Dr. Douglas Harrison

Spermatogenesis is the process in which sperm are made. During early stages, single germ cells divide incompletely, undergoing mitosis and meiosis to give rise to 64 connected spermatids. During the later stages, in a process known as spermiogenesis, the spermatids elongate and are then separated. The process of spermatid separation is referred to as individualization. During individualization, cones of actin, known as individualization complexes (ICs), move from the head of the spermatid to the tail, removing excess cytoplasm and separating spermatids from each other. Spermatogenesis is well-conserved between many animal species and individualization occurs in vertebrates (including humans). To better understand the regulation of individualization, we are using the fruit fly, *Drosophila melanogaster* as a model. Fruit flies have proportionately very large sperm, making them easy to observe. Flies grow rapidly and have many genetic tools available for gene manipulation. In *Drosophila*, the JAK/STAT signaling pathway is required for individualization to begin. Impairment of the JAK/STAT pathway eliminates individualization and reduces activity of the Pvf (Platelet Derived Growth Factor/Vascular Endothelial Growth Factor) pathway. Our goal is to determine whether the Pvf pathway is also required for individualization. Genes for components of the Pvf pathway have been impaired using RNA interference (RNAi) in specific cells of the testes. Testes were dissected and stained using phalloidin, which binds to actin in the ICs. ICs were quantified to determine whether the rate of individualization was impaired in flies in which the Pvf pathway is impaired. Analysis of data is ongoing and will be presented. It is expected that the results of these experiments will indicate whether Pvf signaling is required for the process of individualization.

CONSIDERATIONS IN REPETITIVE ACTIVATION OF LIGHT SENSITIVE ION CHANNELS FOR LONG-TERM STUDIES: CHANNEL RHODOPSIN IN THE DROSOPHILA MODEL

Poster: 44

Hermanns, Christina

Faculty Mentor(s): Dr. Robin Cooper

For nervous systems to function properly, the efficacy of such synapses should be finely regulated and adjustable to respond to changing circumstances and requirements. Too high or too low a synaptic output results in inappropriate communication to target cells. This is most apparent during development and maturation. As the size of postsynaptic cells increases dramatically, a matched increase of neurotransmitter release is required and/or sensitivity of postsynaptic cell to the transmission. On the other hand, the nerve terminals also grow rapidly, both in size and output, and continuously show different types of remodeling to maintain proper synaptic output throughout the life of the animal. We are addressing homeostatic regulation in synaptic function at the larval Drosophila NMJ by over and under excitation of the motor nerve terminal and muscle by the use of optogenetics throughout larval development. The biological significance and aim of this study is to demonstrate that in controlling particular neurons or targets of neurons, over time, and throughout development, one will have a better understand the dynamic nature of forward and retrograde communication in regulating synaptic formation and maintenance. Optogenetics has provided a tool to use but there are limitation in the extent of activation and inhibition which needs careful consideration. We have noted long term (minutes) unexpected effects (i.e., neuron refractory in electrical excitability) from only 10 sec activation of channel rhodopsin (Chr-XXL) targeting motor neurons (D42 expression). Paralysis and inability to eat are considerations for long term neural developmental studies when manipulating neurons and muscles.
THE EFFECTS OF TIMED EXERCISE ON EATING BEHAVIOR RHYTHMS
Poster: 45
Herricks, Sarah
Faculty Mentor(s): Dr. Julie Pendergast

Aberrant eating behaviors, such as breakfast-skipping and late-night snacking, are associated with an increased risk of obesity and metabolic dysfunction. Mid-day exercise has been shown to advance the timing of the sleep-wake cycle in humans, allowing one to wake up and go to bed earlier. As a result, the individual may be more likely to eat breakfast and less likely to eat late at night. We sought to determine if mid-day exercise would alter eating behavior rhythms. We randomized human subjects (age: 18-35; BMI: 18.5-40) to either early morning or mid-day exercise groups and supervised their exercise for 4 weeks. Subjects kept food logs, including intake times, using MyFitnessPal. We analyzed daily rhythms of eating behavior before and after the exercise intervention. Thus far we have collected data from 4 subjects (1 male) that exercised in the morning and 4 subjects (2 males) that exercised at mid-day. Our findings are preliminary since this study is ongoing. We first analyzed breakfast skipping, which was defined as not eating within the first 2 hours after waking. We found that both morning and mid-day exercise decreased breakfast skipping. Likewise, subjects exercising in either the morning or at mid-day ate earlier in the day. Weekly caloric intake, eating duration (the length of time between first and last daily food intakes), frequency of late-night snacking (defined as eating more than 25% of daily caloric intake after 8:00pm), and the relative percentages of daily caloric intake from protein, carbohydrates, or fat appear to be unaffected by the timing of exercise. Our preliminary findings suggest that exercise may alter certain daily rhythms of eating.

DOES SOMA SIZE MATTER? ACTION POTENTIAL GENERATION IN INVERTEBRATES AND MAMMALIAN NEURONS
Poster: 46
Hester, Cameron
Faculty Mentor(s): Dr. Elizabeth Debski

Many invertebrates have evolved to have neurons that are much larger in size than their vertebrate counterparts. The functional consequences of having such large cells on nervous system functioning are not clear. We are examining how differences in soma size impact neuronal communication using the computational neuroscience simulator program, NEURON. The R2 neuron of the mollusk Aplysia is the largest neuron known with a soma diameter of 1-2 mm. In contrast, mammalian neurons range from 4-100 microns in size. We have evaluated the impacts the size of Aplysia neurons may have on action potential activity by creating a one-compartment (soma) model in NEURON comprised of a R2 neuron and a typical mammalian neuron. Values for our model parameters, including resting potentials, sodium and potassium equilibrium values and leak and channel conductances, were obtained from the scientific literature when available. NEURON integrates these neuronal parameters to create visual representation of the voltage across the neuron membrane with respect to time. We are presently assessing the effects of soma size on action potential thresholds, amplitudes and durations, and predicting the values of unknown model parameters by matching simulation outcomes to published activity patterns.
POSTER ABSTRACTS

URBAN GARDENS AS ECOLOGICAL TRAPS: A MODEL
Poster: 47
Howard, Madison
Faculty Mentor(s): Dr. Philip Crowley

Ecologists have noticed a tendency for some animals to settle in a place that is inadequate in amount or quality of resources, particularly in habitats that differ from those to which they have adapted. This phenomenon is known as an ecological trap. The project’s main focus is to model what happens if an urban garden acts as an ecological trap. To do this, we are using NetLogo, an agent based modeling program. The model will illustrate a pollinator’s system of behavioral responses to ecological cues, specifically the presence of pollen. The system will simulate the path of a pollinator as it takes a random walk through a grid of gardens, then zoom-in on a specific garden if the pollinator senses pollen. The pollinator will then forage and experimentation will show whether or not the pollinator will get trapped in the specific garden and if the garden is adequate to sustain the pollinator.

CHARACTERIZING A NOVEL RODENT EXERCISE MODEL TO EXPLORE THE PERMANENCY OF MYONUCLEAR ACCRETION DURING MUSCLE ADAPTATION
Poster: 48
Jones, Savannah
Faculty Mentor(s): Dr. Cory Dungan; Dr. Charlotte Peterson

Myonuclear density increases during skeletal muscle hypertrophy, and it has been postulated that newly-acquired myonuclei are permanent and constitute a muscle memory of previous adaptation; however, the available evidence supporting this is equivocal. The purpose of this study was to determine if myonuclear accretion in skeletal muscle is permanent following a period of prolonged detraining utilizing a novel progressive weighted-wheel running (PoWeR) protocol. PoWeR training involved the progressive addition of weight (2-6g) to an un-balanced running wheel over 4 to 8 weeks. Four month old female C57Bl/6J mice (n=7-10/group) performed PoWeR, while another cohort performed 8 weeks of PoWeR followed by 12 weeks of detraining. Age-matched ambulatory controls were used for baseline comparisons. Following training and detraining, the soleus and plantaris muscles underwent immunohistochemical and single fiber analysis to examine muscle growth and myonuclear density. Wet weight of the soleus muscles, when normalized to body weight, was greater in the 8-week PoWeR trained mice when compared to the in the controls. Similarly, normalized plantaris muscle mass was increased following 8-weeks of PoWeR training when compared to ambulatory controls. Fiber cross-sectional area (CSA) and myonuclei per fiber were greater in the soleus and plantaris following training. After detraining, normalized muscle wet weight and muscle fiber CSA are significantly reduced in the plantaris; however, they were unchanged in the soleus. Similarly, myonuclear density following detraining is reduced in the plantaris and unchanged in the soleus. These data show that myonuclear permanency is muscle specific and may be dependent upon the tonic (soleus) or phasic (plantaris) activation pattern of each muscle. PoWeR provides a methodological advantage over exercise models currently used in mice since it is non-surgical, and elicits oxidative and hypertrophic adaptations in both slow-twitch and fast-twitch muscles. Moreover, the data gathered in this study will provide new insight into the plasticity of myonuclear number following detraining of hypertrophied muscles.

** Denotes STEMcats project
**CIRCADIAN RHYTHMS IN THE GUT MICROBIOME**

Poster: 49  
Authors: Emily Jones, Lavaryae Marshall, Melina Myers  
Faculty Mentor(s): Dr. Vincent Cassone

Circadian rhythms are roughly 24-hour cycles that regulate the physiological processes of living beings from complex beings such as humans to bacteria. These rhythms play a key role in sleeping and feeding patterns. *Enterobacter aerogenes*, a member of the human gut microbiome, is the second bacteria to be found to have a circadian rhythm. We have hypothesized that it is able to have a circadian rhythm because they have certain genes that control their cycle, although this has not been proven. To test this, we mutated one gene per bacteria sample using transposon-mediated mutagenesis. We first mutated the bacteria by introducing the transposon-carrying plasmid PBAMD1-2 into the bacteria using electroporation. After the bacteria were successfully mutated we screened the mutants for swarming behavior in the presence or absence of melatonin. Looking at mutants 28 and 40, it is of interest that the colony grew larger on the control plate rather than the melatonin plate. In mutant 28, the area of the control plate was 882.281 mm$^2$ whereas the colony grown in the presence of melatonin was 608.105 mm$^2$. In mutant 40, the area of the control was 123.029 mm$^2$ whereas the colony grown in the presence of Melatonin was 73.794 mm$^2$. Continued research on finding the genes responsible for maintaining a circadian rhythm in *Enterobacter aerogenes* bacteria could prove to be very beneficial to human health by targeting issues such as jet lag and diet-induced obesity that have been linked to circadian rhythms in the gut.

**DOES THE DAILY RHYTHM OF EATING BEHAVIOR VARY ACROSS THE ESTROUS CYCLE?**

Poster: 50  
Kamineni, Ellora  
Faculty Mentor(s): Dr. Julie Pendergast

The prevalence of obesity and the risk of obesity-related complications increases in women after menopause, due to loss of circulating estrogen. Female mice are also protected from diet-induced obesity until they are ovariectomized, after which they become obese. Abnormal eating patterns, such as breakfast-skipping and late-night snacking are associated with obesity in humans. Likewise, the daily rhythm of eating behavior is disrupted by high-fat diet feeding in male mice. In contrast, a previous study showed that the daily rhythm of eating behavior is not affected by high-fat feeding in female mice, but is disrupted after ovariectomy. This data suggests that estrogen may regulate the daily rhythm of eating behavior in females. Estrogen levels fluctuate across the four-day estrous cycle in mice. This study tested the hypothesis that the amplitude (robustness) and phase (timing) of the daily rhythm of eating behavior fluctuate across the stages of the estrous cycle during high-fat feeding. Wildtype C57BL/6J female mice were single-housed in light-tight boxes in 12h light:12h dark at 7 weeks old while being fed chow ad libitum. They were switched to a 45% high-fat diet at 8 weeks old. Body weight, food intake, and stage of the estrous cycle were measured daily for 2 weeks. Then mice were ovariectomized. After ovariectomy, body weight, food intake, and stage of the estrous cycle were measured daily for 1 week. As found previously, body mass and food intake both increased more rapidly after ovariectomy than before. The amplitude and phase of the daily rhythm of eating behavior did not fluctuate significantly with the stages of estrous. Interestingly, the day-to-day fluctuations in the amplitude and phase of the eating behavior rhythm persisted after ovariectomy, suggesting that ovarian hormones do not regulate these fluctuations.
WHAT ROLE DOES LIGHT QUALITY PLAY IN THE ASEXUAL OFFSPRING GERMINATION OF A TROPICAL PLANT SPECIES?
Poster: 51
Lay, Conner
Faculty Mentor(s): Dr. Nicholas McLetchie

Asexual offspring is an important mechanism used by plants for population persistence, but the sensitivity of offspring germination to environment stimuli is very rarely tested in liverworts (a non-vascular plant). The germination ability of asexual produced offspring (gemmae) of the plant Marchantia inflexa Nees et Mont. were tested in response to light quality. A pilot study demonstrated that low white light and high white light did not differ in germination response and no germination occurred in no light. We then focus on light quality, specifically far-red, red, green, blue, and white. Gemmae were placed in tubes with water and subjected to different light qualities on a 12-hour light cycle. The light sources were LEDs with the light passing through fiber optic cables to the tubes with the gemmae. Gemmae can germinate in 24 hours and was detected by placing a dye in the water that stained the rhizoids (which indicates germination). Generally, each light level was replicated five times. Several trials were done to ensure repeatability. Gemmae germination was affected by light quality. White light (control group) had 0.52 probability of germination and was similar to red light (0.51). The blue light showed low germination probability (0.19) and, green and far red light were very low (0.05). The low rates of germination in far-red and green light are consistent with germination avoidance in low quality light as can result from plants growing above. The high rate of germination is expected in white light and red light as these indicate the presence of sunlight. However, the low response in blue light is not consistent with these explanations because blue light is also an indication of sunlight. Future questions include focusing on how/why germination in blue light is low and determining the mechanism of the germination that responds to red light and white light.

THE EFFECTS OF MATERNAL OBESITY ON DAILY RHYTHMS IN FEMALE OFFSPRING
Poster: 52
Llanora, Josie
Faculty Mentor(s): Dr. Julie Pendergast

About 20% of women are obese during pregnancy. Children born to obese mothers are at increased risk of obesity, impaired glucose tolerance, and other facets of metabolic syndrome. Disruption of circadian rhythms is also associated with obesity and metabolic dysfunction. In male mice, high-fat diet feeding alters daily rhythms and increases body weight. However, female mice fed high-fat diet do not become obese, and their daily rhythms are not altered. In this study, we sought to determine if female offspring weaned from obese, high-fat diet-fed mothers had disrupted eating behavior and locomotor activity rhythms. Female C57BL/6J mice were fed high-fat diet (60% kcal fat) for 12 weeks (6 weeks prior to pregnancy and during pregnancy and nursing). After weaning, female offspring were fed low-fat diet (10% kcal fat) for 5 weeks. At 8 weeks old, offspring were fed high-fat diet for 12 weeks. We measured eating behavior with infrared video cameras and locomotor activity with passive infrared sensors. We found that females born to obese mothers had arrhythmic or low-amplitude eating behavior rhythms compared to females born to lean mothers. The mesors, but not amplitudes or phases, of locomotor activity rhythms were decreased in females born to obese mothers compared to those born to lean mothers. Together, our results show that maternal obesity causes daily rhythms of female offspring to be susceptible to the effects of high-fat diet feeding.

** Denotes STEMcats project
** DOES EXPOSURE TO LIGHT AT NIGHT AFFECT CIRCADIAN RHYTHMS IN COLLEGE STUDENTS?  
Poster: 53  
Authors: Mario Maitland, Emily Punzal, Nyla Swain  
Faculty Mentor(s): Dr. Julie Pendergast  

Circadian rhythms are 24-h cycles of behavior and physiology. Daylight is the most salient cue for synchronizing circadian rhythms with the environment. Specifically, bright morning sunlight is ideal for synchronizing circadian rhythms with the daytime. However, humans are now exposed to light, from televisions, smart phones and laptops, at all times of the day. Light exposure at night can disrupt circadian rhythms. The goal of our study was to characterize light exposure in college students and determine if aberrant light exposure correlates with sleep quality and circadian rhythm disruption. We first surveyed 201 college students and found that 85% were exposed to light (from TVs, computers, smart phones) just before bed. Next, we measured light exposure and sleep in 7 college students with actigraphy watches for 2 weeks. The students also kept sleep logs. We found that college students were exposed to more morning light on school days compared to free days. This could be because college students may have early classes on work days, but they sleep in late on free days. There was no association between morning light exposure and chronotype or social jetlag. Next, we measured the amount of nighttime light that college students were exposed to. We found that there was no difference in exposure to light at night between work and free days. There was also no association between late-night light exposure and chronotype or social jetlag. Finally, we measured sleep quality in college students. On both work and free days, sleep efficiency in college students was about 80%. There was no correlation between sleep efficiency and chronotype or social jetlag. Altogether, our study shows that college students are exposed to morning light on school days and to light at night every day, but these do not affect their circadian rhythms.

MOLECULAR MECHANISM DRIVING CIRCADIAN RHYTHM IN ENTEROBACTER AEROGENES  
Poster: 54  
Marti, Michelle  
Faculty Mentor(s): Dr. Vincent Cassone  

The circadian clock is an internal biological regulation system that exhibits daily rhythmicity. Most Eukaryotes including plants, mammals, and birds exhibit a circadian clock. For many years Cyanobacteria were the only prokaryotic organisms with known circadian rhythm; however, a recent study presented the evidence supporting that Enterobacter aerogenes also possess such characteristics. E. aerogenes is a member of the human gut microbiome and is thought to use the melatonin secreted from the gut as a potential signal for its daily rhythmicity. The aim of this research was to investigate the molecular mechanisms driving the circadian clock of Enterobacter aerogenes. Based on a bioinformatical search, mntH gene was chosen as the candidate gene, due to its homology to a melatonin binding site of the human melatonin receptor. The mntH sequence encodes an important gene, which inter alia, is involved in manganese transport. A set of 26 mutants generated with the Lambda red mediated recombineering were tested for mntH mutation and subsequent circadian clock disruption. Out of the 26 tested mutants, 12 incorporated kanamycin sequence into their genome; therefore, they were chosen for subsequent testing. A new set of primers, specific for the internal part of mntH, was designed implementing the Primer3 program. Primers were used for colony PCR amplification. Additionally, a motility assay on semisolid EMB was performed to test their swarming phenotypes. Bacteria were also tested under physiological concentrations of melatonin. As a result, a significant difference in the swarming area occurred in case of 4 mutants compared to the controls. These strains were used for flagella staining, which revealed peritichous flagellation pattern in all mutants. Additionally, a bacterial stain comparing cells from different parts of the macrocolony showed morphological differences. This information gives a greater insight into the commensal relationship between humans and one member of the gut microbiome.
SENSORY NERVOUS SYSTEM CHANGES IN CRAYFISH EXPOSED TO DIFFERENT CONCENTRATIONS OF THE ANESTHETIC EUGENOL
Poster: 55
Martin, Regan
Faculty Mentor(s): Dr. Melody Danley

Procambarus clarkii, more commonly known as the red swamp crayfish, is considered one of the most ecologically elastic in its order. Due to its prolonged tolerance to dilute saltwater and low dissolved oxygen concentrations, the red swamp crayfish has become an ideal biological test subject. Eugenol, used in food preparation, stabilizers, and restorative dentistry applications, is a potential but unapproved anesthetic for aquatic animals such as crayfish, but requires further testing. The purpose of the current experiment was to investigate how eugenol affects the crayfish’s sensory neurological responses at different concentrations (0, 25, 50, 100 or 200 mg/L). In this experiment, sensory root hairs extending from the caudal end of the tail fins (telson) were manually stimulated using a plastic dropper pipette. Responses from the sensory nerve roots between the root hairs and the 6th abdominal ganglion were then recorded to determine the action potential or spike frequencies. Responses were quantified by recording the activity of the nerves with a suction electrode connected to an ADInstruments differential amplifier and PowerLab unit. Effects of different concentrations of eugenol were determined by measuring the percent change in spike frequency 2 min before exposure, versus every 2 minutes during a 10-minute exposure period. It was predicted that increasing eugenol concentrations would result in a negative percent change of action potential firing (spikes) thereby indicating a decrease in the ability of the sensory neurons to fire action potentials. Due to the wide variety of applications eugenol can have in our advancing society, a deeper understanding of the effects of this chemical is needed.

** THE EFFECTS OF A BACTERIAL ENDOTOXIN ON SYNAPTIC TRANSMISSION AT THE NEUROMUSCULAR JUNCTION: DROSOPHILA AND BLOWFLY MODELS **
Poster: 56
McNabb, Micaiah
Faculty Mentor(s): Dr. Robin Cooper

The bacterial endotoxins lipopolysaccharides (LPS) are known to have direct effects on synaptic transmission at neuromuscular junctions (NMJ) in some invertebrates and mammals. Generally, LPS increases Ca2+ loading and random fusion of synaptic vesicles resulting in enhanced transmitter release in a sporadic nature. The nature of the effect varies depending on the synaptic preparation examined. At the frog NMJ the effect is not reversible with washing but it is at the crayfish NMJ. The effects of LPS toxin has not been investigated at the NMJs in larval Drosophila NMJs to determine the effects. This model offers the ability to potentially address the mechanism of action of LPS on voltage gated Ca2+ channels or other channels with various genetic alteration of the channels. In addition, the effect of Ca2+ obtained from extracellular and intracellular organelles influencing synaptic vesicle fusion can be addressed in this synaptic model. Larvae of blow flies, which are used as therapy for debriding dead tissue in wound care, are exposed to bacterial endotoxins and few studies have investigated the actions of forms of LPS endotoxins on therapeutic blowflies to assess survival and physiological function. At 100 g/ml of LPS from two common strains (Pseudomonas aeruginosa and Serratia marcescens) no effects were observed on evoked transmission or spontaneous vesicle fusion within 2 minutes for larvae of blow flies or Drosophila. The effects of 500 g/ml of LPS from the two strains on synaptic transmission are currently being examined. (Funding: Dept of Biology, Univ. of KY student laboratory fees Bio446)

** Denotes STEMcats project
**SEX AND HORMONAL DIFFERENCES IN COGNITIVE IMPAIRMENTS DUE TO HYPOVOLEMIC DEHYDRATION**

**Poster: 57**  
**Montgomery, Mariah**  
**Faculty Mentor(s): Dr. Jessica Santollo**

Sex and hormonal differences in cognitive impairments due to hypovolemic dehydration. Dr. Jessica Santollo and Mariah Montgomery Estrogens improve performance on cognitive tests and have protective effects on fluid balance. It has previously been shown that 24h water deprivation impairs cognitive abilities in males but whether this is true in females remains an open question. To test for sex and/or hormonal differences in cognitive impairment due to dehydration we performed cognitive tests in male, estrus female (high estrogens), and diestrus female (low estrogens) rats. We used a novel object recognition test that involved 1 day of habituation to the open field, 3 days of training where rats were shown two identical objects, and the test day where they were exposed to the novel object and the original object. On test day, rats (n=47) were given either an injection of 20µg/kg furosemide or vehicle. Furosemide causes selective dehydration of the extracellular fluid components in the body. Fluids were removed and 3 h later rats were placed in the open field. Time spent interacting with both objects was scored and 30 minute fluid intake after the testing paradigm was recorded. As expected, rats treated with furosemide had greater fluid intake compared to control treated rats (p<0.05). Regardless of hydration status, male and estrous females spent significantly more time interacting with the novel object (p<0.05). Furthermore, hydrated diestrous females investigated the novel object more (p<0.05), but their dehydrated counterparts did not show a preference for either object (p=n.s.). This suggests that hypovolemic dehydration’s effects on cognition in females is influenced by stage of the estrous cycle. Future experiments will use ovariectomized female rats with replacement of different hormones to determine which ovarian hormones underlie this effect.

**DAILY LIFE ACCORDING TO BACTERIA IN YOUR GUT**

**Poster: 58**  
**Authors: Andrew Mountain, Julia Deferville, Holly Cook**  
**Faculty Mentor(s): Dr. Vincent Cassone**

The study focuses on the swarming response to melatonin in the human gut microbiota Enterobacter aerogenes, which exhibits its own circadian rhythm. The circadian rhythm is a biological process that displays an endogenous oscillation of about 24 hours. The purpose of this study is to examine genetic basis for Enterobacter aerogenes response to treatment. The study included the introduction of foreign DNA into bacteria by electroporation. The plasmid pBAMD1-2 was used because it encodes a resistance gene for the antibiotic kanamycin (kan) with transposons. Numerous mutants are necessary to locate any genes that might be a factor in the swarming response to melatonin. Some of the mutants that showed greatest variation compared to the wild type included mutants AM 51 and JD 3. The AM 51 mutant had a phenotype that included a larger area than the wild type and thick outer rings. The JD 3 mutant area was also smaller and had thin outer rings. The study currently involves analyzing sequence data from those mutants to understand the genetic basis of the results. It is believed that gut changes can affect the circadian rhythm of the individual. If the circadian rhythm is affected, an individual’s entire sleep pattern can be skewed. For a human, this means a sleep schedule that is off. This can lead to performance issues, health problems, and behavioral adjustments. Since this is the first commensal bacteria to show the circadian rhythm, examining post bacteria interaction will help advance in further research.
SEX DIFFERENCES IN DEHYDRATION-INDUCED COGNITIVE IMPAIRMENTS
Poster: 59
Myers, Katherine
Faculty Mentor(s): Dr. Jessica Santollo

Dehydration has been shown to negatively impact cognitive function in both humans and animal models. Though sex differences in dehydration-induced cognitive impairments are documented in humans, no reported studies have tested these variables in laboratory animals. However, it has long been understood that estrogens, particularly estradiol, regulate fluid homeostasis and improve memory and certain cognitive abilities in female rodents. Because both fluid balance and cognitive function are influenced by estrogens, we hypothesized that dehydration-induced cognitive impairments are also influenced by sex and/or gonadal hormones. This study investigated sex differences in memory impairment following 24-hour water deprivation in rats using the novel object recognition test. This paradigm involved placing an animal in an open field for five minutes and allowing them to interact with a previously seen (control) object and a novel (experimental) object. More time spent with the novel object suggests memory of the control object. Male, diestrous (low estradiol state), and estrous (high estradiol state) female rats were tested in either a dehydrated or euhydrated state. All groups, regardless of hydration status, spent significantly more time with the novel object (p<0.05), and there was no significant difference between the sexes. In addition, dehydrated females in estrus were significantly more active than dehydrated diestrous females and males (p<0.05), while dehydrated males drank significantly more than both dehydrated estrus and diestrous females (p<0.05) after the memory test. Our results likely suggest that either object recognition in the dehydrated state is not influenced by sex or gonadal hormones or that the dehydration manipulation was not severe enough to impair object recognition. Testing sex differences in dehydration-induced impairments of spatial memory offers one future direction for our research, as 24-hour water deprivation has been shown to impair this type of memory in males.

SHORT MEDITATION EXERCISE AND ITS EFFECT ON REACTION TIME USING PVT IN STUDENT NOVICE MEDITATORS
Poster: 60
Nowak, Warunee
Faculty Mentor(s): Dr. Bruce O’Hara

Meditation has been practiced for many centuries for a variety of cultural and religious reasons. Many claims have been made about the health benefits resulting from meditation, however, research supporting most of these claims is limited (but increasing). Previous studies from our research group have shown that reaction time improved following periods of meditation in novice meditators. Both 40 minute and 20 minute bouts of meditation have been successful in improving reaction time, and it is possible that even shorter durations could produce benefits. In this study, a short meditation exercise was performed with the University of Kentucky’s STEM Cats in a classroom setting. Novice student meditators underwent 5 minutes of focused breathing meditation to investigate its effect on reaction time. To measure reaction time, students were given an online psychomotor vigilance task (PVT) before and after the bout of meditation. Collected data showed significant improvements in reaction time following 5 minutes of meditation. PVT performance is also highly sensitive to sleep debt/sleepiness/fatigue, so self-reported data on sleep time for the previous night for each student was collected. Due perhaps to high variability in performance across our subjects and the relatively modest differences in sleep time, no significant correlations were observed between sleep time and performance or between sleep time and the amount of improvement in PVT performance. Despite this, the significant improvement in reaction time further supports the previous findings that meditation improves reaction time, and that at least some improvement is possible with only 5 minutes of meditation. In addition to the basic science contribution of this study, this simple five-minute exercise may provide a practical short term boost for improved performance on a variety of tasks, and may also provide a useful classroom exercise to teach students about the brain, meditation, sleep and performance.

** Denotes STEMcats project
THE BLIGHT OF SHRIMP: PROBLEMS AFFECTING A MULTI-MILLION DOLLAR INDUSTRY

Poster: 61
Penrose, Erika
Faculty Mentor(s): Dr. Robin Cooper

In recent years, shrimp populations in Asia, Central and South America have experienced massive die-outs caused by the bacteria Vibrio parahaemolyticus and Vibrio alginolyticus. This disease, which is linked to gastroenteritis in humans, has long existed in shrimp populations with little to no negative repercussions on the shrimp themselves. Acquisition of a 70-kb plasmid into their DNA, however, has caused this gram-negative bacterium to become toxic, killing out entire shrimp farms and causing massive economic losses for affected areas. The toxin from plasmid parahaemolyticus are PirA and PirB (PirAvp and PirBvp) proteins which are thought to form ionic pores in the cell which can then kill cells. Recently, the mechanism behind this phenomenon is increasingly being understood, opening the door to looking at possible treatments. Although antibiotic treatment is not an option due to increasing levels of antibiotic resistance, the emerging field of phage therapy is looking like a promising alternative. Additionally, as our understanding of the plasmid increases, it becomes a possibility to block the specific ion channels that it forms, thereby debilitating the toxic effect. We are addressing how the toxin and LPS may also be having a synergistic effect. In addition, we are investigating the direct role that lipopolysaccharides (LPS), which make up the outer layer of the membrane in non-capsulated bacterial strains (gram negative bacteria) like strains of Vibrio, have on the health of invertebrates as a model in understanding its action in shrimp. This report is a review on the topic and a presentation on theoretical preventive measures which might be possible for protecting shrimp farms from this blight.

** EXPLORING ENTEROBACTER AEROGENES SWARMING THROUGH RANDOM MUTAGENESIS

Poster: 62
Authors: Taylor Pratt, Frances Salisbury, Sarah Schaefer, Amanda Shaw
Faculty Mentor(s): Dr. Vincent Cassone

*Enterobacter aerogenes* is a bacteria found in the human gastrointestinal tract. These bacteria have a circadian rhythm that is independent of the host. Its circadian rhythm is exhibited in rings that are produced every 24 hours via swarming activity as the bacterium grows, more so when melatonin is present. The purpose of this study is to determine what gives *E. aerogenes* this independent circadian rhythm. Random mutations were induced by inserting the antibiotic-resistance gene aphA via the transposon tnpA into the bacterial DNA with electroporation. The positive mutants were grown on agar plates in the absence and presence of melatonin in order to differentiate the effect of melatonin on the swarming behavior. After each sample was allowed to grow in culture, a few samples with anomalies were chosen to be sequenced. Mutants number 2, 8, and 21 showed significantly different swarming behaviors than the wild type. Mutant 2 did not grow on the melatonin plate and it exhibited branching growths in the absence of melatonin. Mutant 8 grew differently in directionality, origin of growth, size, and color in the presence of melatonin. Mutant 21 grew in a lobed pattern rather than a ringed pattern in both the presence and absence of melatonin. Currently we are waiting on these mutants to be sequenced in order to locate the transposition site in the bacterial genome to determine and analyze the significance of these anomalies. Identifying the portion of DNA responsible for this circadian rhythm could also provide information very significant to the evolutionary timeline because biological data suggest that the independent circadian rhythm of *E. aerogenes* precedes that of cyanobacteria.
INTERSPECIFIC AND INTRASPECIFIC VARIATION IN CHEMICAL DEFENSE OF PINE

Poster: 63
P’Simer, Dylan
Faculty Mentor(s): Dr. Catherine Linnen

The main question this project addressed was; how much pines vary in total resin and phenolic resin content between species and throughout their life cycles? This variation is expected among pine species. Total resin and phenolic resin is expected to be age dependent due to Optimal Defense Theory. This theory states that chemical defense will be allocated where tissue is most vulnerable in this case the softer, younger softer growth. For this research, total resin and total non-volatile phenol content from pine samples. Total resin was measured using hexane extraction and recorded using gravimetric analysis. Non-volatile phenol will be using a methanol extraction recorded via colorimetric analysis. The hypothesized results for this research was discernable variation in total resin and non-volatile phenolic content between examined species. Pitch should be the most resinous and white should least resinous. This hypothesis roots from anecdotal evidence as well as needle thickness correlating with the resin amount. It also was hypothesized that the resin tradeoff should occur between younger and older tissue. Older, less nutrient dense tissue should contain less resin content compared to younger, nutrient dense tissue. This is in concordance with Optimal Defense Theory. For all of the research the null hypothesis was able to be rejected.

GOLGI STAINING IN THE AXOLOTL RETINA PREFERENTIALLY STAINS DEVELOPING CELLS

Poster: 64
Raichur, Prachi
Additional Authors: Aishwarya Balaji, Keely Campbell
Faculty Mentor(s): Dr. Elizabeth Debski

Unlike mammals, the axolotl salamander, Ambystoma mexicanum, is capable of regenerating its central nervous system following injury. We are investigating the regeneration of the axolotl retina following optic nerve and ophthalmic artery transection and have applied the Golgi-Cox staining technique to this tissue. Previous data from our laboratory demonstrated that incubation of the tissue in Golgi-Cox solution for 10 weeks produced stained cells with multiple processes in both the optic tectum and olfactory bulbs. In contrast, staining of the retina, showed only cell bodies and photoreceptors with immature morphologies. To investigate whether the absence of neurite staining in the retina was due to a slower incorporation of the Golgi-Cox solution into this tissue, the effect of 9-12 month incubation periods on cell staining was examined. Once again, the cells stained in the retina lacked processes while processes in brain tissue were abundant. Closer examination of the olfactory bulb led to the identification of six classes of neurons based on soma shape and location and neurite arborizations. However, the neurite branching patterns and process extensions did not appear significantly different from those seen with the 10 week incubation and the complexity of these arborizations indicates that mature cells are being stained. It was concluded that a 10 week incubation period is sufficient to obtain complete fills of neurons in the axolotl with the Golgi-Cox technique. Furthermore, despite being central nervous tissue, the retina differs from the brain in some way that makes only immature neurons susceptible to staining with this technique.

** Denotes STEMcats project
**POSTER ABSTRACTS**

**DEVELOPMENT OF A METHOD FOR ASEPTIC CULTURE**
Poster: 65
Railey, Caylyn
Faculty Mentor(s): Dr. Nicholas McLetchie, Rose Marks

The microbial environment of a plant helps keep the plant healthy - whether it be by defending it from pathogens or assisting with the acquisition of nutrients. In order to explore specific questions related to plant-microbiome relationships, we will characterize the functional impact of the microbiome of a non-vascular plant - Marchantia Inflexa on dehydration tolerance (DhT). Previous research of this species has revealed that microbiome composition of male and female M. Inflexa plants is measurably different. To test if this sex difference is linked to DhT, we will conduct a reciprocal microbiome exchange between the sexes. In order to switch the microbiomes of M. Inflexa males and females, plants will be grown in sterile conditions. Initially, the gemmae were stripped of their naturally occurring bacterial partners to generate aseptic plants. In order to sterilize the gemmae, they were washed in 3.3% bleach. Gemmae from each plant were placed in the bleach solution for approximately 8 minutes, drained and rinsed with distilled water. The sterilized gemmae were then placed on 0.5% agar nutrient media and placed in a growth chamber at 17 C on a 12-hour light/dark cycle. Observations of the gemmae were made every three days. In parallel, both the sterile and non-sterile gemmae were plated on bacterial growth plates to quantify the effectiveness of our sterilization methods. Through this work, it is clear that complete sterilization of the gemmae is a challenge. After sterilization some gemmae still showed evidence of a residual microbiome. However, we are well on our way to optimizing a technique for gemmae sterilization. Our new approach includes the employment of sub-culturing, in which plants that show no evidence of bacteria are selected and transplanted on to fresh agar nutrient media. After sub-culturing, plants will be subjected to reciprocal microbiome inoculation.

**INVESTIGATING SEX DIFFERENCES IN COGNITIVE DEFICITS RESULTING FROM INTRACELLULAR DEHYDRATION**
Poster: 66
Rainer, Ivanka
Faculty Mentor(s): Dr. Jessica Santollo

Dehydration resulting from 24-hour water deprivation decreases cognitive performance in male rats. Whether this is true in females has yet to be tested, however, females may be protected because estrogens influence both fluid balance and cognitive performance. Furthermore, no studies have been completed to test the effects of selective osmotic dehydration on memory. Therefore, the goal of this study was to test the hypothesis that osmotic dehydration will impair recognition memory in both male and female rats but the magnitude of the impairment will be greater in males. In this experiment, male, diestrous (low estrogens) female, and estrous (high estrogens) female rats were tested with a 5-day novel object recognition task. All rats were exposed to an open-field box for ten minutes on one day, and then two identical objects for 5-minute trials on the following three days. On the last day of the test, water was removed and then to induce osmotic dehydration rats were injected with a 2M saline solution or a 0.15M saline control. After 15 minutes, the rats were exposed to one copy of the original object and a novel object. Once the test was complete, water was reintroduced and intake was measured after thirty minutes. Time spent with each object and overall activity were recorded. The dehydrated rats had lower overall activity levels (p<0.05) and, as expected, greater water intake (p<0.05). There was, however, no difference between dehydrated and control groups in exploration time of the original and novel object; all animals, regardless of hydration state, spent significantly more time interacting with the novel object (p<0.05). This suggests that osmotic dehydration has no influence on object memory in males or females.

** Denotes STEMcats project
INVESTIGATING THE EFFECTS OF HOMOCYSTEINE AS AN AGONIST ON INVERTEBRATE GLUTAMATERGIC SYNAPSES

Poster: 67
Samuels, Kaitlyn
Faculty Mentor(s): Dr. Robin Cooper

Homocysteine (Hcy) is produced in the central nervous system and can act as an excitatory transmitter activating both NMDA and non-NMDA glutamate receptors in mammalian models. Hyperhomocysteinemia in mammals can produce neurological deficits in mammals. Thus, understanding details in the mechanics actions of HCY in model preparations could help in potential treatments. The glutamatergic synapses of the larval Drosophila and crayfish neuromuscular junctions (NMJs) are common model synaptic preparations to assay pharmacological agents. Hcy at a 100 mM did not have any consistent effect on altering evoked synaptic transmission on either preparation. The expectations was that this high concentration would have competed for the endogenous evoked release of glutamate at the NMJ and even desensitized the glutamate receptors after an initial rapid depolarization and repolarization. Thus, HCY does not have any acute action on the glutamatergic synapses of the larval Drosophila and crayfish neuromuscular junctions. The pharmacology receptor profile of these NMJ receptors are of a quisqualate subtype and not a kainite, AMPA or NMDA subtype. Thus, HCY may not have any action on quisqualate glutamate receptor subtypes. This is an authentic course-based undergraduate research experience (ACURE).

URBAN GARDENS: HAVENS OR ECOLOGICAL TRAPS FOR POLLINATORS?

Poster: 68
Seale, Tiffany
Faculty Mentor(s): Dr. Philip Crowley

Human-induced rapid environmental change puts pollinators at risk via habitat loss and ecological traps. Ecological traps result from cues that mislead pollinators and attract them to a low-fitness habitat featuring high predation risk and/or low foraging reward, which is what this study will focus on. There will be 35 separate plots created focusing on the plant-pollinator relations of swamp milkweed (Asclepias incarnata), used to support pollinator metapopulations, and the effects of simulated ecological traps on those relations. Nectar quality and quantity, as well as behavioral responses to olfactory cues will be assessed to help determine whether traps are present. Using the data from this study, an agent-based simulation model in NetLogo will be developed, predicting the persistence and dynamics of pollinators over an urban space and time. It will also be used in conjunction with a local science teacher to develop a teaching module to be used in high school classrooms.
EFFECTS OF MEDITATION ON PSYCHOMOTOR VIGILANCE
Poster: 69
Soni, Meet
Faculty Mentor(s): Dr. Bruce O’Hara

For many centuries, meditation has been considered important for both mental and physical well-being, and over the past several decades, researchers have begun investigating and testing specific health claims. Previously, research in our laboratory suggested that meditation provides a short-term performance improvement in novice meditators, and was one of the first studies to quantify immediate physiological benefits of meditation. This study utilized 40-minute periods of meditation which were difficult for subjects to maintain and in general did not address the duration of meditation needed to obtain this benefit. It also did not address the important variables of current sleep debt or sleepiness (related to previous sleep amounts), and of eye closure, which strongly influences many EEG (electroencephalogram) features. This current study investigates these issues, with novice subjects meditating under 6 different conditions. These will differ in 3 factors; whether the eyes of the subject are open or closed, if the subjects are meditating versus listening to a podcast, and the duration of the condition, which will be either 5 or 20 minutes. To assess sleep debt/sleepiness, subjects will be given an actigraph two days before each test day to measure their activity and sleep, in addition to a sleep diary. A well-validated and sleep sensitive reaction time test will be conducted before and after meditation to determine the change in reaction time due to meditation. During each condition, subjects will undergo EEG recordings, that will monitor brain wave activity in many cortical areas. Comparisons of EEG data will allow for analysis of specific brain activity. Collected data will be analyzed to determine the duration of meditation required to alter reaction time performance, and whether eye closure alone is an important variable. We will also determine if the previous night’s sleep had any effect on meditation and performance the following day. These results may provide useful recommendations for both the duration of total sleep and the duration of meditation to achieve desired benefits.

ADDRESSING RURAL KENTUCKY HEALTH DISPARITIES WITH HEALTHY HOUSE
Poster: 70
Stockham, Katherine
Faculty Mentor(s): Dr. Patrick Kitzman

There is a steep health disparity in the state of Kentucky; life expectancies in rural counties are significantly lower than in urban counties. The potential solutions to this problem are complex, ultimately necessitating a cultural change. The audiences most salient and responsive to change are children. Therefore, I developed a children’s book regarding health practices with a series of accompanying lesson plans. The book was taught at North Middletown Elementary and there are plans for it to be taught in Hazard. Additionally, feedback is being collected from teachers regarding the efficacy of the materials. Feedback so far has been positive, but further study will need to be done to achieve quantifiable data. Research of this kind is important because it presents a means of preventing health problems before they start.
THE LINK BETWEEN CIRCADIAN RHYTHMS AND REDOX SENSING IN THE HUMAN GUT BACTERIUM, ENTEROBACTER AEROGENES, AND THE ROLE OF GASTROINTESTINAL MELATONIN

Poster: 71
Tallent, Joshua
Faculty Mentor(s): Dr. Vincent Cassone, Jiffin Paulose

The human gut microbiome has been shown to play an increasingly important role in overall human health and proper physiological functioning. Specifically, we now know that the microbiome is an active contributor to not only gastrointestinal function, but in the maintenance of circadian rhythms and other human physiological functions as well, such as jet lag and shift work-related sleep disorders. One member of the gut microbiome, Enterobacter aerogenes, expresses circadian rhythms independent of its host, and responds to physiological levels of melatonin by increased swarming. One potential signal for swarming in bacteria is oxidative stress. In order to breakdown harmful free radicals produced by digestive processes, a highly conserved set of genes known as peroxiredoxins initiate downstream expression of antioxidant pathways. One such peroxiredoxin, Bacterioferritin Comigratory Protein (bcp) utilizes thioredoxin in order to trigger the downstream redox pathway responsible for free radical degradation. We hypothesize that activation of bcp is induced by the antioxidant melatonin, which is naturally produced in the human gut and may modulate gastrointestinal circadian rhythms. In order to test this, we have engineered E. aerogenes to express the bioluminescent protein luciferase when the bcp gene upstream of the redox pathway is activated. We monitored the bioluminescent bacteria in the presence and absence of melatonin and other agents of oxidizing stress. Results will show if expression of bcp is circadian in any of these cases, and if E. aerogenes is thus more susceptible to oxidizing stress at one time of day versus another. This pathway is highly conserved from archaea to humans, and the literature suggests that peroxiredoxins are rhythmic in humans. Rhythmic activation of the bcp gene in our bacteria would suggest that circadian rhythms may be evolutionarily older than previously thought.

THE GENETIC ARCHITECTURE OF EGG SPACING ADAPTATIONS IN PINE SAWFLIES

Poster: 72
Thiaw, Ndeye
Faculty Mentor(s): Dr. Catherine Linnen

In plant-feeding insects species, their ability to shift and adapt to different host plants has been suspected to drive their speciation. Moreover, a population’s evolutionary response to the new environmental variations is dependent on the genetic architecture of adaptive traits. Genetic architecture is the number of genes that impact a trait, their individual effect on the traits, and the distribution throughout the genome. However, there is still lack of understanding of genetic architecture and mutations causing species to diverge. To examine the genetic architecture of adaptation, we are using a pair of sister species of pine sawflies, N. pinetum and N. lecontei, that differ in the species of pines they use. N. pinetum uses a thinner needle host than N. lecontei. The females of these species embed their eggs into the tissue of pine needles. To keep the needle from drying out and killing the eggs, N. pinetum lays eggs that are more widely spaced than N. lecontei. We crossed N. pinetum and N. lecontei to make hybrids, N. pinetum backcrosses, and N. lecontei backcrosses. After the females laid eggs, we measured the space between the eggs. We found that N. pinetum eggs are more spaced on the egg-bearing needles compared to N. lecontei. A significant difference on egg spacing patterns was observed between, N. lecontei and N. pinetum while no significant differences in egg spacing patterns were observed between N. pinetum, N. lecontei backcrosses, and the hybrids. Thus, the N. lecontei allele is dominant compared to the N. pinetum allele. The egg spacing measurements will be used for QTL mapping to get more fine scaled resolution of the genetic architecture.

** Denotes STEMcats project
DOSE-RESPONSE OF THE ANESTHETIC EUGENOL WHEN APPLIED TO THE VENTRAL NERVE CORD OF CRAYFISH
Poster: 73
Tran, Sarah
Faculty Mentor(s): Dr. Melody Danley

Eugenol is an active ingredient in clove oil and has both anesthetic and antiseptic properties. For example, when handling crayfish for agricultural or consumer use, eugenol has anesthetic properties that inhibit nerve functions, allowing the animals to be safely handled during harvest or transport. However, only limited research is available to show how eugenol works as an anesthetic. The purpose of this experiment was to establish the dose-response relationships of the central nervous system when exposed to eugenol at 0, 25, 50, 100, or 200 mg/L for 10 minutes. For each replicated trial, adult, wild-caught crayfish were dissected, and the ventral nerve cord of each crayfish was connected to a stimulating electrode between the 5th and 6th abdominal ganglia, and a recording electrode between the 1st and 2nd abdominal ganglia. Suction electrodes were then connected to an ADInstruments amplifier and PowerLab system. Responses from the nerve cords were first recorded during exposure to a control saline bath to determine pre-exposure responses. Then, the saline surrounding the nerve cord was removed, and immediately replaced with the appropriate eugenol-treatment saline. Responses from the nerve cord were recorded following stimulation at 2 min before exposure, and then 0, 2, 4, 6, 8, and 10-min during exposure. To determine neural responses to the eugenol exposure, the percent change in compound action potential amplitudes (before versus during exposure) and conduction velocities were determined. Although results are still being analyzed, we predict eugenol concentrations of 100 mg/L dosage and higher will result in diminished compound action potential amplitudes and decreased conduction velocities from the nerve cord, compared to pre-treatment responses. Knowing the dose-response relationship between eugenol and ventral nerve cord of crayfish will assist further research select appropriate treatment concentrations, and thereby facilitate additional research in this area.

SELF-DECEPTION ABOUT FERTILITY IN HUMAN FEMALES
Poster: 74
Von Deylen, Madison
Faculty Mentor(s): Dr. Philip Crowley

The changes in morphology, pheromones, and behavior associated with fertility are known as estrus. Some primate species, including humans, suppress estrus in a phenomenon referred to as concealed fertility. This study used a model to investigate the hypothesis that concealed fertility in humans is an evolutionary response to the conscious decision to avoid pregnancy: the self-deception hypothesis. A model created to visualize the development of self-deception showed that with self-deception, the variation in ovulation timing observed in humans can have an effect on conception probability. The model also showed that self-deception has its largest effect on conception probability when women have some control over mating and that as female mating choice increases, so does the selective pressure for self-deception.
EXPRESSION AND PURIFICATION OF PGMRC1, A PUTATIVE SIGMA-2 LIGAND RECEPTOR AND Aβ OLIGOMER INTERACTING PROTEIN IN NEURONAL SYNAPSES

Poster: 75
Webber, Hayley
Faculty Mentor(s): Dr. Harry LeVine

Progesterone membrane receptor component 1 (PGMRC1) is a 195 aa heme-binding type II transmembrane protein recently identified as the target of small molecule ligands that displace neurotoxic Aβ oligomers from primary neuronal culture synapses and from the oligomer-rich halo of Aβ plaque pathology in postmortem brain tissue. It remains to be determined whether PGMRC1 directly interacts with the oligomers or Sigma-2 receptor antagonists. We propose that the segment of PGMRC1 C-terminal to the transmembrane domain directly binds Aβ oligomers in competition with Sigma-2 receptor antagonists. PGMRC1 (residues 44-195) cloned into the pGEX 4t-1 vector downstream of the glutathione-S-transferase (GST) expressed in BL21 E. coli produces GST-PGMRC1(44-195) when induced with IPTG. GST-PGMRC1 fusion protein was affinity-purified over immobilized Glutathione resin. PGRMC1(44-195) was cleaved from the immobilized GST-fusion to produce purified PGRMC1 (44-195). The fusion protein will be eluted from the affinity column with free glutathione. Purity and yield of the expressed material was monitored by SDS-PAGE. Binding of biotinylated Aβ(1-42) oligomers to GST-PGMRC1 and to PGMRC1 was be monitored on immobilized (ELISA plate or GSH-beads) or in solution (SEC) and biotin detected. The effect of unlabeled Sigma-2 ligands (agonists and antagonists) on bio-Aβ oligomer binding to GST-PGMRC1 and to PGMRC1 will be assessed. Preliminary tests have shown positive heme binding with minimal binding to Aβ oligomers however, current testing involves scaling up on amounts of PGRMC1 produced. It is possible that additional cellular components are required for binding of the Aβ oligomers and we would observe minimal binding. This would imply a scaffolding role for PGMRC1, consistent with the domain structure of the protein. The binding studies will weigh in on the controversy of whether PGMRC1 is a Sigma-2 receptor or requires a cofactor which is the ligand binding element.

DOES EXPOSURE TO LIGHT AT NIGHT INCREASE ATHEROSCLEROSIS?

Poster: 76
Wendroth, Robert
Faculty Mentor(s): Dr. Julie Pendergast

Exposure to light at night, via electronic devices and light pollution, may be contributing to circadian misalignment and the related health consequences. Previous studies showed that exposure to dim light at night (DLAN) disrupted the timing of food intake and increased body weight in mice, but it is unknown whether DLAN affects the development of heart disease. The objectives of this study were to investigate the effects of DLAN on daily rhythms and the development of atherosclerosis. We used Apolipoprotein E-deficient (ApoE/-) mice because they spontaneously develop atherosclerosis. We single-housed male and female ApoE/- mice in light-tight boxes in 12h light:12h dark (12L:12D) with 10% low-fat diet available ad libitum. After 1 week, mice in the control group remained in 12h-200 lux:12h-0 lux (12L:12D) for 12 weeks, while mice in the DLAN group were housed in 12h-200lux:12h-5 lux for 12 weeks. Our preliminary data suggest that exposure to DLAN, compared to 12L:12D, increased atherosclerotic lesion area in male ApoE/- mice. We next analyzed the effects of DLAN on daily rhythms in ApoE/- and heterozygous PERIOD2::LUCIFERASE (PER2::LUC) circadian reporter mice. We found that ApoE/- and PER2::LUC mice consumed a greater proportion of food during the light phase in DLAN compared to 12L:12D. We next analyzed daily rhythms of eating behavior with infrared video cameras. In 12L:12D, ApoE/- and PER2::LUC mice had high-amplitude daily rhythms of eating behavior that peaked during the night. However, after a few days in DLAN, ApoE/- and PER2::LUC mice had low-amplitude eating behavior rhythms. We next examined the effects of DLAN on the phase relationship between central and peripheral oscillators. We found that DLAN did not affect the phases of any tissues. Together these data suggest that exposure to DLAN increases atherosclerosis and disrupts the daily rhythm of eating behavior, but does not affect circadian organization.
ENVIRONMENTAL CORRELATES OF MELANIN SPOTTING INTENSITY IN GEOGRAPHICALLY VARIABLE REDHEADED PINESAWFLY LARVAE (NEODIPRION LECONTEI)

Poster: 77
Woolfork, Maya
Additional Authors: Kayla Mattingly
Faculty Mentor(s): Dr. Catherine Linnen, Claire O’Quin

Coloration is a highly variable trait in nature, both interspecifically and intraspecifically. In order to understand how this variation in color has arisen and persisted, we must also understand the underlying genetic mechanisms and selective pressures that drive the process of evolution. The pigment melanin has been analyzed in many study systems, but these analyses generally do not address both ecological and genetic perspectives. Previous work has identified genetic loci responsible for differences in melanin levels between light-spotted and dark-spotted populations of the redheaded pinesawfly, Neodiprion lecontei, but the selective pressures driving the difference between the populations remain unknown. Because of the correlation between melanic phenotypes and some possible environmental advantages, we developed three non-mutually exclusive hypotheses explaining the function of dark spotting in N. lecontei: (1) ultraviolet radiation, (2) thermoregulation, (3) dessication resistance. We hypothesize that the intensity of spotting will have a correlative relationship with UV intensity, temperature, and humidity of habitat location, respectively. To test our predictions, samples of 358 N. lecontei larvae collected from the eastern United States and Canada during the years 2001-2015 were imaged. These images were analyzed to determine dorsal and lateral spot number. Spot number serves as an indicator of the amount of melanin present in the larvae. In order to control for larval development stage, we measured head capsule area of each larva. We used collection data (latitude, longitude) to obtain climate data from the WorldClim database. After controlling for developmental stage of the larvae, we used linear regression to determine which climate variables have the strongest correlation with spot number. Our results allow for a better understanding of the mechanisms that may be behind the variation in melanic spotting seen in nature.

** IDENTIFYING GENES IN SOMATIC CELLS THAT IMPACT SPERMATID INDIVIDUALIZATION IN DROSOPHILA MELANOGASTER TESTES

Poster: 78
Authors: Haley Jones, Riley Shumard, Ayana Torrey
Faculty Mentor(s): Dr. Peter Mirabito

The process of spermatogenesis involves the relationship between somatic cells and germline cells. The purpose of this study is to identify genes that play a pivotal role in the somatic cells of Drosophila testes that affect the process within spermatogenesis called individualization. Utilization of the GAL4 UAS system and RNA interference enable the study of the roles of somatic cell gene expression in individualization during spermatogenesis. From this system, fly lines were dissected to obtain testes. Samples from the lines were observed and analyzed for individualization complexes in order to quantify the effects on individualization from inhibiting expression of three different target genes. The anticipated outcome is to conclude whether the target genes being studied influence the individualization of spermatids in hopes to further understand the regulation of other complex cellular processes.
USE OF THE FLIPPED CLASSROOM IN STEM EDUCATION
Poster: 79
Ahmed, Habiba
Faculty Mentor(s): Dr. Kim Woodrum

The declining performance of American students on the global stage coupled with advancements in technology and ideology has catalyzed the exploration of more effective methods of teaching and structuring class time. The "flipped" or "inverted" classroom, in which course material is presented via online lectures before class (thus reserving class time for active learning through practice problems and discussion) has gained popularity as a more efficient alternative to the traditional classroom. This research study, structured around a comprehensive research review and supplemented with primary research in the form of testing data from University of Kentucky General Chemistry classes and experience as a General Chemistry Learning Intern, aims to investigate the efficacy, benefits, and limitations of the flipped classroom in higher education STEM courses. Both primary and secondary findings indicate that the flipped classroom style, when thoughtfully and creatively integrated to match the needs of students and professors, can be a powerful, practical model for higher student academic performance and increased problem-solving ability in STEM courses. Further research should be conducted in order to determine the types of classes that benefit the most from this structure as well as how specific elements of the flipped classroom structure can be adapted to all traditional classrooms in order to promote active learning in students.

** IDENTIFYING INSECTICIDES IN HONEY
Poster: 80
Authors: Lauren Archambeau, Lane Brancheau, Xavier Brickeen, Ashton Edwards, Joscelyn Fennelly, Cristian Samano Garcia, Katherine Johnson, Clay Jolly, Justyn Andrea Musngi, Sacina Zimmerman
Faculty Mentor(s): Dr. David Atwood

Pesticides, herbicides, and fungicides are commonly used in the production of agricultural products. These products kill bacteria, fungi, and unwanted pests, but can have harmful effects on insects and humans at high doses. Bees concentrate the products in the hive when they collect pollen and nectar from flowering plants. This can cause a multitude of problems from Colony Collapse Disorder (CCD) to having pesticides within the honey we eat. There is growing evidence that pesticides contribute to CCD, and specifically, the growing effectiveness and widespread use of newly produced neonicotinoid pesticides. Neonicotinoids (NNCs) distribute throughout plants including the pollen and nectar. NNCs act on the central nervous systems of insects but have lower toxicity to mammals, due to their action on a neural pathway of greater abundance in insects than warm-blooded mammals. In insects, NNCs induce paralysis leading to death within a few hours. A multi-residue analysis was developed to quantify pesticides in honey and its by-products. It consists of a single extraction, based on a modified "QuEChERS method" (Quick Easy Cheap Effective Rugged Safe) followed by gas chromatography. The "QuEChERS method" combines salting-out liquid-liquid extraction with acetonitrile extraction and a dispersive-clean up. Through gas-chromatography and mass spectrum analysis, pesticides that could be in the bee products can be detected and traced back to its origins. Bees are essential for the greater ecosystem to function efficiently and effectively. Through this research, detection of insecticides in honey can be used help find solutions to the detrimental effects insecticides have on bee colonies and conversely the whole ecosystem.
CHARACTERIZATION OF ION TRANSPORT WITHIN PROTEIN-MODIFIED COMPLEX MEMBRANES AND MESOPOROUS SILICA SYSTEMS

Poster: 81

Blood, Stuart

Additional Presenters: Ryan Blood

Faculty Mentor(s): Dr. Peter Kekenes-Huskey

Transport phenomena are ubiquitous and governed by a select few equations or models. Many transport systems generalize to a familiar diffusion equation that are described at the smallest relevant scale as diffusion through a pore. Thermoelectric phenomenon comprising heterogeneous metal-polymer systems serve as a promising proof of concept for modeling thermal and electrical diffusion in interfacial systems. Finite element simulations are well suited to characterizing ion diffusion through mesoporous silica films. The ability to characterize different silica film pore morphologies with FEM indicates that modeling more exotic porous structures is a feasible extension of this technique. A remaining challenge in modeling coated membranes with porous diffusion characteristics is capturing the coupling interface diffusion. Diffusion across compartments with varying diffusivities and not parallel to bulk flow has proved difficult without finite element methods. Implementing these methods on layered and aquaporin modified polymeric membranes captures the flow properties of ions across these membranes. Treating aquaporins as occlusions to ion flow through pores in the polymer membrane allows for further characterization of these novel membranes and necessitates additional probing into the flow characteristics of these systems.

** IMPACT OF AUTOPHAGY IN THE INDUCTION OF APOPTOSIS OF CANCER CELLS

Poster: 82

Authors: Megan Bossle, Joseph Bryant, Thomas Calderaro, Sophie Clark, Katelyn Fields, Addison Jennings, Amy Keith, Keren Ngombo, Bao Tran Nguyen, Viviana Ortiz Guerrero, Ashley Price, Nashwa Saleem, Claire Scott, Dominic Spagnola, Erin Vastag, Hannah Walker

Faculty Mentor(s): Dr. Edmond Rucker

Autophagy is an essential mechanism in maintaining homeostasis in all eukaryotic cells. Such functions of autophagy include degradation of dysfunctional or waste components inside the cell. The mechanism includes the creation of an autophagosome complex, encompassing the cellular waste, which is then fused with a lysosome where degradation via digestive enzymes occurs. Moreover, autophagy is also known to play a role in numerous diseases, such as cancer, neurodegenerative diseases, and heart disease. In cancer, autophagy is utilized in tumor cells to maintain cellular energy, especially in avascularized regions of the tumor. The cells maintain energy by digesting organelles and waste components with the assistance of autophagosome complexes. This allows the avascularized regions of the tumor to remain alive in the absence of nutrients from the blood stream. However, increased autophagy in avascularized tumor cells can result in programmed cell death. Initially, the effects of two chemotherapeutic drugs, cycloheximide and camptothecin, are being tested for their efficacy at inducing cell death in three cell lines: 1) MDA-MB-231, a triple negative breast cancer cell line, 2) HeLa, a cervical cancer cell line, and 3) L929, a mouse fibroblast cell line. First line experiments are being conducted in cells with basal (i.e. normal) levels of autophagy within the following treatment groups: 1) negative control, 2) camptothecin, and 3) cycloheximide. After treatment at 24 or 48 hours, cell numbers are quantitated by hemocytometer. Second line experiments are examining the effect of autophagy induction or suppression on the efficacy of the chemotherapeutic drugs with the three cell lines.

** Denotes STEMCats project
EXOSOME-LIKE NANOVESICLES AS DRUG DELIVERY DEVICES
Poster: 83
Caudill, Elizabeth
Faculty Mentor(s): Dr. Chris Richards

Exosomes are tiny vesicles generated by cells and are believed to be a vehicle for cell to cell communication by delivering their cargo to a target cell. This proves to be a very useful function in regards to medicine because research has recently explored the use of exosomes to carry and deliver therapeutics. The major drawbacks of exosomes are that they are produced with very low efficiency and are complicated to load with cargo. Cell-derived nanovesicles are nano-sized vesicles that behave similarly to exosomes and have the same tendency to target cells. Nanovesicles, however, can be produced much more efficiently and are more easily loaded with cargo. We generated vesicles of different diameters to determine the effect of size on the delivery properties. These different sizes could potentially change the effectiveness or probability of entry into a cell by nanovesicles or the delivery of a drug to a cell.

GPU-ACCELERATED AUTOMATED CLASSIFICATION OF MYOCYTE ULTRA-STRUCTURE FROM/confocal microscopy imaging
Poster: 84
Colli, Dylan
Additional Presenters: Ryan Blood
Faculty Mentor(s): Dr. Peter Kekenes-Huskey

Transverse tubules (TTs) are the main method of delivery of extracellular calcium into cardiac ventricular myocytes, which catalyzes the initiation of calcium induced calcium release (CICR) from the sarcoplasmic reticulum. In healthy tissue, TTs are found in a strongly conserved, striated pattern that aligns with the sarcomere network. In a variety of cardiomyopathies, this network is perturbed, which is believed to correlate with ineffective, dyssynchronous CICR. Confocal microscopy has become the de facto standard for characterization of TT networks, for which several algorithms for detecting and classifying these subcellular structures have emerged. However, the ability to rapidly characterize high-resolution, wide field-of-view microscopy data is stymied by the computational expense of computer vision techniques commonly utilized by such algorithms. Here we present a matched filter technique that leverages graphic processing unit (GPU) acceleration to rapidly characterize strongly heterogeneous TT structure in single cardiomyocytes through millimeter-scale tissue preparations. We find that GPU acceleration offers a substantial reduction in computational expense relative to conventional central processing units, while affording strong performance in the automatic classification of TT structure.

** Denotes STEMcats project
IMPACT OF ROTAMER DIVERSITY ON THE SELF-ASSEMBLY OF NEARLY ISOSTRUCTURAL MOLECULAR SEMICONDUCTORS
Poster: 85
Heifner, Michael
Faculty Mentor(s): Dr. Chad Risko

Organic semiconductors (OSC) are a class of materials derived from π-conjugated molecules and polymers. OSC offer many potential benefits including flexible form factors, solution processability, low-cost production, and tunable electronic and optical response. However, little is known about how changes in molecular structure impact OSC efficiency in different applications. Here we make use of computational chemistry approaches to understand structure-function relationships in OSC. We focused on a series of donor-acceptor oligomers that experimentally demonstrate very different thin film morphologies and materials performance in solar cells. A series of electronic structure calculations showcase how rotamer diversity impacts the preferred oligomer conformation and eventually packing configuration. We are now using molecular dynamic simulations to explore the thermodynamic and kinetic aspects of aggregation in these materials. These computationally based results are providing a bottom up view of OSC properties that will enable more holistic materials design.

** DNA STABILITY AS Affected BY ADDITION OF SMALL MOLECULE
Poster: 86
Authors: Andrew Halecki, John Lyle, Andrea Martin, Maya Reddy, Sarah Veazey
Faculty Mentor(s): Dr. Stephen Testa

The purpose of this project was to test the ability of double-stranded DNA to remain stable when bound to small molecules. Finding the stability of DNA duplex with the addition of a small molecule is not only beneficial for the future of medication, but also furthers the knowledge of DNA duplex as a whole. Changes in DNA stability were assessed as changes in absorbance of the DNA molecule. Absorbance was analyzed upon the addition of a small molecule. Higher absorbance means single stranded DNA is present. The absorbance was measured with a temperature controlled UV-Vis Spectrophotometer. Individual wavelength-absorbance scans were performed using the small molecules themselves. Scans were done to ensure that the absorbance of the DNA was normal, and that the absorbance of the small molecules did not interfere with that of the DNA. The small molecules examined were carboplatin, acetylcholine, ibuprofen, heparin, and L. carnitine. DNA duplex stability was determined by the difference in the melting temperature of the DNA without the small molecule and the DNA with the small molecule. If the temperature increased, then the small molecule increased the stability of the DNA duplex. In contrast, if the melting temperature decreased, then the molecule decreased the stability of the DNA duplex. For each small molecule tested in this project, it was determined that the melting temperature, and therefore DNA duplex stability, was increased. For future projects, it would be beneficial to conduct additional trials to ensure more accurate results. In addition, the DNA stability could be measured with a different technology, which would allow for the evaluation of small molecules that are incompatible with UV-vis spectroscopy.
THE MAGGIE LU METHOD: SCALING UK’S GREAT WALL OF MISUNDERSTANDING OF CHINA’S ART AND CULTURE  
Poster: 87  
Benzenhoefer, Kelly  
Faculty Mentor(s): Dr. Buck Ryan

With China consistently on the global rise, it is more important than ever to understand the unique culture of the Chinese people to not only further understanding but also avert conflicts. At the University of Kentucky, forty percent of the international students are from China. But how well does the university use this resource to its advantage to achieve its strategic goal to “foster greater international exposure for students, faculty, staff, and the community”? Preliminary results from a qualitative research study reveal a striking lack of knowledge about China’s culture among UK’s students. Likewise, UK provides no “decompression chamber” for Chinese students to acclimate themselves to Kentucky’s culture to ensure retention and academic success. An experiment to test possible ways to bridge gaps in cultural knowledge and to scale the Great Wall of Misunderstanding at UK assessed the relative value of fiction and non-fiction sources of information. Preliminary results show promise in using a novel, The Kentucky-Fried Adventures of Maggie Lu, to teach cultural differences through reading and writing and listening and speaking. Chinese students report that they are held back primarily because of their lack of conversational English skills. American students, particularly from Kentucky, confess to a reluctance to engage Chinese students in meaningful conversations because of their lack of knowledge about China and its customs. The Maggie Lu Method provides a possible solution as it teaches China’s culture to the American students in an inviting way. At the same time, it can be used to improve the conversational English skills of Chinese students. Among those who might see value in this study are UK administrators looking for creative ways to provide a global education for students, UK faculty who have struggling Chinese students in class, and UK’s Confucius Institute whose mission includes teaching China’s art and culture.

JOURNEY TO AMERICA: DISCOVERING A PATH TO CHINESE STUDENTS’ SUCCESS  
Poster: 88  
Guo, Lingping  
Faculty Mentor(s): Dr. Buck Ryan

Student success grows in importance to the University of Kentucky as the state legislature has linked funding to its performance on measures such as retention and graduation rates. Another important source of funding is tuition dollars from international students, whose largest segment comes from China. Cultural differences present barriers to these Chinese students’ success, yet UK lacks understanding of what those barriers are and how they can be overcome. A cross-cultural case study of a Chinese student’s journey through higher education in America, told through narrative, tested through interviews, and seen through the theory of social capital (Putnam, 2000), clarifies the many barriers to Chinese students’ success and offers insights into how to unleash untapped potential for academic achievement and personal well-being. The primary barrier to academic success and social interactions with classmates was found to be confidence in English conversation skills. Although these skills are addressed in ESL classes, a more effective approach was found in discipline-based, class team projects where students must participate with classmates in developing the project, then present findings to the entire class. A second important barrier is the Chinese students’ Confucian view of the teacher as someone to respect, not to challenge nor engage in requests for more information or opportunities. What Western professors view as shyness, a trait that appears across cultures, misses an important point about cultural differences in Chinese students that requires the professor to take the initiative to lower the barrier to academic interactions. A third challenge is that opportunities for social interactions tend to center on Bible groups that encourage a conversion to Christianity, something the Chinese students’ parents may oppose. Findings from this study can be valuable to university administrators seeking to improve retention and graduation rates as well as to Chinese student groups on campus.
COMMUNICATION SCIENCES AND DISORDERS

BRIDGING THE GAP IN ASSESSMENT OF CHILDREN WITH AUTISM SPECTRUM DISORDER AND HEARING LOSS
Poster: 89
Reed, Kaylee
Faculty Mentor(s): Dr. Anne Olson

Up to 10% of children with autism may also present with hearing loss. Diagnosis of hearing loss is difficult as the characteristics often overlap with those of autism. Autism spectrum disorder (ASD) is defined by impaired social interaction, atypical communication skills, and restrictive, repetitive, and stereotypical behaviors. Characteristics can include, but are not limited to, regression of developmental milestones, speech and language impairment, and self-stimulating behaviors. Some of these traits in ASD are similar to those with hearing loss. This means that the initial diagnosis of ASD masks the existence of a comorbid hearing loss. Thus, the existence of a hearing loss in children with ASD can be overlooked due to diagnostic overshadowing. This places a child at risk for a delay in identification of permanent hearing loss. Adaptations of assessments of hearing in children with ASD are essential to obtaining an accurate diagnosis. Therefore, the purpose of this poster is to inform families of children with ASD and future clinicians on how to better approach working with this population. Several relevant adaptations to the hearing assessment process are described here and include: A communication board that illustrates the hearing assessment process; A social story that highlights how hearing assessment occurs; A communication platform to be used by patients with ASD during a hearing assessment.

COMPUTER SCIENCE

GOAL ORIENTED RATIONALIZATION FOR INTELLIGENT AGENTS
Poster: 90
Corwin, Adrienne
Faculty Mentor(s): Dr. Brent Harrison

AI decision making has often been viewed as a black box. However, today, with the expansion and integration of AI technology into our daily lives, there is increased interest in improving the transparency of these autonomous agents. Additionally, with increasing interactions between humans and autonomous agents, it becomes important not only for these agents to provide rationale, but to do so in a human understandable way. This is especially difficult in sequential decision making environments where an agents decision making is governed by a utility or scoring function. Thus, this research seeks to enable agents to rationalize about their actions in a human understandable way in terms of a greater goal hierarchy using deep neural networks. To accomplish this, we have developed a gaming environment in which an agent is trained to rationalize about its actions by watching gameplay replays annotated with explanations using an artificial grammar.
REVOLUTIONIZING HYBRID PARALLELIZATION THROUGH DATA COMMUNICATION TECHNIQUES
Poster: 91
Nkansah, Asare
Faculty Mentor(s): Dr. Chad Risko, Dr. Eduardo Santillan

In a world where we are dependent on efficiency, parallel and distributed computing are becoming necessary in almost all aspects of computation. In the computer science field, we are constantly searching for new ways to optimize the implementation of our various software based programs. In the quest for superior performance, we used a simple two-dimensional Lattice-Boltzmann Method Computational Fluid Dynamic simulation to investigate different data communication techniques. The unique improvement of communication was primarily done using distributed computing, but through a combination of distributed and shared memory manipulation, we were able to achieve a level of optimum efficiency that was previously unattainable. In order to prove the scalability of this method high-powered computing, we also created a custom mini-cluster comprised of 16 credit-card sized compute nodes, with a total of 288 cores.

CALIBRATION OF 3D SCANNERS FOR MONITORING DETERIORATION OF PAVED SURFACES
Poster: 92
Stewart, Jack
Additional Presenters: Jacob Culler, Ngoc Phan
Faculty Mentor(s): Dr. Daniel Lau

Aging American roadways are quickly deteriorating. Monitoring over 2.6 million miles of pavement is an extremely resource-intensive process jointly because of the lack of automation and because of the sheer scope of the task. As a result, repairs are often put off until the roads are critically damaged to ease the strain on workers. Often, surfaces that need minor repairs are ignored in favor of those that pose significant safety threats, which demand more immediate attention and funding to restore. If the monitoring process was streamlined through the use of automated 3D scanning technologies, labor forces would have both more time to repair existing roads and more money left to address the minor projects previously ignored. This research will provide valuable information regarding the deployment of several remote, self-sufficient robots which would allow paved surfaces to be monitored much more frequently, allowing repair crews to begin addressing the minor, inexpensive repairs as well as the larger, more expensive ones. The automation of the scanning process depends on the ability of robots equipped with 3D scanners to follow preset paths as well as the proper calibration of the 3D scanners themselves. To calibrate these devices, serial communication can be used to relay commands to a stepper motor-driven cross slide assembly. The calibration of the device’s camera will occur once it captures images from four known locations along its range of motion.
DESIGN

MEASURING UP: SUSTAINABILITY ASSESSMENT OF CAMPUS BUILDINGS AT THE UNIVERSITY OF KENTUCKY
Poster: 93
Haley, Megan
Faculty Mentor(s): Rebekah Radtke

The primary goal of this project is to expand the definition and evaluation of sustainability in the built environment to include environmental, social, and economic factors, and to create a comprehensive metric that considers triple bottom line impacts. We have three objectives in this project. First, we will develop a survey and toolkit for measuring the social sustainability of campus buildings. The toolkit consists of building performance measurement equipment, methods for collecting data on social patterns of use, and economic models. Second, we will complete a pilot study of the Gatton College of Business and Economics building using this toolkit. We will utilize these variables and how they impact the wellbeing, comfort, and productivity of students, staff, faculty, and visitors to the newly renovated structure. We will make available these resources and findings to facilitate future research in sustainability assessment. The principle outcome of this project is a comprehensive metric that considers environmental, social, and economic factors in the sustainability assessment of the built environment. Other outcomes include an increased awareness among campus stakeholders of the multidimensional aspects of sustainability, inclusive of environmental, social, and economic variables, as well as a better understanding of features in the built environment that contribute to academic success and a growing sense of community.

FUNKHouser BUILDING: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE
Poster: 94
Harvey, Talia
Additional Authors: Katie Coyne
Faculty Mentor(s): Rebekah Radtke

The purpose of this research is to focus on the University of Kentucky’s historic buildings as part of the 2018 Sustainability Research Grant. The Funkhouser Building is one of the seven core buildings being reviewed in the Grant. The intent is to preserve the historical context of the buildings, while ensuring that they are being used to their fullest extent for future use. The research will fulfill the goal to modernize the university, enhance the classroom environment, as well as create student centered environments that pursue the pedagogical advancements of the twenty-first century. Methods employed included researching the history of the building, documentation of existing conditions, observations of use all documented by reviewing existing photos, taking new photos and sketches noting the issues throughout the building. By including these elements as a part of the research, future implications can be thought through and further explored. The review of the current status of the building will allow the Sustainability team to begin to outline how to improve the building for future use. By providing samples for spatial re-organization and visualizing options of new spaces and multimodal classrooms, the facilities team at the University can begin to manage the re-organization of necessary areas around campus to be more accessible to students and visitors to the campus. The process of modernizing areas to be student workspaces/lounges or classrooms will be done so with visual diagrams, including a rough outline of how the spaces can be laid out and which departments or occupants may remain in the building. Designs of classrooms and student spaces will be provided by digital renderings. These will show potential ideas of what could be done for the new classroom or student lounge being proposed for the space.
LAFFERTY HALL: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE
Poster: 95
Jackson, Claire
Additional Authors: Kasey Farrell
Faculty Mentor(s): Christina Birkentall

The research intention was to explore ways to bring the historical buildings on the campus of University of Kentucky into the 21st century by modernizing the student spaces thereby providing places which align with contemporary learning practices. The aim is to provide options for space usage in order to renovate Lafferty Hall while retaining the historical character and quality of the building. Lafferty Hall is one of seven buildings on UK’s campus that the Sustainability Grant Team is trying to update and incorporate into the campus core. Lafferty Hall was built in 1936 and was originally intended to be the College of Law Library. M.I. King Library is also being considered in this research project for potential restoration and relocation. Through historical research the team determined how and why Lafferty was originally built. Other research methods included observations, recording field conditions, reviewing existing codes that apply to accessibility, lighting, signage and materials. Suggestions were made for applying current building codes to Lafferty Hall in order to make it a fully functional space. New designs incorporating multimodal learning environments and study lounges will be proposed with digital renderings and plans. As part of this holistic view of the seven buildings, it was determined that Lafferty Hall has the ideal location on campus and enough space to house a vital portion of Special Collections that need to stay on campus while the remainder is relocated in an off-site storage facility. Sketching existing conditions will inform the future vision and larger implications of historically preserving Lafferty Hall, restoring its original purpose as a library, and provide contemporary group and private study spaces for students.

WHAT DOES A TREE HAVE TO DO WITH INTERIOR DESIGN?
Poster: 96
King, Alexa
Additional Authors: Noura Al Balushi, Hannah Thomas, Emily Andreasson, Brooke Blanchette
Faculty Mentor(s): Helen Turner

Environmental sustainability is no longer just a buzz word or a talking point - it is a fact of life. Unfortunately, the built environment is one of the main contributors linked to the shortages of our Earth’s natural resources and to the rising environmental/ecological concerns (Hawthorne, 2003). Designing built environments to be biophilic and sustainable through the reduction of waste and energy is becoming more of a global request than a trend. Another aspect of sustainable design includes the preservation of our natural and built environments. Consequentially, the social responsibility for design professionals, educators, and students to adopt sustainable design is not merely a theoretical framework, but in strategic practice (Sorrento, 2012; Steig, 2006). One such exploration in biophilic and sustainable design involved first-year interiors students through conceptual design of a support system to preserve a significant and old Bur Oak at the McConnell Springs Park. The design process required researching, analytical thinking, sketching, model making, dialogue, field visits, project critiques, and a final presentation to the community as clients. This thesis was inspired by Helen Turner, Assistant Professor at the School of Interiors, while serving as a member of the Citizens Environmental Academy in 2017.

** Denotes STEMcats project
MCVEY HALL: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE
Poster: 97
Krake, Korie
Additional Authors: Aimee Craighead
Faculty Mentor(s): Christina Birkentall
The University of Kentucky has historical buildings on campus that are key components in enhancing the educational experiences and enlightenment for students and faculty. The current state of the buildings doesn’t positively advance the pedagogical and scholarly standards that the university would like as common. The modernization of the university with consideration to historical precedence and sustainability would be a vital step in improving the overall impact on students during their time on campus. Of these buildings, McVey Hall, named for previous UK president Frank L. McVey, is an excellent example of a university building in need for revaluation and assessment. Site observations, interviews, and the recording of field conditions helped to create a more well-rounded view of the buildings needs, functions, and the role that it plays on the campus as a whole. These studies reveal the need for improvement of accessibility, the upgrading of light quality, and the renovation of wayfinding and overall aesthetics. McVey Hall houses the computer data center for the University. Relocation of this center will free up much needed main campus space. The new modern data center may cost over $40 million, per the report done in 2012, which stated: “The existing data centers have insufficient space, and insufficient electrical power (both normal and emergency) and cooling for the University’s supercomputer, IRIS servers, and many other servers supporting the students, faculty and staff of the University of Kentucky.” To achieve a cohesive relationship between McVey and the campus as a whole, taking steps to make the building more student accessible and welcoming is a necessity. This can be accomplished by creating space for student centered activities. Blocking diagrams and digital renderings of new student classrooms and student-centered workspaces will be an inspiration for what the building could become in the future.

STAFF PERCEPTIONS OF CHANGING FROM OPEN BAY SYSTEM TO SINGLE PATIENT FAMILY ROOMS
Poster: 98
Miracle, Caroline
Faculty Mentor(s): Lindsey Fay
This study investigates qualitative and quantitative measures of overall staff perceptions within a Neonatal Intensive Care Unit (NICU) at the University of Kentucky Chandler Medical Center as it moves from an open bay system to single-family patient rooms. Advancements in evidence-based design and a greater focus on patient and family-centered care, the inclusion of single patient rooms, and improvements in technology, have led to the implementation of single-family rooms versus the traditional open bay NICU design. The single-family room system was implemented with the goals of increasing privacy for families, offering better control over environmental stimuli, and reducing infections. However, these changes have additionally been found to have a significant impact on staff perceptions of the environment relative to satisfaction and efficiency of care. The challenge now remains to weigh the implications of these changes in the patient-care process relative to satisfaction and design. Prior research reflects an increase in staff satisfaction with the change from open bay to single-patient rooms. In a study by Bosch, Bledsoe, & Jenzarli (2012), staff rated the single-family (NICU) room more positively relative to quality of work environment, quality of patient care, job quality, safety and security, interaction with technology, and overall satisfaction.

** Denotes STEMcats project
DESIGNING A NEW BIRTH EXPERIENCE: A FREESTANDING BIRTH CENTER FOR CENTRAL KENTUCKY
Poster: 99
Moore, Jessica
Faculty Mentor(s): Lindsey Fay

In the U.S. healthcare sector, the traditional design and implementation of labor and delivery rooms do not support evidence-based maternity care best practices. In response to a healthcare model that has become increasingly standardized and profit-driven, women are looking for alternative delivery and maternity care options that better support their choices and health. According to the American Association of Birth Centers, Kentucky is one of only thirteen states nationwide that does not have a freestanding birth center, limiting the health choices of female residents. To address this through the perspective of design, research was conducted via a survey of women and professionals regarding an independent birth center that supports evidence-based practices for Central Kentucky. A total of 858 responses were collected, providing a wide breadth of experiences and opinions. The survey indicated that women overall were generally open to considering a birth center for their care, and described the amenities and environment they would prefer during childbirth. Additionally, various case studies of hospital maternity wards and freestanding birth centers were analyzed for implementation of best care practices and design integration. Using this research combined with survey results as a foundation, a birth center design proposal was developed to address the needs of twenty-first century women and implement design guidelines from the American Association of Birth Centers. The proposed freestanding birth center contains three birthing rooms, four exam rooms, a community kitchen, a classroom, and features that encourage evidence-based options such as movement, upright positioning, eating and drinking, and water immersion during labor. Ultimately, this research project hopes to promote a growing awareness of evidence-based care and advocate for the rights of women in healthcare, supporting the highest standard of health for childbirth.

KASTLE HALL: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE
Poster: 100
Ogle, Amber
Additional Authors: Kait Hurley
Faculty Mentor(s): Christina Birkentall

This project goal is to preserve the University of Kentucky’s historical campus buildings while also updating them with regards to ADA regulations, fire safety codes, and general building codes. Keeping buildings intact and re-designed for new needs is one of the most sustainable approaches as determined by preservation goals. The research team which studied Kastle Hall has documented the existing conditions and history of Kastle Hall, which was constructed in two phases in 1909 and was completed in 1926. Kastle Hall currently does not meet the 2018 International Existing Building Codes (IEBC) or accessibility requirements. The data was obtained through extensive historical research and observation throughout the project. In these observations, circulation paths, main egress areas, and occupant loads were analyzed. Observations were recorded through photographs and field notes which also documented existing conditions and fire safety. Additionally, current accessibility codes were reviewed to be properly applied in the subsequent final results. Research findings show that there are neglected spaces throughout the building. The current arrangement of space is mostly large faculty offices, little-used labs, and storage of records. Due to the location of the building, in the core of campus, research supports reassigning and rearranging spaces such as offices, classrooms, and laboratories. The research discovered concerns regarding the building accessibility, energy use, and signage codes violations. Users should be able to navigate throughout the space fully and successfully, while also getting to enjoy every aspect of Kastle Hall. It is the intent to conclude this project with alternative floorplans which will utilize the spaces while bringing the building usage up to twenty-first century pedagogical needs. These plans will take into consideration current student needs while balancing existing department demands.

** Denotes STEMcats project
MEMORIAL HALL: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE

Poster: 101
Poage, Allison

Additional Authors: Taylor Fussell
Faculty Mentor(s): Christina Birkentall

The goal for the research project is to modernize the core buildings within the main campus of the University of Kentucky. Memorial Hall is one of the iconic historical buildings on campus, but serves very few and lacks accessibility as required by current codes. Working with the Sustainability Grant team, this project explores how to retain the historical features of the building while creating new spaces which meet the needs of the student population of the twenty-first century. Through observational research and recorded field conditions, problems were discovered and this project intends to help propose solutions. Existing codes were researched in order to know what needs to be applied and updated. Historical research was also conducted to learn more about how and why this building was built and deserves to be preserved. Observational sketching was done in order to analyze the current conditions and details of the space. Upon review of the existing building, there were evident concerns with accessibility and meeting codes. Memorial Hall has very limited access to the building for any handicap or a user with disabilities. The building will need to be renovated in order to better accommodate every user. The goal is to allow everyone to enjoy every space and aspect of Memorial Hall. The goal is to continue preserving this historic landmark while letting it reach its maximum potential. Through the use of diagrams and planning drawings, the researchers will propose solutions to the accessibility concerns as well as provide examples of contemporary learning and work spaces. The building has minimal use now, the intent is increase the use of this historic building by designing it for new purposes and uses.

PENCE HALL: HISTORIC PRESERVATION AS SUSTAINABLE FUTURE

Poster: 102
Rhoten, Bailley

Additional Authors: Robbin Thompson
Faculty Mentor(s): Christina Birkentall

As part of the undergraduate research team for the Sustainability Grant for Historic Preservation, each team was responsible to research existing conditions and recommend potential improvements to reduce energy costs, comply with ADA, and achieve more efficient use. This review of Pence Hall, intends to showcase the building with new uses, for general classrooms and study spaces. Methods of the research includes documenting the history of the building, with a focus on major renovations that have been done to building over the time span of its existence. Observation of current use was done at several intervals, allowing study of the people within and the paths throughout the building. Pence Hall is currently under minor renovation in the basement to allow for a more student centric study space. From these observations and field conditions documentation, solutions to problems can be addressed. The building is not sprinklered and has the original wood floors. There is a woodshop in the basement, with laser cutters and other noisy equipment. Fire hazards are evident as its lack of accessibility for students who may have mobility impairments. Way finding is lacking, adding to the confusion of the visitor. Currently there are only six bathrooms throughout the whole building, which does not meet code nor student needs. All of these issues and concerns can be solved in order to improve the function of the building. With the intent of relocating the current occupants to another location to be determined, and by reviewing existing conditions, and presenting designs for new student centered spaces and classrooms, the research team may be able to assist the university in finding ways to meet the needs of the contemporary pedagogical concerns. Through plans, specification, and renderings, the team will create solutions for accessibility and better usability for the university.
CARING FOR CAMBODIA: A COMMUNAL ORAL HEALTH + WELLNESS CENTER
Poster: 103
Schrider, Carly
Faculty Mentor(s): Lindsey Fay, Helen Turner

The developing country of Cambodia has been working to improve their public health system through their Health Sector Strategic Plans since the 1990s and is currently working towards their Sustainable Development Goals. However, the Cambodian government still faces challenges that hinder their ability to provide potable water, basic medical healthcare, and informative education pertaining to the importance of health, nutrition and wellness to all of the varying socio-economic populations. Currently, there is little to no access to basic medical healthcare or clean water from the floating village communities along the Tonle Sap Lake of the Siem Reap Province. This is a major issue as these communities rely on the polluted lake as their main source of drinking and bath water, as well as their fishery, and collective sewage system. As a result, these village communities lack sufficient nutrients and are suffering from poor oral health and disease. Based on field observations conducted during education abroad in January, 2017, the compilation of continual research, and evidence-based design, a communal dental and wellness center will be designed to provide the largest floating village, Kompong Khleang, among others with access to a communal dental health and wellness center. This center will provide access to a fully-funded dental clinic, potable water produced through an aquaponics system, which will produce clean water and healthy fish, as well as an education center that will focus on the importance of and link between sustaining proper oral care, nutrition, water, and wellness. The project will consider the importance of place, cultural and communal values, and the natural surroundings to provide a trusting and comforting interior and exterior environment. Through this project model, the overriding goal is to help provide, support, and sustain better health and wellness among the community members of the Siem Reap’s Villages over time.

DESIGNING HEALTHCARE
Poster: 104
VanDierendonck, Alyssa
Faculty Mentor(s): Lindsey Fay

Too often, there is a disconnect between the fields of healthcare and design. The research that was completed in the summer of 2017 aimed to identify other universities that are forwarding research related to healthcare and design through centers or programs that might offer a degree with the hopes that these models could be used to enhance the University of Kentucky. A healthcare design center is a designated place on a university campus that has an accredited college of design program, as well as a nursing, medical or health program. This center is a place to collaborate all user groups as well as create an environment that encourages interdisciplinary research and discoveries. In turn, these centers help students understand evidence-based design and allow all students to enhance their own disciplines including nursing, healthcare, and design. This will further lead to student-based research opportunities to expand their learning outcomes. I have found that overall ten centers were identified in seven states. The focuses of the centers range from healthy communities to integrating design to practice. The findings of this research can be translated to beginning a healthcare design program at the University of Kentucky. This will include community involvement of the hospital and the college of nursing to work with the college of design. This research was beneficial to understand the needs of creating a program as well as seeing examples of other University and what works for them, and what will work best for the University of Kentucky. One of the most beneficial areas of creating a healthcare-design research center is to create connections between colleges. The collaborations with the colleges will educate students in both disciplines about areas outside of their major.

** Denotes STEMcats project
PROTEIN INTAKE AND ACADEMIC PERFORMANCE AMONG UNIVERSITY OF KENTUCKY STUDENTS
Poster: 105
Alturkistani, Ahmad
Faculty Mentor(s): Jessica Houlihan

The National Institute of Health recommends for adults to consume 0.8 grams of protein a day for each 1 kilogram of bodyweight. Currently, it is unclear how many individuals on average are following these guidelines and how both high and low protein intakes would have an effect on academic performance in students. This study aims to define the relationship between the optimum daily protein intake and the academic performance of UK students. It is hypothesized that UK students who have their daily intake of protein closer to their recommended protein intake would have a higher grade point average (GPA) than those who have it farther. Methods: The main data was self-reported by 39 UK students (18 males, 21 females) through a cross-sectional survey. Protein intakes were calculated from a self-reported 24 hour recall question. Surveys were distributed electronically through social media. A t-test and Pearson correlation coefficients were used to evaluate the observed correlations. Results: 15% of students consumed more than 200% of their recommended DRI of protein. Female students consumed less protein (57.1 grams) and were physically less active on average compared male students (94.8 grams). There was no correlation between GPA and protein intake (r=0.09). Main correlation of the study, GPA and ΔI (the difference between the calculated individualistic DRI of protein and the actual intake of protein), were observed to counteract the hypothesis, but were statistically insignificant (p=0.09). Conclusion: The results confirm other study findings that female college students tend to consume less dietary protein than male students, and that college students tend to overall consume more protein than their DRIs. The results indicate that protein intake according to the recommendations does not affect academic performance. Future studies are suggested to use different methods for calculating protein intakes and to conduct the studies on larger scales.

CORRELATION BETWEEN RUNNING AND FRUIT/VEGETABLE CONSUMPTION IN UNDERGRADUATE AND GRADUATE STUDENTS
Poster: 106
Basham, Ross
Faculty Mentor(s): Jessica Houlihan

Running is one of the most popular forms of exercise amongst college students and the general adult population. However, there are many runners who do not pay attention to their diet and if they do, only focus on carbohydrates and protein. Current research lacks information regarding the correlation between running frequency and fruit and vegetable consumption. There is a small amount that examines the relationship between diet and exercise but there is very little between running habits and fruit and vegetable consumption. This research seeks to examine the correlation between running frequency (independent variable) and fruit/vegetable consumption (dependent variable). The hypothesis states that there will be a positive correlation between running frequency and fruit/vegetable consumption among college students. The study population consisted of approximately 1,600 undergraduate, graduate, and non-traditional college and university students across the world. The largest group surveyed was graduate students followed by undergraduates and then non-traditional students. The data was collected through in-person solicitation, social media, and on the /r/running Subreddit of Reddit.com. The study conducted was a cross-sectional survey and Qualtrics software was utilized as the survey platform. A Pearson correlation test was used for the post-collection data analysis. Based on the Pearson correlation, there was an r-value of 0.82 showing a strong, positive correlation between the independent and dependent variable. The original hypothesis stated that there would be a positive correlation between running frequency and fruit/vegetable consumption. The significant r-value demonstrated that as running frequency increased, fruit/vegetable consumption did as well. The result of the study can be used to further analyze diet trends among college runners and students in general. It can also be applied to other food groups besides fruits and vegetables and other types of aerobic exercise can be analyzed for correlations as well.
ASSOCIATION BETWEEN STUDENTS’ MAJORS AND THEIR PHYSICAL ACTIVITY AND EATING HABITS
Poster: 107
Bolvin, Shannon
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that students at the University of Kentucky, who have a science based major, are more likely to eat healthier and engage in more physical activity than students who do not. Many studies have looked into college students and their rates of physical fitness or eating habits but few have looked at students’ majors compared to these factors. This study aims to determine if a student’s major (science vs. non-science) has any effect on their physical activity and eating behaviors. From the population of University of Kentucky students, data was collected from 100 participants consisting of 62 science major students and 38 non-science major students. A cross-sectional survey that examined the student physical activity and food consumption was distributed through forms of messaging and social media. Results were analyzed through t-tests and simple statistics. T-tests and averages were conducted for 8 different questions/categories. The amount of moderate exercise, vigorous aerobic activities, strength training exercises, grains, vegetables, fruits, dairy and protein consumed or preformed were all measured. The students of science based majors had overall higher means of all categories. However, most of the averages for non-science major students were very similar. When looking at the t-tests values only three were statically significant, those being moderate exercise (p=0.01), vegetables (p=0.03) and fruit intake (p=0.001). In conclusion, the results show that a student’s major affects certain aspects of physical activity and eating habits. Although some were found to be significant, 5 out of the 8 categories were not statically significant when analyzing student’s majors and aspects of healthy lifestyles. However, limitations were part of this study, and it is suggested that further research should be done on this topic.

DIFFERENCE OF WORKOUT SUPPLEMENTATION IN GENDER
Poster: 108
Budoi, Megan
Faculty Mentor(s): Jessica Houlihan

Pre-workout supplementation is believed to improve performance in a workout. This study aims to determine the relationship between gender and the use of supplementation. Studying how supplements affect a person’s body is important due to the increased popularity of these supplements in society today. Although there is a lot of research involving the effects of these supplements, there is limited data involving supplementation use and its correlation to gender. It is hypothesized that college men will be more likely to take pre-workout supplementation before a workout than college women. Methods: In this study, 52 undergraduate students at the University of Kentucky were asked to fill out a survey about their use of pre-workout supplementation. The survey was sent out online through Facebook groups and GroupMe chats. Through a cross sectional survey, the students were asked to report how often they exercised in the past month, the type of exercise they did while at the gym, if they used supplementation, and report any benefits the supplements provided the workout. A t-test was used to analyze the data. Results: 5.5% of the female respondents used supplementation, where as 37.5% of males reported using supplementation. A t-test showed that there was no significance between gender and the use of supplementation (p=0.299). 33% of the participants reported that supplements gave them more energy; with 25% stating it gave them more muscle endurance. The results show that males are more likely to take supplementation than females. This information could help in studying supplementation effects the body with knowing what population they should be targeting. Future research could study a larger population of people more closely at the gym in their uses of supplementation, rather than looking at the college campus as a whole.
THE EFFECTS OF BMI AND HEALTH CONDITIONS ON OSTEOARTHRITIS IN YOUNG ADULTS

Poster: 109  
Bush, Jacob  
Faculty Mentor(s): Jessica Houlihan

Osteoarthritis impacts nearly twenty-seven million Americans and is the most prevalent chronic joint condition in the United States. Though most people who suffer from osteoarthritis are above the age of sixty-five, it is a disease that can occur in people of all ages. Chances of developing osteoarthritis have been known to increase with age, obesity, previous joint injury, and overall overuse of joints. There is little to no research done on osteoarthritis in young adults. This study aims to investigate how BMI may influence a young adult’s chances of developing osteoarthritis later in life. Furthermore, this study also aims to investigate how factors such as physical activity, diet, and the diagnosis of an injury to the knee joint in early adulthood may also influence a young adult’s chances of developing osteoarthritis later in life.

Methods: The population being studied consisted of about 22,500 undergraduate college students attending the University of Kentucky during spring of 2018. A total of 125 participants were between the ages of 17 and 24 years old and include both males and females of various ethnicities, cultures, and backgrounds. Participants were either full time or part time students and represent students from all educational fields provided by the university. A self-report, cross-sectional survey was conducted both online, and on the University’s campus at multiple locations during the spring semester of 2018.

Results/Conclusion: This study looked at how participants’ BMIs related to them experiencing knee pain and discomfort. It was hypothesized that a higher BMI would result in more knee pain. The findings of this study provide a variety of implications for the diagnosis and prevention of osteoarthritis later in life.

INFLUENCE OF RESIDENCE PROXIMITY TO RECREATION CENTER ON COLLEGE STUDENTS’ EXERCISE HABITS

Poster: 110  
Busse, Aundrea  
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that residence proximity to the campus recreation center affects the exercise habits of college students, specifically the closer students live to the recreation center, the more exercise they will get. Currently, there is little research on how the location of students’ residence affects their exercise habits. This study aims to analyze the effect of residence proximity to the recreation center on college students’ exercise by distributing a cross-sectional survey to University of Kentucky students. Data was collected from 105 college students enrolled at the University of Kentucky (88 females and 16 males). Surveys were distributed via the University of Kentucky Class of 2018, 2019, 2020, and 2021s respective Facebook pages. The survey recorded students’ days of vigorous and moderate activity per week, minutes of vigorous and moderate activity per day, location of residence, and where they did the majority of their activity. Pearson Correlations were conducted. Moderately strong negative correlations were found between residence proximity to the Johnson Center and both the total amount of vigorous (r = -0.502) and moderate (r = -0.45) activity per week. A strong negative correlation was found between residence proximity to the Johnson Center and the amount of people who attend the Johnson Center at a given residence distance (r = -0.91). The results suggest that residence proximity to the campus recreational facility has a moderate effect on the amount of exercise performed per week. However, proximity to the recreational facility does have a strong effect on the amount of people who actually attend the facility. Further research with larger sample sizes is needed to gain a more complete picture.
THE EFFECT OF MEAL PLAN CHOICE ON FIRST-SEMESTER COLLEGE STUDENT WEIGHT GAIN

Poster: 111
Chadwell, John
Faculty Mentor(s): Jessica Houlihan

For years, people have warned high school seniors of the dreaded “freshman fifteen”. While the freshman fifteen has been found to actually be just less than four pounds of weight gain during the average freshman year, weight gain is still a problem. College students who become overweight or obese are at a greater risk of being overweight or obese as they age so strategies are necessary to prevent this weight gain. It is not known precisely if the choice of meal plans provided by a university impacts the weight gained by the freshman students. What is the relationship between choice of dining meal plan and weight gain after the first semester of freshman University of Kentucky (UK) students? This study aims to determine through survey, which, if any, UK dining meal plan reduces first semester freshman weight gain the most. It is hypothesized that the meal plan with the most amount of meals per week will have the least amount of weight gained for freshman students. This study surveyed 100 former or current UK freshman students gaining 69 useful responses. Data from this cross-sectional survey was collected near a dining hall and classroom building on UK’s campus. Weight change variance among dining plans was calculated through an ANOVA test. The analysis showed that results as not significant, F(4, 64) = 0.47864. The p-value calculated is p =0.751272. Thus, the result is not significant. These results suggest that weight gain during the first semester of freshman year is not significantly affected by residential meal plan choice at the University of Kentucky. Consequently, there can be no recommendation on which meal plan best prevents freshman year weight gain. Future studies should seek other methods of preventing freshman weight gain.

ASSOCIATION BETWEEN ARTIFICIALLY SWEETENED BEVERAGES AND BODY MASS INDEX OF UNIVERSITY OF KENTUCKY UNDERGRADUATE STUDENTS

Poster: 112
Chadwell, Lauren
Faculty Mentor(s): Jessica Houlihan

Because of the obesity epidemic in America, many consumers are using artificially sweetened beverages as a way to reduce caloric intake. However, there is conflicting research whether consumers of artificially sweetened beverages have lower body mass indexes (BMI). This study aims to determine, if any, the correlation between amounts of regularly consumed artificially sweetened beverages and the BMI of University of Kentucky students. Using a cross sectional survey, 92 University of Kentucky students amount of regularly consumed artificially sweetened beverages, as well as sugar sweetened beverages were recorded. Additionally, BMIs were calculated. Surveys were distributed randomly at the University of Kentucky Bowmen’s Den. A Pearson Correlation test was used to determine the association between artificially sweetened beverages and BMI. The average body mass index of the sample population was 24.56, with a standard deviation of 5.2. 2.0% of the sample population are considered underweight, 66.3% are normal weight, 20.7% are overweight, and 12.98% are obese. 63% of the sample population regularly consumes sugar-sweetened beverages. The Pearson Correlation coefficient for artificially sweetened beverages and BMI was 0.34, compared to the Pearson Correlations coefficient for sugar sweetened beverages and BMI of 0.02. This study found that as consumption of artificially sweetened beverages increases, so does the BMI of University of Kentucky students. Of those that reported consuming artificially sweetened beverages regularly, 51.6% students chose the reason for choosing artificially sweetened beverages over sugar sweetened beverages was to lose weight. This study shows a small positive correlation between University of Kentucky college student’s consumption of artificially sweetened beverages and their BMIs. This information is helpful to anyone who is substituting artificially sweetened beverages in place of sugar-sweetened beverages for weight loss. Further research is needed to accurately determine the effects of artificially sweetened beverages on BMI.

** Denotes STEMcats project
PARTICIPATION IN SPORTS DURING HIGH SCHOOL AND BMI IN COLLEGE
Poster: 113
Coldiron, Kara
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that college students who participated in sports during high school will have a lower body mass index (BMI) than college students who did not participate in sports during high school. However, much of the current research looks at other variables contributing to BMI changes in college, such as dietary choices, alcohol consumption, and more freedom of choice. This study aims to determine the association between participation in sports during high school and one’s BMI in college using a cross-sectional survey.

Methods: Data was collected from 110 students at the University of Kentucky (91 females, 19 males). An electronic, cross-sectional survey was distributed using a snowball sampling method. The survey recorded information about sports participation in high school, height, weight, current level of physical activity, and demographics. A t-test was conducted after data collection.

Results: 91.8% of the sample population participated in sports during high school, while 8.2% did not. The average BMI of the sample population that did participate in sports during high school was 24.83 ± 4.8. Additionally, the average BMI of the sample population that did not participate in sports during high school was 26.82 ± 3.73. A t-test indicated that there is no difference (p=0.234) between the average BMI of the two groups. Furthermore, 60.39% of subjects that participated in sports during high school reported that they currently work out 3-7 days per week, while only 44% of participants that did not participate in sports during high school reported they currently work out 3-7 days per week.

Conclusion: The results suggest that participation in sports during high school does not affect BMI in college. However, due to the majority of the subjects having participated in sports during high school, this conclusion is likely not accurate. More research is needed to make further conclusions.

ANXIETY AND GPA
Poster: 114
Daniel, Wesley
Faculty Mentor(s): Jessica Houlihan

In recent years anxiety, and mental health in general, has gained quite a bit of popularity. While anxiety used to be something that people never thought about, or at least never talked about, emerging research suggests that it plays a large role in the everyday lives of most people. With the many life transitions, difficult classes, and relationship troubles, overwhelming anxiety in college students is more prevalent. While there has been research on these two topics individually, there is little research done relating the two. It is hypothesized that the more self-perceived anxiety a person experiences, the lower their GPA will be.

Methods: Approximately 133 college students were recruited via social media to take a survey using the University of Kentucky’s Qualtrics software. This was a cross-sectional study and a correlation and simple regression test were used to analyze the data.

Results: The data shows that most people feel that they experience a fair amount of anxiety in their lives. However, there are no clear trends in the data that suggest this anxiety has negative effects on their overall GPA’s. Upon running a correlation and simple regression test for the independent variable (self-perceived anxiety) and the dependent variable (overall GPA), the p-values both came out to be greater than 0.05. This means that the tests show the relationships between the two variables are not statistically significant.

Conclusion: For future studies on the relationship between anxiety and GPA in college students, a larger survey population would be ideal and using a more validated anxiety test would decrease limitations. While anxiety does pose some hindrance on academic performance in college students, it does not seem to be correlated with a lower overall GPA. However, more research needs to be done on this topic before any definitive claims can be made.
THE EFFECTS OF ESSENTIAL OIL AROMATHERAPY ON SLEEP QUALITY OF COLLEGE STUDENTS
Poster: 115
DePaso, Avery
Faculty Mentor(s): Jessica Houlihan

Studies have shown essential oil aromatherapy to be effective in improving sleep quality in adults, but the college student population has not yet been evaluated. Disruption caused by classes, living situation, diet, and stress, in college life can have detrimental effects on the sleep habits and quality of students. This research will provide insight to an otherwise not-studied demographic. This survey will be used to determine the frequency of essential oil use on campus and its relation to student sleep quality. It is hypothesized that college students surveyed who use essential oils will be better rested according to the Epworth Sleepiness Scale than those who do not use essential oils. Data was collected through self-reported survey, distributed directly to the student electronically. The survey recorded frequency of essential oil use, method (topical or inhalation), sleep quality (Epworth Sleepiness Scale), and perceived effectiveness of essential oil use in improving sleep quality. A Fisher’s exact test was conducted and the p-value for sleepiness among users vs. non-user groups was 0.042. This p-value is statistically significant indicating that there is a difference in level of sleepiness between user and non-user groups. The average score from the Epworth Sleepiness Scale for users was 8, which indicates a normal level of sleepiness and the average for non-users was 6.8, which also falls within the normal range of daytime sleepiness. The results of this study indicate that 72% of student participants use essential oil aromatherapy and 39% of participants experience more sleepiness than normal. Further research should be done to examine if the larger number of above average sleepiness in essential oil users is due to an external factor.

IMMUNIZATION REFUSAL IN COMMUNITY PHARMACY
Poster: 116
Doerr, Ashley
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that immunizations provided by the pharmacy are underutilized due to patients commonly refusing as they perceive there are more opportunities to vaccinate. However, little is known about patient decision making regarding immunizations in the community pharmacy setting. This study aims to determine patient response to immunization through questioning to determine whether refusal is scientifically founded or unfounded; determine if convenience prompts patients to say yes when they would otherwise say no; determine whether specific vaccines have associations with specific refusal reasons; and determine whether the time of year has an effect on how many people refuse. Data was collected from 141 patients who filled their prescriptions at a local community pharmacy. An observational survey was utilized by the pharmacy to document the patient responses. The survey recorded the most common refusal reasons for 5 immunizations: influenza, Prevnar13, Pneumovax23, Tdap, and Zostavax. The refusal reasons consisted of those that were scientifically unfounded including patients who perceived they didn’t need vaccines, history of immunization illness, rumor, and fear. It also included those that were scientifically founded such as allergy, immunization by other provider, or immunization at another time. Descriptive analysis was used to review the results. The most commonly refused immunization was influenza (80.9%), and the most common refusal reason overall was that the patient would get the vaccine at another time (27.7%). When looking at the influenza immunization, there was a 13.8% rate of vaccine hesitancy, where there were about half were unfounded refusals and the other half were founded refusals. The results suggest that pharmacists should place greater emphasis on immunizing at the current interaction.

** Denotes STEMcats project
COMPARING THE KNOWLEDGE OF COLLEGE STUDENTS WITH OR WITHOUT A FAMILY HISTORY ABOUT TYPE 2 DIABETES

Poster:  117
Groswald, Amy
Faculty Mentor(s):  Jessica Houlihan

It is hypothesized that students with a family history of Type 2 Diabetes (T2D) will have more knowledge about symptoms and complications of the disease than those students without a family history. However, currently, little is known regarding the association between knowledge of T2D and college students in general. This study aims to analyze the difference in the knowledge of college students with or without an immediate or extended family member with T2D. Methods: Data was collected from 89 college students at the University of Kentucky. Cross-sectional surveys with questions regarding T2D were distributed to students via various social media outlets. The survey asked whether students had an immediate or extended family member with T2D, specific questions regarding what puts someone at a greater risk to develop T2D, along with what examples of symptoms and complications appear with the disease. Frequency of exercise and eating fruits and vegetables was asked along with height and weight. Results: 44.94% of the students surveyed had an extended family member with T2D and 13.48% had an immediate family member with T2D. A t-test and Fischers exact test were conducted. The t-test (p=0.12358, p=0.20677) indicated that there was not a statistically significant difference between the knowledge of students with a family history of both immediate and extended family versus those without any family history. Although BMI was slightly higher for those that did not have a family history of T2D, according to the Fischers exact test (p=0.487, p=0.328) there was no statistically significant difference. Conclusion: The results suggest that having a family history of T2D does not increase knowledge of symptoms, complications, and overall facts in college students. This study shows it is crucial that those at a higher risk for developing T2D are taught more about the negative consequences that can result.

DETERMINING THE CORRELATION BETWEEN BODY MASS INDEX AND CAVITIES IN CHILDREN

Poster:  118
Hedgespeth, Kali
Faculty Mentor(s):  Jessica Houlihan

It is hypothesized that children in 3rd - 5th grade with a BMI above normal will have more cavities than those in the normal BMI range. There are current studies that support this hypothesis, however, the majority of them do not consider the other factors that could contribute to the results. This study aims to determine the association between BMI and cavities in children who are in 3rd – 5th grade. Methods: Data was collected from an elementary school of 3rd-5th-grade students in rural Kentucky (29 males and 45 females). Students were pulled from the classrooms and given a cross-sectional survey to take while their participant number was matched with their BMI. The students’ BMI was provided by the school. The survey examined their ethnicity, dietary habits, and their oral health. A t-test and a Pearson correlation test were conducted. Results: The relationship between BMI and cavities was determined to be -0.0473668. This shows that there is no correlation between BMI and cavities in this sample. The survey questions regarding age, gender, ethnicity, dietary habits, and oral health were available to examined as contributing factors to the children’s BMI and cavities. A t-test was performed to determine the difference between the normal and overweight BMI categories and cavities (P=0.956954526). There is no statistically significant difference between the groups. These results can further the knowledge of children’s overall health and can lead to a reduction in the obesity epidemic in Kentucky. Conclusion: More research needs to be done in this area which can lead to an overall improvement in the development and lifestyle of children from 3rd-5th grade and beyond.
YOUNG ADULTS SMOKING AND THEIR KNOWLEDGE OF THE EFFECTS OF TOBACCO USE ON THE BODY
Poster: 119
Hochleutner, Erin
Faculty Mentor(s): Jessica Houlihan

When looking at research about tobacco use, there is a lot of research about peer influence and the effects that has on young adults’ tendency to smoke. However, there is a lack of research regarding one’s knowledge about the adverse effects of smoking and their tendency to smoke. This study aims to determine the likelihood of students who smoke and assess their knowledge of tobacco use and harm to the body. It is hypothesized that students are more likely to use tobacco when they are misinformed how it harms their body. Data was collected from 46 college students using a cross sectional survey distributed via an anonymous link through social media. The survey recorded tobacco use, assessed one’s knowledge of tobacco use, and asking the participant about social influence. A t-test and Pearson’s test were conducted. 13.04% of the sample uses tobacco. 14.28% of the males used tobacco products whereas only 12.82% of the females were tobacco users. A fisher test was used to see if there was a difference between the perceived good or bad knowledge one had and their tendency to be smokers. The p-value was 0.651. A chi-square statistic for correlation between reacting to peer pressure and tobacco use was 2.0463. The p-value was 0.1526. It was found that there was no strong correlation between people that use tobacco products and their knowledge about cigarettes. There was also no difference between peer pressure and the tendency to use tobacco. More research should be done to understand the driving force that urges these young adults to still use tobacco regardless of the consequences.

THE EFFECTS OF FOOD INSECURITY IN COLLEGE STUDENTS AND MAINTAINING AN ADEQUATE DIET
Poster: 120
King, Sierra
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that college students who don’t have accessibility to food and cannot afford nutrient dense food will not be nutrient sufficient. Currently, there isn’t much research on the topic and correlation between the two variables among college students. The aims are to assess if college students can afford a nutrient sufficient diet using and to assess if college students have the necessary access to a nutrient sufficient diet using cross-sectional survey. Methods Data was collected from 100 students at the University of Kentucky. The cross sectional survey was an electronic survey, spread by email, social media and group messages. Food consumption, preparation, affordability, school classification and living location and grocery store proximity were recorded through the survey. A Fischer’s test, snapshot of percentages and descriptive analyses were conducted. Results 66 % of the participants lived on campus and 34% lived off campus. Of those, 64% classified as Freshmen, 24% were Sophomores, 5% were Juniors, 16% were Seniors and 1% was other 99% of the respondents were full-time college students. 45% of students consume meals that contain a food from each food group and 55% of the students don’t. The two variables were the accessibility of food and the affordability of food for students who live on campus have versus those who live off campus. A Fischer’s test was conducted to examine the means of the variables and P-value for food affordability was 0.256 and for accessibility was 0.021. Conclusion The results suggest that food insecurity, affordability and accessibility are issues on the UK’s campus among college students. However, there needs to be more research, to obtain further proof and indication that this is an issue among college students, more research needs to be performed.
THE EFFECT OF SCREEN TIME ON QUALITY OF SLEEP
Poster: 121
Krohn, Erik
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that time in front of illuminated screen devices will have a negative impact on quality of sleep. However, there is little research on this topic. This study aims to analyze the effect of illuminated screen devices on quality of sleep using a cross sectional survey with elements of the Pittsburgh Sleep Quality Index (PSQI). Methods Data was collected from 80 respondents (47% male, 53% female). The cross-sectional survey was powered by Survey Monkey and was posted to various social media outlets. The survey recorded number of lit screen devices used daily, average hours per day using a lit screen device, employment and educational status, hours of sleep per night, hours in bed per night, as well as the questions from the PSQI. Results Of the 80 responses, 8 had to be omitted. From the remaining 72 respondents, there was an average of 3.11 screen devices per person, with a standard deviation of 1.055, and the average time spent looking at illuminated screen devices was 10.5 hours per day. The average PSQI score was 7.74 with a standard deviation of 3.25. Only 10 of the 72 respondents were considered to have good sleep quality. 62 (86.11%) had a score indicative of poor sleep quality. A PSQI score of 5 or greater is considered indicative of poor sleep quality. A Pearson test was run to determine a relationship between hours per day using a lit screen and PSQI score, and results were R=0.18. Conclusion The results suggest there is a weak positive correlation between screen time and sleep quality. However, more respondents are necessary to provide enough data to perform an accurate statistical analysis.

NUTRITION EDUCATION AND ITS IMPACT ON FRUIT AND VEGETABLE CONSUMPTION IN COLLEGE STUDENTS
Poster: 122
Lewis, Gentry
Faculty Mentor(s): Jessica Houlihan

The average college student diet consists of foods that are high in fat, sugar and sodium and low in essential nutrients. In light of the growing obesity epidemic in America, it is important to find ways to establish healthy habits in students before they reach adulthood. It has been hypothesized that students who complete a basic nutrition course consume more fruits and vegetables than students who do not. Recent research has been inconclusive on this topic, many studies claiming that education is a significant influencer of fruit and vegetable consumption yet others claiming that it is not. The following study is designed to determine the relationship between nutrition education and fruit and vegetable consumption amongst students at the University of Kentucky using a cross sectional survey. The survey was distributed to 148 students, some of who had completed a basic nutrition course and some of whom were currently enrolled in one. Students completed the survey during their DHN 212 or DHN 510 class time. Using a 5% confidence interval, it was determined that students who had completed a basic nutrition course were no more likely to meet their USDA recommendations for fruit and vegetable consumption than students who had not completed a course (p=0.073). Although this value is not significant at the 5% level, it is approaching significance. In addition, those who had taken a nutrition course were more likely to consume a higher total amount of fruits and vegetables (p=0.00056). Unfortunately, this research does not contribute significantly to the gap in research because the results mildly contradict one another and the benefit of consuming much more than the USDA recommendations are inconclusive. Future research should be geared towards larger studies consisting of students who are not currently enrolled in a nutrition course.
RELATIONSHIPS BETWEEN FRUITS, VEGETABLES, AND SMOOTHIE CONSUMPTION
Poster: 123
Long, Mitchell
Faculty Mentor(s): Jessica Houlihan

The hypothesis for this experiment is smoothies consumed will have a positive relationship with fruit and vegetable intake for college aged students at the University of Kentucky. With a growing industry of smoothie companies, the results can better health information. The purpose of this research is to use cross-sectional surveys to find a connection between smoothie intake and daily fruit and vegetable consumption for college aged adults at the University of Kentucky. A validated questionnaire about fruit and vegetable intake by the CDC was used to assess intake. Smoothie consumption questions were used to assess intake. All surveys were accepted except the ones that were not completed, or were completed by individuals that were out of the desired age range (18-24). The research included campus, local shops, and smoothie stations on and around campus. There was a population of 61 participants which focused on average consumption of fruits and vegetables for smoothie and non-smoothie consumers as well as average serving size consumption of fruits and vegetables in smoothie and non-smoothie consumer. Finally, Pearson tests examined the relationship of ounces of smoothie per week to fruit (0.0245) and vegetable (-0.0014) intake. A T-test also showed an insignificant number (0.3658) when comparing the average servings of fruit and vegetables consumed to smoothie and non-smoothie consumers. The data did not show a correlation between the two variables. More information about this topic should be done on a larger scale.

NUTRITION AS A COMPONENT OF PATIENT CARE: A PILOT STUDY ON MEDICAL PROVIDERS’ CONFIDENCE AND ATTITUDES TOWARD NUTRITION COUNSELING
Poster: 124
Lowe, Abby
Faculty Mentor(s): Jessica Houlihan

Despite overwhelming evidence of the importance of nutrition to health, many medical providers remain unprepared to offer nutrition counseling to patients. While research has assessed factors affecting nutrition competence in medical students, no research on currently licensed providers was found. The intent of this study was to determine the impact of mode of education on a provider’s nutrition confidence. It was hypothesized that involvement of a registered dietitian in training would correlate with increased nutrition confidence. An electronic survey was distributed to physicians, physician assistants, and advanced practice nurses, and providers were asked to forward the survey to colleagues. Responses from 101 providers in the fields of pediatrics, internal medicine, family medicine, obstetrics and gynecology, and psychiatry were analyzed based on the number of providers who agreed with nine questions pertaining to their confidence in nutrition counseling. Chi-squared tests were used to analyze the differences between groups. While no significant difference was found between providers who did and did not receive training from a registered dietitian, differences were observed between providers with different licensures and from different specialties. Allopathic physicians (MD) were slightly less confident than the average for all providers (P=0.351). Of the non-MD providers, advanced practice nurses were the most (P=0.156) and physician assistants the least confident (P=0.0159). Pediatricians and family medicine providers were more confident than those in other specialties (P=0.00199 and P=0.00819, respectively), and psychiatrists were less confident than any other group (P=0.0000000552). While further research would be helpful in identifying the most effective way to educate providers, implementation of some kind of nutrition education is more important. In the absence of universal guidelines, it is the responsibility of individual institutions to promptly address the need for improved nutrition education among their students.
TYPES OF PHYSICAL ACTIVITY AND THE EFFECTS ON UK STUDENTS GPA
Poster: 125
McKinney, Michelle
Faculty Mentor(s): Jessica Houlihan

The amount of exercise done is very important for good health, but the type of exercise performed is just as important and could potentially lead to improved cognitive function. It is hypothesized that UK students who are involved in aerobic-type physical activity will have a higher GPA than those who do not. However, currently, there are many studies showing different results regarding the association between type of physical activity and GPA among college students. This study aims to determine the association between the type of physical activity a UK student participates in and GPA using a cross-sectional survey. Data was collected from 112 college students enrolled at the University of Kentucky (58 females and 54 males). Students in classrooms and at the recreational center were asked to take a self-reporting, paper survey. The survey recorded type of physical activity participation, type of aerobic-intensity, amount of physical activity performed weekly, amount of time dedicated to schoolwork per week, and GPA. A t-test was conducted. Results: Majority of the participants reported participating in physical activity (94.64%). A significant portion of participants (53.57%) reported that they participated in aerobic physical activity, 39.3% of participants reported that they participated in anaerobic physical activity, 7.14% was other. There was not a statistically significant difference between mean GPA of those who participated in anaerobic exercise with those who participated in aerobic exercise (p= 0.16861261). The results suggest that type of physical activity performed does not affect GPA of college students, which helps contribute to the indecisive research gap. In the future, more studies need to be performed with larger sample populations at more universities.

KNOWLEDGE OF SUGAR CONTENT CORRELATED WITH BMI IN UNIVERSITY OF KENTUCKY UNDERGRADUATE STUDENTS
Poster: 126
Mitchell, Andrew
Faculty Mentor(s): Jessica Houlihan

Foods high in sugar are readily consumed by people of nearly all ages everyday. From sugar sweetened beverages, candy bars, and even pasta sauces, sugar is unavoidable. Too much consumption can result in obesity and the chronic health problems that follow. Educational interventions are possible ways to alleviate high sugar intake, especially in the young adult years of life. Because of the gap in research among people in college, this study aimed to assess how much UK students knew about the amount of sugar in food items they commonly consume and compared to their BMIs. It was hypothesized that students who knew less about sugar content would have a higher BMI. Using a cross-sectional design, the sample population for this study included 90 UK undergraduate students (freshmen through seniors). Data was collected online through anonymous distributed surveys from January through March 2018. 28.88% of surveyed students were either overweight or obese. Statistical analysis of the data included a Pearson Correlation with an R-value of -0.26223561, showing a weak inverse relationship. A t-test was used to examine the difference in survey scores between participants in the normal weight versus the overweight/obese BMI categories. This test produced a p-value (significance level p=0.05) of p= 0.176143923, indicating the data was not statistically significant. Therefore, the null hypothesis was not rejected. The sugar content in food items students knew the least about was the Blackberry Greek Yogurt and the Starbucks White Chocolate Mocha. Students knew most about the Traditional Prego Sauce. This information is concerning for students and healthcare providers because students regularly consume foods high in sugar, leading to insulin insensitivity and overweightness. More educational tools / activities like this could be the next step in narrowing the research gap and further developing the amount of sugar content knowledge.
THE EFFECT OF STRESS AND SLEEP DEPRIVATION ON ACADEMIC PERFORMANCE IN COLLEGE STUDENTS
Poster: 127
Ordu, Barry
Faculty Mentor(s): Jessica Houlihan

This study investigates the effects of stress and lack of sleep on the academic performance of undergraduate students at the University of Kentucky using a cross-sectional survey. Learning and memory can be affected by many aspects such as lack of sleep and stress. An optimal level of stress can enhance learning ability but too much stress can cause physical and mental health problem, may affect the academic achievement by resulting in decreased GPAs. Research has made strong correlation between stress and GPA but a more comprehensive list of stress factors are needed. It is hypothesized that increased stress and lack of sleep negatively affects college students. Data was collected from 41 college students that are currently enrolled at the University of Kentucky (20 males, 21 females). Surveys were distributed through social media and other media outlets such as GROUPME. The survey recorded class standing, average GPA, living situation, amount of physical activity, sleep schedule, sleep cycle, and a stress scale. A Pearson correlation test was conducted to better understand results. A significant amount of the population (91%) reported that they sleep for 6-8 hours daily, while 9% of the population reported sleep for 4-5 hours. On the stress scale 39% of the participants reported being stress at a level of 8, 24% of the participants reported being stress at a levels of 9, 22% of the participants reported stress level of 7 and 5% of the population reported stress level of 5. The Pearson test indicated that there was a correlation between stress and GPA (r=0.37), however no correlation between sleep and GPA. The result indicates that increase stress does have an effect on GPA in college students, however, there was no indication of sleep being a factors in academic performance

EFFECT OF STIMULANT MISUSE AND FREQUENCY OF MISUSE ON GPA OF UNDERGRADUATE COLLEGE STUDENTS
Poster: 128
Ortiz, Kassandra
Faculty Mentor(s): Jessica Houlihan

The aim of this study was to explore the association between GPA and the use of stimulant medications in students at the University of Kentucky. Although it is important to understand how misuse can affect students’ academic performance, few studies have looked at the influence of frequency of misuse on GPA. It was hypothesized that UK students misusing stimulant medications would have a lower GPA compared to those not misusing them. The second hypothesis was that UK students misusing stimulants more frequently would report a lower GPA than those misusing them less frequently. A total of 103 undergraduate students from the University of Kentucky completed a cross-sectional survey. The survey was sent to professors who then sent it to students in one of their courses. It was also distributed through social media and group messages. To analyze the data, a t-test and Pearson correlation were used. Findings showed that the difference in GPA between misuse and non-misuse groups was not significant (p = 0.558). There was also not a strong correlation between frequency of misuse and GPA (r = -0.265). Although the results of this study were not necessarily significant, this may be due to the small sample size. Other studies have found a difference between GPA of misuse and non-misuse groups. Additionally, a stronger negative correlation may have been found between frequency of misuse and GPA if a larger sample had been used. More studies are needed to fill this gap in the research on this topic. Longitudinal studies may be better suited to understand the relationship between these two variables.

** Denotes STEMcats project
CAFFEINE CONSUMPTION VS. ACADEMIC TEST SCORES IN UNIVERSITY OF KENTUCKY COLLEGE STUDENTS
Poster: 129
Patel, Kishan
Faculty Mentor(s): Jessica Houlihan

College students rely on caffeine to get them through the rigors and stress of final exam week. However, little is known if the caffeine helps or hurts these students perform well on their exams. Therefore, research should be done on this topic to create recommendations to students based on statistical analysis of research results. This study aims to discover a correlation between the amount of caffeine consumed and the performance on final exams in the Fall 2017 semester by University of Kentucky students. It is hypothesized that caffeine would have negative effects on students’ final exam grades. Data was collected by 93 participants from a cross-sectional Qualtrics survey performed. All participants were students varying from 49.5% underclassmen and 50.5% upperclassmen from various majors. Caffeine consumption was self-reported in the survey, as well as final exam performance, daily consumption, frequency of studying, and amount of sleep. A Pearson correlation test was performed to fulfill the aim of the study. However, t-tests and Fisher’s exact tests were performed to discover alternative results. Caffeine was most likely consumed in the morning (44.1%) rather than afternoon, evening, or night-time (55.9%). The preferred caffeine type was coffee (57%). A Pearson correlation test concluded that there was no relationship between the number of caffeinated drinks, or the milligrams of caffeine consumed and the final exam performance (coefficient = 0.1423 & 0.0586, respectively). Interestingly, there is no correlation between amount of exams and milligrams of caffeine consumption (correlation = -0.0401). The results concluded that there was no correlation between amount of caffeine consumption and the final exam performance in UK students. However, further research from additional respondents, including more specific caffeine consumptions could conclude accurate results. No recommendations can be made at this time on students’ caffeine consumption to affect their grades.

THE EFFECT OF FOOD LABELING ON FOOD CHOICE IN UNIVERSITY OF KENTUCKY STUDENTS
Poster: 130
Rawlings, Taylor
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that, when given the choice of two food items, college students will make the healthier choice when the unhealthier food item is labeled negatively. There is currently a lot of research about different types of food labeling, but this method of labeling unhealthier items in a negative way has never been studied. This study aims to determine the association between food labeling and food choices among college students at the University of Kentucky using a cross-sectional study. Methods: Data was collected from 297 college students at the University of Kentucky. A table was set up at high-traffic locations on campus and students were offered their choice of one of two cookies. This study was broken down into three labeling treatments: “Original” vs. “Sugar-Free”, “Original” vs. “High-Sugar”, and “High-Sugar” vs. “Sugar-Free.” The number of students who chose each cookie for all three treatments was recorded. A chi-squared test was conducted after data was collected to test for significant differences in the proportion of students who chose the healthier cookie between all three treatment groups. Results: In the “Original” vs. “Sugar-Free” treatment, 38% of participants chose the healthier “Sugar-Free” option. In the “Original” vs. “High-Sugar” treatment, 64% of participants chose the healthier “Original” option. In the “High-Sugar” vs. “Sugar-Free” treatment, 69% of participants chose the healthier “Sugar-Free” option. A chi-squared test (χ² =22.45) indicated that there was a statistically significant (p<0.0001) difference in food choice between different food labeling treatments. Conclusion: The results suggest that labeling an unhealthier food item in a negative way does affect the food choices made by college students. These findings fit into the growing field of food labeling research, and could influence the way that foods are labeled in the future in attempts to encourage healthier choices.
THE EFFECT OF THE NUMBER OF HOURS OF SLEEP A STUDENT ATTENDING THE UNIVERSITY OF KENTUCKY HAS ON GPA

Poster: 131
Rote, Nathan
Faculty Mentor(s): Jessica Houlihan

The importance of sleep has been long underestimated by college students, as many are sleep deprived while observing a lower GPA. This study is necessary to help students see the effects of sleep while providing insight on how they can perform at their best. Studies done in the past have given conclusions regarding a correlation between the variables, but have failed to account for multiple compounding variables that this study includes. The aim for this study is to analyze the effects that sleep has on a student’s GPA. The hypothesis is as follows: Students that receive less sleep during the week end up having a lower GPA. Methods: Using a cross-sectional study, 80 students attending the University of Kentucky filled out a questionnaire discussing basic questions including: ethnicity, number of hours of sleep obtained, cumulative GPA, age, status in school, etc. The results were gathered on SurveyMonkey, a survey tool that was easily dispersed to participants while having the capability to analyze and draw conclusions based on the data set. A Pearson correlation test analyzed the data. Results: 47.5% of students have recorded that they have difficulty focusing in class, and 43.75% of the sample population typically receives less that the recommended amount of 7 hours of sleep a night. The most common time found that students fall asleep is 11:00PM and 12:00AM. The R-value calculated was 0.107 indicating very minimal correlation between the number of hours of sleep and GPA. Conclusion: Given the R-value, no correlation can be drawn between the number of hours of sleep students get and their GPA. Outliers (compounding variables) could have skewed data analysis given such small number of participants. Future recommendations include expanding the number of participants while accounting data collected from multiple schools.

KNOWLEDGE OF PROPER VISION MAINTENANCE AMONG COLLEGE-AGED STUDENTS

Poster: 132
Runyon, Taylor
Faculty Mentor(s): Jessica Houlihan

Rates of blindness and other vision-related issues are rapidly increasing in Kentucky. Vision maintenance is not often a common topic of discussion. Knowledge of eye health and preventative measures are essential, and the majority believe they are taking proper care of their eyes. In current research, there are no studies that looks at vision knowledge comprehensively. This study will attempt to fill those gaps by assessing different aspects of vision healthcare. Through a current research project, the aim is to determine the relationship between perceived knowledge and maintenance among college aged students using a cross sectional survey. It is hypothesized that students who have perceived knowledge of eye care are actually more knowledgeable than those who aren’t. The study sample consisted of 382 college aged students ages 18-24. The knowledge assessment, in form of a cross sectional survey, was distributed over several social media outlets. The descriptive variables observed included age and gender. Categorical descriptive statistics were used to analyze these variables such as median age and percent of each age for each gender. The inferential statistics were determined by using a Fisher’s test. The sample consisted of more females (84.07%) than males (15.93%). The ages were evenly distributed, with a median age of 21. Two Fisher’s test were conducted. When observing perceived knowledge vs. sunglasses knowledge, the p-value was 1. Perceived knowledge vs. knowledge about eye exams received a p-value of 2.33x10^-11. Based on the results, college students are knowledgeable about different aspects of vision health. Students who were perceived to be knowledgeable about vision were not concerning sunglasses usage. However, they were knowledgeable about the scheduling and circumstances of eye appointments. For future reference, optometrists and researchers need to define what is sufficient vision knowledge and explore sunglasses education.

** Denotes STEMCats project
THE EFFECT OF TIME SPENT VOLUNTEERING ON SELF-ESTEEM SCORES IN COLLEGE STUDENTS
Poster: 133
Schilling, Jessica
Faculty Mentor(s): Jessica Houlihan

Volunteering is a common practice among college students widely due to the availability of volunteering-based organizations as well as graduation requirements. College students are also one of the most at risk populations for mental illness, including low self-esteem. The hypothesis was that the greater a person volunteers monthly, the higher he or she will score on a self-esteem assessment. This study aims to determine if there is a relationship between time spent volunteering and self-esteem by distributing a cross-sectional survey to college-aged adults. Methods: Data was collected from 44 college students in the United States (35 females and 9 males). Surveys were distributed electronically via social media and text messaging. The survey recorded monthly volunteer hours, type of volunteer work, as well as ten questions from the Rosenberg Self-Esteem survey. The data was analyzed using a T-test and Pearson correlation coefficient. Results: The relationship between monthly volunteer hours and score on the Rosenberg Self-esteem Scale (RSES) did not show a strong relationship (PCC=0.15). There was also no difference between the low self esteem group (RSES<15) and the high self esteem group (RSES≥15) in terms of monthly volunteer hours (p=.51). Conclusion: The results indicate that time spent volunteering does not have an effect on self-esteem. However, there are many other variables such as gender, physical activity, social media usage, and socioeconomic status that may be the reason behind score acquired on a self-esteem assessment.

FAST-FOOD CONSUMPTION EFFECTING BMI AND DIETARY INTAKE OF KENTUCKY COLLEGE STUDENTS
Poster: 134
Scruggs, Andre
Faculty Mentor(s): Jessica Houlihan

The purpose of this research in making connections of increasing fast-food consumption with being related to lower fruit and vegetable consumption in college students’ dietary intake along with higher BMIs, being indicative of obesity risk. It can be advantageous viewing this possible relationship in terms of dietary habits of younger adults such as college students at the UK being a population early to making individual eating decisions within a demanding lifestyle. A cross-sectional approach is used in a non-standardized food consumption questionnaire developed and found suitable for use in an electronic survey conducted entirely using online databases through text, email, and social media outlets. It consists of 17 questions gathering eating preferences and habit information. The participants are only students attending universities or colleges in Kentucky. 145 survey responses were recorded, although 106 responses could only be used for analysis because of exclusion criteria. The statistical analysis consists of Pearson correlation evaluation between the three major variables of BMI, fast food consumption, and dietary intake. A T test is used for data of UK students compared to other Kentucky Schools. Responses used from questionnaires, show average age of students as 20 years with average BMI of 26. Pearson Correlations showed weak but positive relationship with fast food consumption and BMI at 0.188; and as for relationship of BMI with fruit and vegetable consumption in the diet, weak negative relationships were found respectively -0.117 and -0.040. Relating fast food consumption with fruit and vegetable intake in diet produced somewhat low values showing weaker negative relationships at -0.132 and -0.235. Results support positive relationship of fast food consumption with increasing BMI in college students as well eating fast food negatively effects dietary intake of fruits and vegetables. Though results aren’t as strong, this relationship needs further research with more time and resources.
** POSTER ABSTRACTS **

** DIETARY SUPPLEMENT USE IN COLLEGE STUDENTS **

Poster: 135  
Shah, Monica  
Faculty Mentor(s): Jessica Houlihan

Supplement use is on the rise in America. There are many ads for new “quick-fix” supplements and they are often marketed to a young population. College students are beginning to take more supplements yet little is known about what factors influence their decisions to use supplements. This study researches dietary supplement use in college-aged students and compares if students in health-related majors consume dietary supplements more often than students not in health-related majors. This study also compares perceived knowledge on supplements for students. In addition, this study aims to determine the most used dietary supplements and determine what students consider when deciding whether or not to take a supplement. Methods: The study sample is 119 students aged 20-25 attending college and the data was collected through anonymous surveys through Qualtrics. The surveys were distributed on various social media platforms. T-tests were performed to determine statistical significance. Results: The test for whether or not students with health related majors consume more dietary supplements resulted in a p-value of .769020773. The test for whether health related majors had a higher perceived knowledge than non-health related majors resulted in a p-value of .25053679. Non-health related majors tended to refer to the Internet for advice on dietary supplements when compared to students with health related majors. Also, health related majors were more likely to discuss their supplement use with their medical provider. Conclusion: Neither test was statistically significant and further research needs to be done to determine whether students’ field of studies plays a role in their dietary supplement use and knowledge. Future research should study a larger sample size and ensure a sample representative of the entire U.S. is used. This study suggests that health-related fields of study do not influence student’s supplement choices.

** THE EFFECT OF MULTIVITAMIN USE ON COGNITIVE FUNCTION IN YOUNG ADULTS **

Poster: 136  
Shoman, Zac  
Faculty Mentor(s): Jessica Houlihan

Multivitamin supplementation is becoming increasingly popular among the general population. Supplementation has been associated with providing concentrated nutrients and minerals to prevent, alleviate, enhance, or influence physiological processes within the body. However, it is not fully understood how these supplements may specifically act on cognitive functions, such as learning and retaining information. With this being said, this study aims to discover the potential correlation between multivitamin supplementation and University of Kentucky students’ GPAs. It is hypothesized that increasing multivitamin supplementation will have a positive correlation with GPA. Data was collected from 80 valid cross-sectional surveys using the Qualtrics software. The target population was University of Kentucky students, with 92.5% of the participants being undergraduate students and only 7.5% being professional school students. 76.25% of the students that participated in the survey were male and the other 23.75% were female. The frequency of multivitamin supplementation was reported through a multiple choice response format, and GPA was self-reported in the survey. A Pearson correlation test was used to analyze the overall correlation between multivitamin supplementation and GPA. 48.68% of the participants reported that they did not consume multivitamins or minerals. For the participants that did take daily and weekly multivitamin and/or minerals, the two primary reasons they did so were to support nutrient deficiencies (19.74%) from lack of fruit and vegetable intake and to boost immunity (23.68%). A Pearson correlation test concluded that there was a slight correlation between multivitamin supplementation and GPA (correlation=0.149). The results concluded that there was a minor positive correlation between supplementation and student GPA. With the r-value being 0.149, it is important for further research to be completed regarding the effects of supplementation on mental health. At this time, one cannot statistically claim the beneficial effects of multivitamins and minerals on mental performance.

** Denotes STEMcats project
ADHD PRESCRIPTION USAGE IN COLLEGE STUDENTS
Poster:  137
Wing, Anthony
Faculty Mentor(s): Jessica Houlihan

It is hypothesized that college students who aren’t prescribed prescription stimulants but take them anyway to attain a higher GPA will have a GPA that is the same or lower than students who are prescribed prescription stimulants. Little is known behind the reasons and motivating factors for students taking these prescription stimulants. This study aims to evaluate student’s motivation for taking prescription stimulants and striving for a high GPA using a cross-sectional survey to University of Kentucky students. Data were collected from 70 college students enrolled at the University of Kentucky. Self-reporting surveys were distributed to students through social media outlets such as Facebook and Groupme. The survey recorded participant GPA, what their motivation for striving for a high GPA is, whether they’re prescribed prescription stimulants, whether they still take prescription stimulants if they aren’t prescribed, and what their motivating factors for taking these prescription stimulants are. A table was put together to compare demographic data, and a t-test was conducted to compare results. Of the 70 participants, 55 participants reported that they were not prescribed prescription stimulants. Of these 55 participants, 32 individuals say they still take prescription stimulants (58.1%), while the other 23 participants reported that they still don’t take the prescription stimulants (43.6%). The average GPA of the 32 individuals was a 3.24. The average GPA of the 23 participants, along with the participants who are prescribed was a 3.32 GPA. A t-test indicated there was not a statistically significant (p=0.44) difference between the GPA of misusers of prescription stimulants versus those who don’t misuse prescription stimulants. The top three motivating factors for individuals to take prescription stimulants are as follows: more efficient in studying, cramming for an exam, and it helps improve/maintain your GPA. After looking through the results, it was discovered that the results reject my hypothesis.

ECONOMICS

PREVALENCE OF VICARIOUS TRAUMATIZATION AMONG UKY STUDENTS
Poster:  138
Adam, Amar
Faculty Mentor(s): Dr. Gail Hoyt

Attracting and retaining volunteers is an integral function for the operations of any non-profit organization. While previous research focused on the barriers to volunteering and the channels by which an organization can attract more volunteers, there is a dearth of research conducted on how an organization can retain volunteers once acquired. The largest impediments to continued voluntarism is the existence of a phenomenon called vicarious traumatization. Vicarious traumatization, or compassion fatigue (CF), as Dr. Charley Figley, a leading expert in the field, describes is “the state experienced by those helping people in distress; it is an extreme state of tension and preoccupation with the suffering of those being helped to the degree that it can create a secondary traumatic stress for the helper” (1982). This phenomenon is well recorded among social and humanitarian workers, though the condition could also manifest itself in volunteerism. Since development of this state can lead to a decreased emotional detachment, and raises the cost of caring, it could disincentivize or impede the willingness of one to volunteer. Given this, it is useful for non-profit organizations to be aware of the likelihood that its volunteers develop CF and to know how to intervene to increase retention rates. To explore these concepts, this paper analyzes (via regression analysis) the responses of surveys conducted among students at the University of Kentucky, a large source of volunteers for non-profits in Lexington, KY. Surveys included questions from the ProQOL R-IV, a tool created to assess levels of CF, to identify which group of students are most prone to experience compassion fatigue. If it is discovered that students report experiencing high levels of fatigue, this could have implications on how non-profit organizations recruit volunteers, and it could provide explanations for why some college students are less civically engaged than others.
ECO-DELIVERY: CONSUMER WILLINGNESS TO CHOOSE ENVIRONMENTALLY FRIENDLY ONLINE DELIVERY OPTIONS
Poster: 139
Ahmetagic, Benjamin
Faculty Mentor(s): Dr. Gail Hoyt

Carbon emissions have risen drastically over the last 50 years, largely due to human activity. Studies have shown that people still make environmentally unfriendly decisions. The focus of this study is to examine levels of environmental consciousness and determine whether that makes people more or less willing to opt into more environmentally friendly decisions, specifically in relation to online shopping and the use of Amazon Prime express delivery. Self-reporting surveys were administered to students on a large, public university campus, garnering a sample size of 594 with 43.7% male and 56.3% female. The sample was not perfectly representative of the university, so there is a potential bias in the data. Respondents were asked about their access to Prime, volume of use, environmental consciousness, and their willingness to opt out of express delivery for non-essential products in favor of more environmentally friendly options. Regression analysis of those willing to use an eco-friendly option on frequency of use, environmental consciousness, and other demographic indicators provided an assessment of the viability for an eco-friendly delivery option. Gauging consumer willingness to implement environmentally friendly options into their shopping habits is useful information for retailers such as Amazon who are becoming increasingly aware of their carbon footprint.

OVERCOMING PSYCHOLOGICAL DISTANCE IN CHARITABLE DONORS
Poster: 140
Bomkamp, Andrea
Faculty Mentor(s): Dr. Gail Hoyt

While there are 1.1 million charities operating in the US today, each individual citizen will only donate to a small handful of them. Current altruism literature suggests that psychological distance plays a part in individuals’ decisions about the charities to which they will donate. Psychological distance in this research is defined as a participant’s attitude toward a group of beneficiaries with whom the study participant has had little or no interaction. This research examines the extent of psychological distance’s role in individual decision making before attempting to identify ways to overcome this distance. Possibilities for decreasing the impact of psychological distance include highlighting the disparity in donations to some causes as opposed to others in an effort to garner sympathy, as well as creating an artificial personal connection to a beneficiary of a cause by providing a personal “success story” for donors as they make their decision. The research expands the current literature by offering an examination of donor choices among several causes rather than a simple yes/no choice for only one cause. Participants, or donors, consist of college students who approach a table set up in the Gatton College of Business and Economics who are given a small bead or marble to place in one of three labelled boxes. Causes labelled on the boxes include cancer research, substance abuse and addiction, and human trafficking. Each participant is told that they can vote for one cause only, and that their vote will result in $2 being donated to a charity supporting that cause. The findings of this study will be directly useful for smaller organizations serving marginalized and isolated groups by extending knowledge on the ways in which they can overcome psychological distance.
CAN I MAKE A SUGGESTION? HOW SUGGESTED CONTRIBUTION LEVELS AFFECT CHARITABLE GIVING
Poster: 141
Bryan, Sarah
Faculty Mentor(s): Dr. Gail Hoyt

Nonprofits and fundraising organizations need to raise the maximum amount of money in the most efficient way, leading some to suggest a specific donation level as a base for donors. This practice can affect the amount people give as well as their willingness to give. The relationship between suggested contribution levels and the charitable giving behavior of college students is the primary focus of this study. Secondary research has been conducted through academic journals and experiments, and primary research is being conducted with different versions of a widely distributed survey. Each survey has one of three donation level suggestions for the same nonprofit: no suggested level, $20, or $50. The survey is otherwise identical. Then, the effect of suggested donation levels will be measured in accordance to students’ giving tendencies and the significance it holds will be analyzed. The expected outcome of providing a suggested donation level will be generating more profit than no suggestion will. It is also suspected that too high of a suggested donation level can cause fewer donors to participate, but can still generate a larger amount of money than the lower suggested level. These insights will inform recommendations for nonprofits and other organizations on how best to raise money amongst a college student population. This information can then be used to generate the most financial support for their cause in the most effective manner.

THE EFFECTIVENESS OF A TIERED MERIT PROGRAM IN INCENTIVIZING STUDENT VOLUNTEERING
Poster: 142
Childress, Adam
Faculty Mentor(s): Dr. Steven Lugauer

For many students at the university level, volunteering is an integral part of their college experience. Educators and administrators at the University of Kentucky are eager to promote student volunteering and are looking to install a tiered badged reward system in order to motivate students to participate in more volunteer service work. Student time is valuable and difficult to delegate, therefore investing capital into a program with little potential impact on student volunteering outcomes could be detrimental. Accordingly, the research question is, what effect could this tiered badge system have on student volunteering outcomes at the University of Kentucky? This study contains a large student-conducted survey whose results are examined both through statistical and descriptive analysis as well as multivariate regression analysis. These data are used to determine an answer to the research question and to examine student motivation for volunteering, which includes what types of students might be more motivated by this incentive program. This study offers a guiding framework for volunteer incentive programs at the University of Kentucky and provides a much clearer picture as to what motivates students to volunteer.
A COMPARATIVE ANALYSIS OF THE EFFECTIVENESS OF MONETARY POLICY TOOLS IN G7 NATIONS

Poster: 143
Douglas, Tsage
Faculty Mentor(s): Dr. Steven Lugauer

Central banks are employing both new and historical tools of monetary policy in an attempt to grow their post-recession economies as well as to better control changing economies and to keep pace with sensitive markets. What can be derived from the current impact of these new policies and what, if anything, can be foreshadowed from their continual use? Also, are the current policies in use optimal? It is difficult to deduce whether or not a policy is optimal when comparing central banks because economies have so many dissimilarities. The exploration and comparison of these tools is based on commonly used economic models and assessment of both trends in economic indicators and forecasted numerical values for economic indicators. Both robust economic policies and more distinctive models used to make policy decisions are considered in order to understand the variations between central banks more clearly. Comparisons between the policy decisions and subsequent consequences of the central banks of G7 nations is beneficial to the understanding of the future of monetary policy amongst changing markets.

DONATING YOUR WAY UP THE SOCIAL LADDER: THE EFFECT OF SOCIAL RECOGNITION ON CHARITABLE BEHAVIOR

Poster: 144
Herman, Abigail
Faculty Mentor(s): Dr. Gail Hoyt

In today’s world, social media influences how people behave. Individuals can no longer avoid social pressures, and fundraisers have capitalized on bringing in charitable funds through crowdfunding websites made specifically for donations to philanthropic and humanitarian causes. Crowdfunding websites, such as GoFundMe, are increasing in popularity, and have grown from raising $470 million for charities in 2014 to $3 billion in 2016. Generally, the idea of altruistic giving goes against economic free-rider principals, enforcing the idea that people who donate to these causes are looking for an extrinsic benefit. Individuals who donate through these websites gain social recognition by listing their name, the amount donated, and a personal message, while other users also have the ability to “like” donations and share them on Facebook. The social media pressures involved with donating raise the question: do individuals act pro-socially out of pure altruism, or are they merely seeking positive social recognition? These websites affect small town and celebrity circles alike, as causes range from raising money for local mission trips to building a legal defense for the Times Up movement. This analysis exposes the impact that the expectation of social acknowledgement and admiration has on pro-social activity. Through a review of prior literature, this analysis found that social pressures had a distinct impact on charitable donations. To further examine the initial hypothesis, this study conducted a behavioral survey given to students at the University of Kentucky in order to analyze how image concerns and donation recognition affect giving habits.
ALTRUISM AND POLITICAL IDEOLOGY: EFFECTS ON CHARITABLE CONTRIBUTIONS
Poster: 145
Katinic, Briana
Faculty Mentor(s): Dr. Gail Hoyt

As different academic disciplines begin to overlap, more economists are discovering the impact behavioral economics has in the world. Therefore, it comes as no surprise that research into the economics behind politics and altruism is both influential and fruitful. To better guide and enlighten charitable organizations about the ways in which they can successfully fundraise and promote themselves, further research investigating the link between political ideology and altruism must be done. This research accomplishes these goals by attempting to answer the question of whether or not an individual’s political ideology and stance influence the types of charity they are likely to donate to or participate in. The study includes a survey that investigates individuals’ perceptions of their political stances and their opinions on different types of charities. The hypotheses is that having left-leaning political ideologies and stances will lead to a higher likelihood of donating or participating in charities that promote social equality and protection, while having right-leaning political ideologies and stances will lead to a higher likelihood of donating or participating in charities that promote respect and purity, ceteris paribus. Furthermore, it is believed that this will be seen in individual decisions regarding which types of charities to donate or volunteer at and in the amount of money individuals are willing to donate to charities. Although the data are preliminary and we are currently conducting analyses, it is already clear that there are stark differences between the types of charity people with different political beliefs support. Through statistical analyses that includes descriptive analysis as well as multivariate regression analysis, the depth and impact of these results are hoped to be discovered so they can be translated into practical applications for nonprofits.

SMILE AND DIAL: USING ECONOMIC MODELS TO PREDICT ALUMNI GIVING LEVELS THROUGH THE PHONATHON
Poster: 146
Scott, James
Faculty Mentor(s): Dr. Gail Hoyt

In a work environment where four-year degrees are nearly a necessity for employment, the rising cost of tuition puts financially-disadvantaged high school students even further behind their more privileged peers. This climate makes the role of philanthropy and fundraising in higher education even more important, as it increases the opportunities for deserving students to receive merit and need based scholarship through private funding. The University of Kentucky’s Office of Philanthropy has detailed records and demographics of each alumni and potential donor to the university, as well as their giving history and amounts. Elements such as major, graduation year, involvement in Greek Life, and many others stand to affect the likelihood of giving back in the future. The data will be analyzed using multivariate regression analysis to determine the degree to which these factors can forecast giving likelihood and donation levels of university alumni. Then, a predictive model will be created to help the Office of Philanthropy’s Phonathon optimize their calling strategies to maximize the amount money raised to put towards scholarships. The results of this research could serve to make the University of Kentucky a leader in alumni relations, allowing them to access both emotional and financial support of their alumni. Additionally, it could help the university in the future to identify which prospects to target earlier because of a higher likelihood to give. The mission of a public university should be to provide accessible education to its citizens, and this research can help further that goal.
RETURN ON RECIPROCITY: A STUDY ON THE COMBINED POWER OF FREE GIVEAWAYS AND MUTUALLY BENEFICIAL INTERACTIONS

Poster: 147
Will, Caroline
Faculty Mentor(s): Dr. Gail Hoyt

There is a general consensus that free offerings are a useful and advantageous business strategy, both in the corporate world as well as in the charitable community. Free giveaways not only have the power to potentially increase involvement and giving, but could also be correlated with an increase in another social behavior — reciprocity. While there have been various studies aiming to explain the nature of reciprocity, as well as the power of the word “free,” there has been no study conducted to test the validity of these findings in combination with each other. This research paper conducts a behavioral experiment at the University of Kentucky’s Gatton College of Business and Economics that examines whether or not human behavior associated with free giveaways and reciprocity could be used to help non-profit organizations garner awareness and increased participation for their cause. The experiment is designed with three different overall trials: one (the control) with no free giveaways, one with a simple free giveaway, and one with a more eye-catching free giveaway. People who approach the table can sign up to receive emails about volunteer opportunities within Gatton. A regression analysis and statistical summary of the data collected from the experiment is run to reveal any statistically significant results. This analysis hopes to prove that by presenting free products, nonprofit entities can entice people to come hear more about the organization. Due to the sense of obligation one feels in relation to favors, those organizations will further raise awareness by using the force of reciprocity to engage with those who might not have shown previous interest but through the offering of free giveaways. The larger of the giveaways will result in increased willingness to return the favor by those who take the item.

EDUCATION

THE SOCIAL FOUNDATIONS OF ENGINEERING SELF-EFFICACY

Poster: 148
Chen, Xiao-Yin
Faculty Mentor(s): Dr. Jane Jensen

Although self-efficacy plays an important role in students’ enrollment and persistence in engineering (Mamaril, Usher, Li, Economy, & Kennedy, 2016), little research has focused on how engineering self-efficacy develops. The purpose of this study was to use a qualitative inquiry approach to identify and describe efficacy-relevant social experiences reported by undergraduate engineering students (N = 654) enrolled at two universities. Through open-ended questioning, students were prompted to describe social experiences that had influenced their beliefs about engineering. Deductive coding of students’ responses indicated the complexity of students’ social experiences, which vary by type of experience (i.e., modeling, encouragement, or introduction to engineering) and socializer (e.g., parent, teachers, peers). Responses revealed the importance of social support to students’ engineering self-efficacy, especially when feeling challenged. Findings also support that men and women perceive experiences differently, and that the engineering culture has a strong influence on the development of student’s self-efficacy beliefs.
A QUALITATIVE INVESTIGATION OF MATH AND SCIENCE SELF-EFFICACY DEVELOPMENT IN RURAL APPALACHIA
Poster: 149
Corcoran, Kelsey
Additional Presenters: Natalie Hewlett, Tiffany Thomas, Jessica Toler
Faculty Mentor(s): Dr. Jane Jensen

Social cognitive theory posits that individuals’ perception of their capabilities, or self-efficacy, is informed by four primary sources: direct experience, vicarious experience, social persuasion, and physiological states. Students’ exposure to these sources can be influenced by contextual factors, such as their environment or gender stereotypes (Bandura, 1997). However, little research has focused on how self-efficacy develops among students living in a rural, high-poverty area. The purpose of this study was to examine the sources of math and science self-efficacy development among rural Appalachian students (N = 545) in Grades 4-12. Students provided open-ended written accounts of experiences that raised and lowered their self-efficacy in math and science (a total of 1,591 qualitative responses). Deductive coding was used to identify central themes.

Students’ responses often reflected the ways that direct experiences of mastery or failure changed their self-efficacy. However, other themes also emerged, such as the importance of help availability and social comparative information. Important differences emerged in students’ response patterns by domain (math or science), question valence (raising or lowering confidence), gender, and school level. Students’ responses often reflected the way that they use information from multiple sources when judging their capabilities. Knowing more about how Appalachian students’ self-efficacy develops can aid their educators in crafting more effective teaching methods. This qualitative approach allows for a deeper look into the development of math and science self-efficacy in this understudied population of rural students.

ACCESSIBILITY OF HIGHER EDUCATION FOR APPALACHIAN KENTUCKIANS: THE HISTORY OF THE ROBINSON SCHOLARS PROGRAM
Poster: 150
Hamilton, Michael
Faculty Mentor(s): Dr. Jane Jensen

The purpose of this project is to analyze the history of the Robinson Scholars Program and to examine the ways in which the program’s mission and scope have evolved since its inception. As the program’s state funding is currently in question, understanding the policy shifts and the perspectives of different stakeholder groups will help shed light on the impact ending the program might have on Eastern Kentucky students in the event that the scholarship program is defunded. The methods for this project rely heavily on primary sources and document analysis. Previous compiled reports on the program from its conception to the last significant review in 2010 will be analyzed. These reports detailed the dynamic and evolving nature of the program as it has had to be adaptive to changes in funding over time. Assessment data and documentation of the program since 2010 will also be analyzed to build picture of the program as it stands. Although the program has been able to manage funding deficits in the past, the one it is facing with the looming Kentucky budget discussions may render the program unsustainable. In what ways can the program’s interventions be sustained and what would be lost? In addition to scholarships, the Robinson Scholars Program also offers enrichment programs both before and after acceptance to the University of Kentucky. A review of the literature regarding the pros and cons of these kinds of enrichment programs relative to matriculation, retention, and student success, will round out the study for a complete picture of the Robinson Scholars Program at this critical juncture.
MEASURING COLLECTIVE EFFICACY IN SCHOOLS: A MIXED METHODS EXPLORATION
Poster: 151
Herzing, Julia
Faculty Mentor(s): Dr. Ellen Usher

Situated in social cognitive theory, collective efficacy is defined as the beliefs shared by a group about their abilities to improve student outcomes (Bandura, 1997; Goddard, 2002). Despite the measurement limitations of existing scales (McCoach & Colbert, 2010; Tschannen-Moran & Barr, 2004), collective efficacy has been shown to have a large effect on student achievement compared to other school factors (e.g., grades, socioeconomic status; Hattie, 2015). The purpose of this study was to explore the measurement of collective efficacy using an exploratory mixed methods design (Creswell & Plano Clark, 2017). School leaders (N = 89) from 17 districts participating in a professional development program in the southeastern U.S completed a survey at two time points. At Time 1, open-ended questions assessed perceptions of school-based teams and factors that strengthened or undermined collective efficacy. Coded responses and consultation with field experts informed the development of a 14-item collective efficacy scale. At Time 2, participants rated their collective perceived efficacy at the individual, group, and school level. In an integrative phase, data from both time points were analyzed to assess the alignment of qualitative responses to quantitative data. Interpersonal interactions, collaborative culture, and responsibility towards shared goals were themes that emerged from open-ended responses. Participants reported lower confidence in collective efficacy at their group and school’s capabilities than in their personal capabilities. This mixed methods exploration provides direction for further observations and interviews with school leaders, as well as hierarchical investigations of the multidimensional, multilevel measurement of collective efficacy in schools.

A SURVEY OF STUDENT PARTICIPATION AND RACIAL/SOCIOECONOMIC DIVERSITY IN SECONDARY SCHOOL MUSIC PROGRAMS IN KENTUCKY
Poster: 152
Holbert, Kellie
Faculty Mentor(s): Dr. Martina Vasil

The purpose of this study was to examine student participation and racial/socioeconomic diversity in secondary school (grades 6–12) music programs in the state of Kentucky. This investigation was guided by three research questions: (1) What are student participation levels in secondary school music programs in Kentucky?; (2) What is the racial and socioeconomic diversity of students in secondary school music programs in Kentucky?; and (3) In what ways are music teachers working to increase the racial and socioeconomic diversity of students in their secondary school music programs in the state of Kentucky? A researcher-designed 26-item survey was distributed to members of the Kentucky Music Educators Association email listserv and via the social media platform Facebook to qualified respondents. Results are to be determined. We are anticipating average numbers for participation and socioeconomic diversity levels within these programs, as well as multiple methods for increasing program diversity.
BElONGINGNESS AND EMOTIONAL HEALTH: A LONGITUDINAL EXPLORATION OF STUDENTS IN AN ALTERNATIVE LEARNING PROGRAM

Poster: 153
Johnson, Alecia
Faculty Mentor(s): Dr. Ellen Usher

Many factors are associated with early high school dropout, including racial minority status, low socioeconomic status (SES), and academic difficulties (Ahn, 2010). It is now believed that high school dropout depends on more than demographic factors. In fact, school engagement, such as belongingness, has been shown to be one of the most important determinants in the decision to drop out or not (Audas et al., 2001; Fredricks et al., 2004; Janosz et al., 2008). Even so, less is known about the psychological factors that minimize or exacerbate dropout risk. The purpose of this study was to examine belongingness, coping self-efficacy, and depressive symptoms among a sample of students identified as at-risk. High school students (N = 166) enrolled in an alternative learning program in a southeastern state completed surveys across two time points (across two school years). Results indicated that depressive symptoms were inversely correlated with coping self-efficacy and belongingness. As self-efficacy for dealing with emotion and sense of belonging increased, severity of depression decreased (r = -.52 and r = -.35, respectively). An independent samples t test revealed that students in the racial majority (M = 4.60, SD = .94) felt a higher sense of belonging than students in the racial minority (M = 4.23, SD = .84). Paired samples t tests were used to determine whether students’ beliefs changed over time. The mean for students’ symptoms of depression increased from Time 1 (M = 2.19, SD = 0.66) to Time 2 (M = 2.29, SD = 0.64, d = .15). This research holds implications for educators and school administrators to better school climate and inclusion as well as emotional support for students.

INTERSECTING IDENTITIES: PERCEPTIONS OF BLACK WOMEN AT HBCUS AND PWIS

Poster: 154
Malone, Natalie
Additional Presenters: Lauren Zahrn
Faculty Mentor(s): Dr. Ellen Usher

Researchers have identified the race and gender as essential components of individuals’ lived experiences (Crenshaw, 1989). Limited research has focused on how Black women navigate these intersecting identities, especially in distinct higher education settings (Ferguson & Miville, 2017). The racial composition of postsecondary institutions has been linked to the performance and self-perceptions of Black students (Palmer, Davis, & Maramba, 2010). The purpose of this study is to compare the self-perceptions of Black women who attend Predominantly White Institutions (PWI; postsecondary institutions where White students account for ≥ 50% of student body; Brown & Dancy, 2010) and Historically Black Colleges and Universities (HBCU; postsecondary institutions established before 1964 with the mission of educating African American students; Lomotey, 2010). Black women (N ~ 400) pursuing a Bachelor’s degree at PWIs (n ~ 200) and HBCUs (n ~ 200) will be recruited to participate in a web-based survey assessing their racial identity, body image satisfaction, academic self-efficacy, sense of belonging, and reasons to attend their institution. Mean level differences comparing PWIs and HBCUs will be examined using independent-samples t tests. We predict that Black women attending a PWI will report lower in-group identification, body image satisfaction, academic self-efficacy, and sense of belonging than will Black women attending an HBCU. Further, Black women attending an HBCU are hypothesized to report race-related reasons for attending college more often than respondents attending a PWI. Findings could better inform post-secondary institutions in supporting the performance and self-perceptions of Black women based on their chosen higher education setting. Keywords: African American/Black Women; Identity; College Experiences

** Denotes STEMcats project
ENGINEERING

EFFECT OF KEY FACTORS CONTRIBUTING TO CROSS-PROGRAMMING IN RFID MULTI-TAG APPLICATIONS
Poster: 155
Appleton, Ibrahim
Faculty Mentor(s): Dr. Johne Parker

Radio Frequency Identification (FRID) is a method for wirelessly transferring data using electromagnetic fields. Such tags have been utilized in a variety of applications including item tracking, security, and electronic payment methods such as Samsung pay and Apple pay. This technology, however, is not without flaws. There are several conditional parameters that can have a significant effect on the reliability and functionality of a tag. As an example, the ability to successfully read a tag is dependent on factors such as air gap (distance between tag and radio antennae), antennae type, antennae shape, etc. In addition, it is difficult to specify which tag is being programmed if there are multiple tags in close proximity to each other. This often results in cross programming, which occurs when a nearby tag is programmed instead of the targeted tag. Thus, the goal of this project is to develop a more optimized design configuration and more reliable methods for reading and writing to RFID tags that would minimizing cross programming while maintaining tag readability. Current results are based on prior studies conducted by our team to determine the key factors which affect single-tag performance. More recently, our group began working with a multi-tag setup to investigate the causes of cross-programming in detail. Key accomplishments from prior work include an automated air gap fixture as well as the design of a more intuitive GUI with higher parameter flexibility. Data was collected from both the M6e RFID reader and the older Skytek reader for comparison. At the conclusion of the previous phase of testing, prototype antennas were designed for further testing. Including antenna type as well as different values for air gap as parameters will provide us with more data which will be used to further optimize the reading and writing of tags in semi-controlled environments.

INTEGRATING SELF-HEALING MICROCAPSULES INTO WEARABLE TECHNOLOGY
Poster: 156
Breitenstein, Marissa
Faculty Mentor(s): Dr. Susan Odom

The research project focused on the integration of polymer microcapsules into a flexible sensor, which would allow for autonomic restoration of conductivity upon mechanical damage. While these microcapsules can be filled with different compounds, I chose to work with hexyl acetate due to its benign characteristics. The process of making the microcapsules requires an emulsification polymerization that involves the reaction of several monomers to make the walls of the capsules that allow for the encapsulation of the hexyl acetate. The purpose of the hexyl acetate is to spread over the sensor where failure occurs, enabling the ink particles to redistribute within the solvent, cover the crack, and thus restore conductivity.
A PRODUCTIVE APPROACH TO CLEANING THE WORLDS WATER SYSTEMS
Poster: 157
Browning, Shelby
Additional Authors: Samuel Hawthorne
Faculty Mentor(s): Dr. Jeffrey Seay

Waste plastic is accumulating at an exponential rate and is causing serious problems for humanity, including severe water contamination. From deteriorating health due to the added hormones to the destruction of our oceans and natural resources. Various methods need to be developed and implemented to slow and reverse this epidemic. A common-sense approach is to analyze the Reduce, Reuse, Recycle proverb with focus on the Recycle portion. One such method was developed by the University of Kentucky to convert waste plastic into a fuel oil for diesel engines, which is growing in demand. As the amount of waste plastic continues to increase in our environment, it becomes vital that new, effective methods of converting this solid waste into useful substances are implemented. There are many industrial processes for transforming plastic waste, but there are currently few logical operations that makes sense regarding sustainability. If the right steps are taken, the enormous amounts of plastic floating atop our oceans and tangled in the reefs can have a life other than being compacted and buried on land. By utilizing a low-cost, easy to use processor developed by the University of Kentucky Appropriate Technology and Sustainability (UKATS) research team, the plastics can be converted into an energy-dense fuel oil for use in diesel engines. This is the primary driving force behind finding a solution: giving what was once worthless trash, a significant value. As small-scale testing becomes more successful, UKATS looks to the future where we will begin expanding the process to a larger scale in efforts to accommodate more waste plastic.

INVESTIGATION OF THE IMPACTS OF DOPE SOLUTION VISCOSITY ON POLYMERIC MEMBRANES
Poster: 158
De Jesus, Samantha
Faculty Mentor(s): Dr. Isabel Escobar

In non-solvent induced phase separation (NIPS), organic solvents are generally used to dissolve polymers. In this research, the viscosities of different dope solutions made by dissolving polysulfone (PSf) in Dimethylacetamide (DMAc), N-Methyl-2-pyrrolidone (NMP) and PolarClean (PC) were measured as a function of polymer concentration, shear rate and temperature. Membranes were cast using a doctor blade and immersed in Deionized water. Morphological characteristics of membranes prepared using the tested dope solutions monitored included contact angle, zeta potential, surface roughness, surface pore size distribution and pure water permeability. Correlations between dope solution viscosity and membrane properties were analyzed to develop a mathematical model that could be extrapolated to provide information regarding casting dope viscosity to achieve desirable membrane properties when using new solvents.
ANALYSIS OF THE WATER DISTRIBUTION SYSTEM IN MARTIN COUNTY, KENTUCKY

Poster: 159
Douglas, Allyson
Additional Presenters: Kelsey Cole
Faculty Mentor(s): Dr. Lindell Ormsbee

Over 90% of Americans receive their drinking water from a public drinking water system, however, the American Society of Civil Engineers has given the United States' Water Infrastructure a D rating. Martin County, Kentucky has one of the worst water distribution systems in the nation, with 113 boil-water notices and 48 water system violations in twelve years, not to mention the fact that residents will often go for days without water due to leaking pipes. In order to aid the residents of Martin County, we developed a computer model of the water distribution system and conducted steady state, transient, and water age analyses. The steady state analysis allowed us to calibrate the system based on the age and material of the pipes obtained from Martin County. Then, the transient analysis allowed us to detect areas of negative pressure in the system where a vacuum could be created, sucking untreated groundwater into the system through leaks and breaks in the pipes. Finally, through the water age analysis, we were able to study the chlorine concentrations that have led to several water system violations. Based on our findings, we were able to provide the Martin County Water District with recommendations on how to improve the system.

INVESTIGATION OF PHOSPHORENE’S PHOTOCATALYTIC PROPERTIES

Poster: 160
Elder, Katherine
Faculty Mentor(s): Dr. Isabel Escobar

Phosphorus, which constitutes about 0.1% of the earth crust, is one of the most abundant elements. It exists as several allotropes which include white, red and black phosphorus. Phosphorene can be exfoliated from bulk BP in the same way as graphene from bulk graphite. Phosphorene distinguishes itself from other 2D layered materials by its intrinsic structural anisotropic features, which gives it some interesting properties. It possesses anisotropic physical (electronic band structure, electrical transport, thermoelectric) and mechanical (critical strain, Poisson’s ratio, Young’s modulus) properties, which have not been fully explored. More interesting is the presence of a natural band gap, which essentially allows the conducting properties to be switched on and off. Fouling mitigation is a key concern in the field of membrane separation. Phosphorene can act as a metal-free photocatalyst to degrade organic compounds in the feed solution. In this study, the unique properties of phosphorene in developing low fouling nanocomposite membranes are explored.
BIOMIMICRY OF SCHOOL OF FISH FOR COMMUNITY STORM DESIGN APPLICATIONS
Poster: 161
Enbody, Brandon
Faculty Mentor(s): Dr. Mariantonieta Gutierrez Soto

Cities are built and designed to encompass many considerations and needs that must be fulfilled. From physiological to societal, structures are built one at a time with specific priorities in mind. The first priorities of a community are to ensure shelter and protection from dangers, including the environment. Though civil designs focus on making individual structures safe and structurally capable, perhaps the incorporation of smart organization should be considered prior to construction. When compared to multicelled organisms, single structures imitate individual cells while communities and cities embody the organisms. For the organism to survive and thrive, all of its individual cells need to operate together. Appropriately, the next step in civic smart design is to apply smart organization to benefit a community’s collective ability to survive storms rather than simply its pieces. A method of smart organization for fluid survivability is in the biomimicry study of aquatic life and schools of fish. Several sources covering storm disasters, aquatic movement, and aerodynamics were examined to determine whether aquatic life possess unique adaptations both worth exploring and capable of being applied as an organizational method for community design. Books, journal articles, and research papers stated with evidence that aquatic life, including schools of fish, possess adaptations that positively influence locomotion, drag reduction, and increased efficiency. In addition, multiple organisms were shown to have exploitable mechanisms that reduce locomotion energy, control laminar and turbulent flows, and reduce drag or surface friction. Overall, examination of several sources show that a biomimicry study of aquatic life has the potential to manifest a method of smart civic organization. Using the adaptations and mechanisms evident in aquatic life that are found in fluid ecosystems, cities can be designed to withstand storms collectively and mitigate the chance of damage because of neighboring buildings.

MEMRISTOR FABRICATION TECHNIQUES
Poster: 162
Ferguson, Ted
Faculty Mentor(s): Dr. Todd Hastings

Memristor fabrication requires the deposition of metal layers on a silicon wafer. Photolithography and sputtering are the standard techniques for patterned metal deposition. The different methods of photolithography I’ve explored include: shadow masking, contact masking, optical masking with lense, and imprinting lithography. Each technique has pros and cons with feature resolution and alignment.
INVESTIGATING N LEVELS IN A STREAM

Poster: 163
Gorman, Reagan
Additional Authors: Jack Keady
Faculty Mentor(s): Dr. William Ford

One of the Grand Challenges for Engineering includes managing the nitrogen cycle. Eutrophication can occur in waterways due to N runoff from agriculture and industry sources. Removing N from the stream after it already entered is the strategy highlighted in this study. The impact of restoration on waterways is not well understood, though widely used, and this study is to further the understanding on this concept. The targeted stream will later go through the process of restoration and post-restoration monitoring. For this study, a storm water drainage stream, located in a field behind the construction site, was selected to observe the stream’s natural ability to removed excess nitrogen. In order to determine the concentrations of nitrogen two ISCO automated grab samplers were set up to gather 500 mL water samples every seven hours. One device was located up stream, while the other was located about one hundred and fifty yards downstream, to measure the differences in concentrations as the water flowed the stream. A flow depth measuring device was also placed in the stream to measure the changing flow depths, showing storm events. The data collected with this device will then be analyzed using Mannin’s Equation to estimate the flow rates during a given period. Using the estimated flow rates, and the concentration of nitrogen found from the collected samples, the N fluxes of the upstream location and downstream location will be estimated. The N levels are calculated using a SEAL discrete analyzer for samples taken in both locations. The difference in the levels from upstream from downstream will show the stream’s natural ability to remove the extra nitrogen.

USING ANTHROPOGENIC COMPOUNDS IN SEWAGE TO CREATE NEW FECAL SOURCE AND FECAL AGE INDICATORS FOR USE IN PROTECTING AND IMPROVING WATER QUALITY IN KENTUCKY WATERSHEDS

Poster: 164
Hall, Ashley
Faculty Mentor(s): Dr. Gail Brion

In recent years, it has become apparent that established methods of fecal source tracking have their limitations. Some non-microbial methods have become obsolete due to the ubiquitous nature of some chemicals in the environment. Others, such as fecal coliform bacteria tend to be quite nonspecific and expensive. All of these methods have one thing in common; they cannot age the sewage. While you may know that there is human fecal pollution within the environment, with current methods, it is hard to trace that pollution back to its point source relying only on concentration fluctuations. Water, and water of good quality are vital to a healthy life. Many of the waterways we pollute lead into reservoirs used as drinking water sources Methods that inaccurately represent fecal pollution in the environment, at a very high cost are putting us all at risk. To put that in perspective, one of the most polluted waterways in our area is the Kentucky River. The Kentucky River supplies drinking water to 16% of the population of Kentucky; that is 710,000 people. As human impacts on surface waters continue to grow, an inexpensive, accurate method of fecal source tracking that has the ability to pinpoint where exactly fecal pollution is entering the environment is needed now more than ever. The Environmental Research Training Laboratory, under the direction of Dr. Gail Brion designed a study to track Sucralose and acetaminophen through the wastewater treatment process. Samples of raw influent, pre-chlorination effluent, and post treatment effluent were taken during March 2016, February 2017, and June 2017 from Town Branch and West Hickman Wastewater Treatment Plants. Both of these WWTP flow into watersheds that eventually flow into the Kentucky River Basin. Taking samples from both plants allowed for sucralose and acetaminophen levels to be compared across multiple facilities. After looking at preliminary data, it is clear that both sucralose and acetaminophen are consistently present in WWTP influent. Sucralose exits the plant in virtually unchanged concentrations whereas acetaminophen disappears below detection limits. It was also found that the ratio of sucralose to acetaminophen entering the plants are not significantly different between plants or over time. Therefore, this ratio can be used to age untreated sewage in the environment. Laboratory benchtop studies were also preformed to simulate and model...
the natural rate of decay of Acetaminophen relative to Sucralose in different environmental conditions. Studies were performed at 21°C in March 2016 using WWTP influent and June 2017 using spiked creek water, and at 4°C in February 2017 using WWTP influent and June 2017 using spiked creek water. It was found that the decay rate slower in lower temperatures. It took about 48 hours for acetaminophen to decay below detection limits at 21°C but did not decay below detections in 168 hours at 4°C. Creek water was also sampled throughout the Lexington area to see if there was significant background Sucralose due to its stability in the environment. The creeks were sampled in April and July of 2017. It was found that an average of about 0.2 ng/mL Sucralose was present in creeks. These samples were also checked for the presence of Acetaminophen. Two sampling sites (McConnell Springs and Tates Creek at Malabu Dr.) were previously known to be possible hotspots for untreated sewage using E. Coli fecal source tracking method. Both suspected hotspots did have detectable levels of Acetaminophen in them, verifying that this method agreed with the previously established one. Finally, creek water was sampled up and downstream from two suspected sewer line leaks, Tates Creek at Malabu Dr. and Alumni Dr. Samples were analyzed for Sucralose and Acetaminophen levels to determine where a ratio could be calculated. Once a ratio was determined, those ratios were compared to the decay model created in the June 2017 4Â°C Creek study and stream flow rate data to pinpoint where exactly the untreated sewage was entering the water. Data is still being analyzed currently to determine where the leaks are.

ADVANCED MATERIALS FROM INDUSTRIAL HEMP USING DEEP EUTECTIC SOLVENT FOR CLEAN WATER APPLICATIONS

Poster: 165
Jenkins, David
Additional Authors: Andrew Lin
Faculty Mentor(s): Dr. Jian Shi; Dr. Lalitendu Das

Lignocellulosic biomass, the second largest component on Earth composed of cellulose, hemicellulose, and lignin. The cellulose and hemi/holocellulose consist of C5 and C6 sugars are intertwined with lignin, making lignocellulosic biomass more recalcitrant. Lignin constitutes up to 35% of a typical woody material by mass and 50% by energy, providing strength and rigidity to the plant cell wall. Hence, effective pretreatment technologies are essential to deconstruct the rigid plant cell wall structure to remove lignin. Lignin is a phenolic heteropolymer, and is the second most abundant natural terrestrial biopolymer. Despite its great potential to produce a wide range of chemicals and materials, lignin is yet an underutilized substrate. Nevertheless, as suggested by techno-economic analyses, the success of a lignocellulose-based biorefinery largely relies on the utilization of lignin to generate value-added products, i.e. fuels, materials, and chemicals. Recent advances in the application of deep eutectic solvents (DES) for biomass deconstruction and subsequent lignin extraction have brought new tangent to the biomass pretreatment process. DES is intrinsically cheaper than many ionic liquids (ILs) due to low precursor cost, simple synthesis and improved recyclability. Meanwhile DES can be as effective as IL towards dissolving lignin from plant materials. Industrial hemp (Cannabis sativa L.) is a commodity crop grown all over the world for various applications. Industrial hemp is known for its application in fiber, oil, and nutraceutical products, however utilizing industrial hemp as advanced material for clean water applications provides new avenue to hemp’s value addition. The specific objectives of this study are to: 1) characterize the lignin streams from DES (1:2 choline chloride: lactic acid) treated industrial hemp and further upgrade the extracted lignin to carbon based materials for waste water treatment; 2) synthesis of hemp fiber supported catalysts for mitigation of phenols from water.
ASSESSMENT OF INFRASTRUCTURE DEFORMATION USING DIGITAL PHOTOGRAMMETRY
Poster: 166
Jylkka, Clayton
Additional Presenters: Carter Luketich
Faculty Mentor(s): Dr. Sebastian Bryson

Usually, after a natural disaster, there is a team sent to assess the structural integrity of damaged infrastructure such as bridges and buildings. However, doing this can be very dangerous. The best way to eliminate this risk would be to assess the structural integrity without someone being physically at the scene. This can be accomplished by using photogrammetry techniques obtained from an unmanned aerial vehicle (UAV) to assess the structural integrity. So far, most of the research using UAV-based imaging has been focused on bridge structures. However, due to the ubiquitousness drones and advanced in photogrammetry technology, it is feasible to use UAV-based imaging tools assess the conditions of buildings and other urban infrastructure. Research was developed to evaluate the viability of using photogrammetry techniques to detect positional changes in buildings. For this research, a physical representation of a structure was created and subjected to a simulated disaster. Digital photographs were taken of the structure using cell phone cameras. These images were uploaded into the Pix4D image processing software to create a 3D point cloud. After the initial imaging, the structure was moved then imaged once again. The two point clouds were overlapped, and by using geo-referencing, the displacement was found. The intent of this research was to quantitify the percent error from the direct geo-referencing of the displacements relative to actual measured displacements.

CURCUMIN MULTIACYRilate LOADED POLy(LACTIC-ACID) FILAMENT FOR 3D PRINTING
Poster: 167
Kington, Paige
Faculty Mentor(s): Dr. Thomas Dziubla

Oxidative stress surrounding medical implants are a key cause of rejection due to an increase in polymer degradation products and foreign bodies within a wound site. Antioxidants have the ability to aid in the body’s immune response through free radical scavenging, decreasing oxidative stress and inflammation. One such antioxidant is curcumin, which is shown to have a more controlled release when incorporated into a poly(antioxidant β-aminester) (PβAE) cross linked structure. Including PβAEs could help decrease the rate of rejection by slowly releasing curcumin antioxidants which can improve biocompatibility. These PβAEs were incorporated into filament through two methods: coating and mixing powder. The coating method involved covering the poly(lactic-acid) (PLA) pellets in 10wt% PβAE microparticles. The powder mixing showed a higher weight loading, 30wt%. Both the 10wt% and 30wt% filament showed no degradation in PBS over one month while the 30wt% showed consistent degradation in 1M NaOH after three days. The 30wt% filaments were calculated to have a lower loading than calculated. These filaments are aimed to create 3D printed grid structures for testing in curcumin release.

** Denotes STEMcats project
CHARACTERIZATION OF SLEEP AND SEIZURES IN A KNOCKOUT MOUSE MODEL OF LAFORA DISEASE
Poster: 168
Mills, Rollie
Faculty Mentor(s): Dr. Sridhar Sunderam

Lafora disease (LD) is a highly severe form of progressive myoclonic epilepsy, for which there is no cure. The development of treatments for LD would therefore provide inestimable relief from suffering. Animal models such as the Laforin KO (LKO) mouse have been used to study LD and its response to therapy. A major impediment to investigation is that the spontaneous seizures in LKO mice are subtle and infrequent. Investigators have used chemical convulsants to induce acute seizures in LKO mice and test the therapeutic potential of drugs. However, the targets/pathways impacted acutely by convulsants may be completely unrelated to those involved in seizure generation in LKO mice. We therefore set out to detect and characterize spontaneous seizures and sleep patterns in LKO mice using a noninvasive piezoelectric motion sensor (Signal Solutions, LLC). We have previously used this “piezo” sensor for noninvasive sleep scoring and in vivo detection of spontaneous seizures the pilocarpine mouse, a chronic epilepsy model. Here, we monitored six male LKO mice (6-8 months old) for eight weeks each using the “piezo” sensor. In addition, we implanted three LKO mice (2M/1F; 1-12 months old) with EEG/EMG headmounts and monitored them for several weeks with simultaneous piezo and video. The data thus collected were analyzed using automated algorithms. Using this approach, several brief myoclonic events of varying duration have been detected and verified. This establishes the feasibility of analyzing behavior in LKO mice for weeks at a time, a prerequisite to testing novel therapeutic interventions aiming to reduce seizures. Support: This investigation was made possible by an Igniting Research Collaborations seed grant from University of Kentucky.

ORIGAMI-INSPIRED BUILDING ENVELOPE DESIGN FOR WIND-STORM RESILIENT HIGH-RISE STRUCTURES
Poster: 169
Nguyen, Alexander
Additional Presenters: Caylee Marshall, Chris Addington
Faculty Mentor(s): Dr. Mariantonietta Gutierrez Soto

With global trends in climate change, extreme weather events are occurring more rapidly than ever before. One such event is the hurricane, a storm characterized principally by high winds. Historically, hurricanes have caused major residential damage and population displacement as a consequence of their occurrences. This study aims to provide insight into origami’s ability to mitigate this issue by investigating rapid prototyping of a wind-resistant facade element. This is a pilot study working on small-scale modeling using rapid prototyping architecture designs. Origami, the art of paper folding, yields highly modular designs that allows widely ranging functionality and structural forms. Through extensive literature and origami design review, the study has selected one such design, a highly compressible corner fold, as the testing subject and two parameters to manipulate: paper weight and corner-fold angle. Through performing parametric study of these control variables, the comparative ability of each design to withstand wind pressure and associated mechanical forces was determined. In general, the weight of the paper used to fold the design highly affects the structural integrity of the facade, which indicates that material parameters have significant implications on success of a resistant facade. The results of the experiment offer evidence into which design choices improve structural performance of the building envelope, which can be translated into larger-scale tests and mechanisms. While strength testing for this design is a primary concern, this study also evaluates the origami engineering design using performance criteria established in the literature for compliant mechanisms such as joint translations for thicker structure elements as well as practical considerations such as cost and space/storage efficiency.

** Denotes STEMcats project
SYNTHESIS AND CHARACTERIZATION OF NOVEL CROSSLINKED POLYMERS FOR THE CAPTURE OF PCBS
Poster: 170
Ostertag, Thomas
Faculty Mentor(s): Dr. J. Zach Hilt

Polychlorinated biphenyls (PCBs) are environmental pollutants that have negative impacts on human health; although banned from use in 1979, these contaminants remain due to their inherent difficulty in degradation. This project involves synthesizing and characterizing novel polymer films with biphenyl functionality for binding PCBs with high affinities. The primary characterization method reviewed in this project is swelling studies, as these studies help to understand the crosslink network of the polymers thereby helping to understand the potential usefulness of the polymer films in binding to the pollutants. Studies in different temperatures and in various solvents have been conducted. These results have major implications for PCB binding because knowledge of swelling behavior will lead to an increased ability to remove the PCBs from the environment. Further testing is still necessary to fully understand the polymer film and its interaction with PCBs.

MULTISCALE COARSE-GRAINING OF IONIC LIQUID ELECTROLYTES TO DELIVER ACCURATE DYNAMICS AND TRANSPORT PROPERTIES AT THE MESOSCALE
Poster: 171
Parks, Lexi
Additional Authors: Amber Pitt
Faculty Mentor(s): Dr. Sergiy Markutsya

All atom molecular dynamics (MD) is a powerful tool in predicting structure, dynamic, and thermodynamic properties of systems at the atomic scale. With large number of atoms, MD slows down significantly. More efficient methods, such as coarse-grain molecular dynamics, might be used instead. Most coarse-grain methods use all-atomic simulations as an input. Current coarse-grain molecular dynamics methods, when applied to ionic liquids, accurately predict the structure but not dynamic properties such as diffusion coefficient and viscosity. When coarse graining is applied, degrees of freedom of the coarse-grained system are reduced when compared to the original molecular structure. This results in the loss of effective friction of the model, which increases the dynamic properties of the system. To solve this problem, the new coarse-grain method has been applied to recover both structure and dynamic properties of ionic liquids. With this method, in addition to the average of the effective force for each pair of beads, force variance is also accounted for. These forces are applied to perform coarse-grain molecular dynamics (CGMD) simulations. Such parameters as diffusion coefficient and radial distribution function are calculated for CGMD and compared to the same parameters obtained from MD simulation. The diffusion coefficient lines up perfectly, while the radial distribution function matches well. This new coarse-graining method allows accurate prediction of both structure and dynamic properties of ionic liquid electrolytes in a more efficient manner. This method can be applied to a variety of systems in a liquid state, assuming an adequate model is chosen.
SYNTHESIS AND CHARACTERIZATION OF DRUG-RELEASING BIODEGRADABLE POLYMER SCAFFOLDS
Poster: 172
Ritz, Isabella
Faculty Mentor(s): Dr. David Puleo

Synthesizing biodegradable materials is rapidly becoming a prominent research focus in the fields of biomaterials and tissue engineering research. Medical applications of such materials could include controlled drug release within an implantable system as well as scaffolding systems that may support cell growth for tissue regeneration purposes. The purpose of this study is to synthesize and characterize three different types of drug-releasing scaffold systems. The three systems include a three-layer poly(β-amino ester) (PBAE) hydrogel scaffold, an extrusion 3D printed poly(lactic-co-glycolic acid) (PLGA) scaffold, and a 3D printed UV photopolymerized PBAE scaffold. Each of these fabrication methods provide varying degrees of structural control which produced three unique systems to be analyzed. The drug loaded into these scaffolds was chosen to be simvastatin, a drug that is commonly prescribed to control cholesterol but is also effective at promoting bone growth. To characterize the three scaffold systems, each scaffold was subjected to a degradation study using phosphate-buffered saline lightly stirred at 37 degrees Celsius to mimic the degradation conditions of the human body. Through these degradation studies, the scaffolds were characterized by measuring mass loss and using high-performance liquid chromatography respectively. These scaffold designs are of interest to the biomaterials field because they incorporate a drug that can be controllably released. This type of technology could be very useful in medical applications for bone/tissue grafts and could eliminate the need for a patient to take a medication orally. The loaded drug could also be varied from the simvastatin used in this study. Additionally, the structures synthesized with 3D printing offer more spatiotemporal control than the hydrogel system which would allow for complex and form-fitting grafts to be printed specific to patient needs in future applications.

SOLUTION-PHASE SYNTHESIS OF A SELF-ASSEMBLING SUPRAMOLECULAR FRAMEWORK
Poster: 173
Spencer, John
Faculty Mentor(s): Dr. Isabel Escobar

Membranes occupy an imperative area of separation because the process is pressure operated and this commonly translates to lower energy costs. Biomimetic polymer membranes such as those that utilize the protein aquaporin are gaining increasing attention in desalination due to their high selectivity and flux. Drawbacks of biomimetic membranes include stability and orientation of biological molecules in synthetic environment. An alternative to using biological elements in membranes leads to synthetic molecules that show potential for water transport to the polymer surface. The goal of this research is to synthesize a self-assembling, supramolecular framework that may be used for desalination that achieves biomimetic-level water transport results. The first steps were taken in this experiment to functionalize the PBI membrane surface via carbodiimide and dehydration synthesis reactions. Preliminary Fourier transform infrared spectroscopy (FTIR) results supported carbodiimide chemistry functionalization of polybenzimidazole for attachment of 4-(Chloromethyl) benzoic acid and subsequent attachment of 6-Aminopyridine-2-carboxylic acid. Further synthesis steps were taken, but FTIR has yet to support this as progress towards the final formation of the supramolecular framework.
RELATIONSHIP DYNAMICS IN HADESTOWN
Poster: 174
Justice, Madison
Faculty Mentor(s): Dr. Rynetta Davis
This paper examines the relationships of Hades and Persephone and Hades and Eurydice from the musical Hadestown through the lens of the slave master-slave girl relationship dynamic found in African American literature set in the Antebellum period. Through close reading and analysis, these relationships are studied to see if and how they exemplify and/or subvert that traditional relationship dynamic. The research has found that that dynamic is present in a limited form in the Hades and Persephone relationship due to the fact that she is only in Hadestown for 6 months of the year and so he is unable to exert full control over her. However, this dynamic is fully present in the Hades and Eurydice relationship since he has almost complete control over her and her ability to leave Hadestown.

THEATRE AS CULTURAL REFLECTION: RESTORATION-ERA ADAPTATIONS OF SHAKESPEAREAN TEXTS
Poster: 175
Kirk, Katie
Faculty Mentor(s): Walter Foreman
This project is a critical examination of adaptations of Shakespeare’s works written during England’s Restoration Era (approx. 1660-1688). Some of the specific texts studied are John Dryden and William D’Avenant’s adaptation of The Tempest, Dryden’s Troilus and Cressida, Nahum Tate’s King Lear, and Thomas Shadwell’s Timon of Athens. Not only does the research draw upon the adaptations themselves, but it also takes into account other popular comedies and tragedies of the time period as a way to attempt to better understand the changes made to the original Shakespearean texts. In addition, this research also takes the historical and political context of the era (the reign of King Charles II and the reopening of British theatres after eighteen years) into account when looking at the texts. Overall, this project examines the ways in which both the theatrical and historical context of the era may have influenced respective adapters of Shakespeare’s texts during the Restoration.
ENTOMOLOGY

SURVIVAL STRATEGIES AND STRESS LEVELS OF THE ANTARCTIC MIDGE, BELGICA ANTARCTICA

Poster: 176  
Dalrymple, Emma  
Faculty Mentor(s): Dr. Nicholas Teets

A major component of survival in Antarctic environments is the ability of an organism to survive temperatures below freezing. One of its natives, the Antarctic midge, may use one of two cold survival strategies—freeze tolerance or freeze avoidance—to cope with the Antarctic’s frozen conditions. Under freeze tolerance, the midges can survive internal ice formation, while under freeze avoidance, internal fluid composition changes to prevent internal ice formation. While both strategies are effective in promoting survival, the amount of stress conveyed on the midges in the process is unknown. Because effects of stress can alter growth and development, preferentially choosing the less stressful survival strategy may improve an organism’s overall success. To examine the amount of stress accumulated under each survival condition, we examined gene expression of heat shock proteins after cold exposure treatments of frozen and supercooled for 24 hours, 24 hours with recovery time, 2 weeks, and 2 weeks with recovery time. Quantitative polymerase chain reaction was used for analysis of heat shock proteins because of their demonstrated role in stress responses in many organisms. After comparison to a reference gene, we found significant changes in heat shock protein expression within the frozen and supercooled for 24 hours with recovery treatments, but did not find significant changes within any other treatments. Within these treatments, one gene in the small heat shock protein group shows significant upregulation, indicating that certain levels of cold exposure contribute to increased stress levels. Based on our findings we suspect that Antarctic midges may avoid multiple short freeze-thaw cycles to reduce increased stress levels and its costs.

CONTEST VERSUS SCRAMBLE COMPETITION: A COMPARISON OF MOVEMENT PATTERNS OF SEED PARASITE LARVAE

Poster: 177  
Deeb, Adan  
Faculty Mentor(s): Dr. Chuck Fox, Allyssa Kilanowski

All organisms require resources (e.g. food) to increase fitness, but resources are never infinite. For many parasitic insects, larvae cannot move among hosts and cannot leave to find a new resource if the host is depleted before development is complete. Therefore, two competition strategies have evolved: contest and scramble competition. Contest competition involves direct conflict between individuals, ending in a winner-takes-all scenario, whereas scramble competition includes gathering as many resources as possible before others deplete the resource. Competition strategies between larvae within a host are hard to track, but by understanding how these individuals forage, we can begin to understand the mechanisms between avoidance/attraction behaviors of competing larvae. Seed beetles (Callosobruchus maculatus), seed parasites that develop inside beans, exhibit both competition strategies. We predict that competing beetle larvae within a single bean alter their foraging behavior based on their strategy; specifically, scramble competitors will move away from competing beetles, whereas contest competitors will move towards competitors. This is because scramble competitors benefit from acquiring as many resources as possible, whereas contest competitors benefit from eliminating opponents. We cultivated larvae of two competition strategies (Burkina Faso and South India Strains) on mung beans (Vigna radiata) with no competitors or a single competitor, and dissected beans to determine larval foraging path (towards or away from the competitor). We expect to see results from the second larval stage onward but not during the first larval stage, because individuals will be too small to encounter each other. However, if the beetles do not move according to our expectations, it may be that competition strategies affect behaviors/traits other than larval movement (e.g. sperm production). In conclusion, our research aims to understand how contest/scramble competitors partition a finite resource. Future research should evaluate how vibrations of foraging larvae drive the avoidance/attraction behaviors of competing larvae.

** Denotes STEMcats project
DEVELOPMENT OF AN INNOVATIVE CUCUMBER BEETLE MONITORING TRAP
Poster: 178
Kositzke, Christopher
Faculty Mentor(s): Dr. Ricardo Bessin

The striped cucumber beetle Acalymma vittatum and spotted cucumber beetle Diabrotica undecimpunctata howardi inflict over $100 million in damages on commercial cucurbit crops annually in the U.S.A. Numerous control methods have been implemented in an attempt to control these pests, but an effective, low-cost method has not been developed. Currently, many large-scale organic farms use costly organic insecticides as their primary control method. Yellow sticky traps provide farmers with a way to monitor beetle populations and efficiently apply these insecticides when beetle populations reach the economic threshold. However, sticky traps are non-renewable and prove difficult to place without damaging the highly vascular cucurbit plants. Our primary objective was to create a reusable monitoring trap with a more accurate capture rate. Throughout the 2017 growing season we developed a modified funnel trap and deployed it at regular intervals in organic winter squash and mixed cucurbit plantings. By recording the number of beetles captured over a 24-hour period with different variations of the funnel traps, the commercial sticky traps and the live traps currently used to lure beetles for research purposes, we were able to generate a side-by-side comparison of the effectiveness of the respective trap types. The modified funnel traps outperformed all competitors by a factor of 3 or more, significantly increasing the number of beetles collected. In doing so, the modified funnel traps provided a cost-effective, reusable, durable and highly practical alternative to current trapping and monitoring methods. We conclude that this trap could allow farmers to more accurately predict beetle populations in their crops. Additionally, it could serve as an easy, effortless way to collect cucumber beetles for research purposes.

POTENTIAL NON-TARGET EFFECTS OF GENE SILENCING FOR CONTROLLING EMERALD ASH BORER
Poster: 179
Langford, Charles
Faculty Mentor(s): Dr. Lynne Rieske-Kinney

For my research project, I am evaluating the non-target effects of using double stranded RNA as a mechanism to eradicate the emerald ash borer. The emerald ash borer is an invasive beetle from Asia that is causing mass mortality of ash trees in the U.S. My lab has been developing a double stranded RNA gene silencing serum specifically designed to cause mortality in EAB. The double stranded RNA otherwise known as RNAi binds to the messenger RNA and causes it to unwind and thus does not code for a gene. The double stranded RNA can be designed to silence the genes we choose, which will be genes that cause the greatest mortality rate. The double stranded RNA is very specific to EAB and thus is hypothesized not to harm other insects, so for my project I am testing that hypothesis. I have been working with a number of different insects, running feeding assays, dosing them with double stranded RNA, and evaluating mortality rates. My work will hopefully prove that double stranded RNA can be effectively used to eradicate EAB without non-target effects and thus allow for it to be implemented in a number of different control techniques that could save trees and money.
FINANCE

AN OVERVIEW OF F5 NETWORKS AS A STOCK
Poster: 180
Blakeman, Elyse
Faculty Mentor(s): Dr. Wendy Liu

F5 Networks is a technology firm that specializes in application delivery. Traditionally a hardware company, F5 Networks is making a shift into software in the fields of cloud solutions and security, a move that is common in the industry. Giants such as IBM and CISCO have done similar shifts as more low-cost foreign manufacturers enter the market. Using F5 Networks as a case study, this industry-wide phenomenon can be examined. F5 Networks’ economic moat varies by division, but with hardware still making up 85% of revenue, it is the division to watch most carefully. The transition to software will take some time and there is a possibility that F5 Networks will be unable to maintain its position in hardware in the intervening time. Its positions in security and cloud technology are more tenuous, though F5 Networks has formed strategic connections with Microsoft, Google, Amazon and other prominent players to bolster these positions. Recently F5 Networks is seeing changes in management, with CEO John McAdam being replaced by Francois Locoh-Donou in September 2017 and its CFO Andrew Reinland retiring in 2018. The market consensus on F5 Networks is hold and this report explains why while offering unique insight.

EVALUATION OF THE EQUITY IN UNIFI INC.
Poster: 181
Green, Jada
Faculty Mentor(s): Dr. Wendy Liu

The research was to develop a variant view regarding a public company based on qualitative and quantitative research. The research provided an in-depth study into the operations of the firm UNIFI Inc. (UFI) and its value to investors in the market. UNIFI Inc is in the textile industry and manufactures and sells polyester and yarn domestically and internationally. For the qualitative aspect of valuing the firm, the most recent annual reports from SEC filings such as the 10Q and 10K were analyzed extensively. The economic moat of UNIFI Inc., which is the competitive advantage of the firm compared to other competitors in the industry were also examined for the qualitative aspect of the firm. After researching the company’s products, there is no product differentiation and it has been concluded that there is no economic moat for UNIFI Inc. After analysis of the margin of safety it has been determined that the margin of safety for UNIFI Inc. is relatively narrow for the industry that UNIFI Inc. currently resides in. For the quantitative valuation discounted cash flow analysis as well as the valuation metrics such as price/earnings per share (P/E), and enterprise value/ earnings before interest taxes depreciation and amortization (EV/EBITDA) were used for current and future valuation. From their financial statements free cash flow, return on assets, return on equity, and net margin compared to other firms in the industry were examined. The financial statements over the last five years have shown a steady growth in net income as well as a steady increase on return on asset. After examining the qualitative and quantitative data of UNIFI Inc, it has been concluded that the firm is fair valued at this time.
**POSTER ABSTRACTS**

**GENERAC HOLDINGS EQUITY RESEARCH**  
Poster: 182  
Hausberger, Camden  
Faculty Mentor(s): Dr. Wendy Liu

Generac Holdings was the first company to engineer the common household standby-generator in 1959. It is an industrial powerhouse that sells products in the household, industrial, and commercial markets. Generac has posted strong financial numbers for years and especially when natural disasters occur (like Hurricane Harvey), Generac has seen its stock price jumps drastically in the aftermath of these disasters, as the company sees an influx of demand. These price jumps are due to Generac’s ability to produce high quality backup generators for household, commercial, and industrial uses and therefore, when substantial power loss and widespread damage hits, Generac provides the necessary products to help thousands of households and businesses get up and running once again. This phenomenon is unique and is the reason why Generac is being looked at in a deeper sense. Equity research, in general, is very relevant because many people invests their money into the stock market at some point in their life. Whether they invest themselves or through third parties like mutual funds, it is important for people to understand and recognize what a good investment looks like. The main objective for this research is to provide an in-depth analysis of the qualitative and quantitative aspects of Generac Holdings and be able to advise an investment position to potential investors. Through this research it has been found that there is a strong case for investing in Generac because of its continuous strong growth, and its presence as a top company in its industry. Generac has made 10 acquisitions since 2011 and are currently in a pending acquisition of Selmec which is a Latin American Industrial company. These acquisitions are just one of the many factors that have contributed to Generac’s growth as well as their strong reputation in the industrial sector.

**PERFORMING EQUITY RESEARCH ON GREIF INC.**  
Poster: 183  
Rosenzweig, Drew  
Faculty Mentor(s): Dr. Wendy Liu

This past semester he chose to perform equity research on a company called Greif Inc. Greif Inc. is a company that focuses on industrial packaging for a variety of markets ranging from steel drums to plastic containers and serves for multiple other package industries. As a part of the research, he analyzed the financials of Greif Inc. and specifically dove into their income statement. He looked at the progression and changes through the past few years. Throughout the research, he had three required readings that helped to better his research. The readings are as follows, The Warren Buffett Way by Robert Hagstrom, The Five Rules for Successful Stock Investing by Pat Dorsey and lastly Best Practices for Equity Research Analysts by James Valentine. These three readings played an integral part in what to look for when investing. Equity research is the idea of analyzing a company’s financials, performing ratio analysis, and forecasting whether the market correctly values a company. Today, investing in the stock market plays a huge role in an individual’s financial life. People across the world contribute money into the stock market and use it as a source of income or a retirement tool. Investing in the stock market is a very hard task, some individuals are very successful, while others may fail. Equity research is an integral part in making smart and intelligent investments. Greif Inc. was a great opportunity for him to apply equity research, as he has learned tons of valuable information and can’t wait to use his research in his future career.
PERCEPTIONS OF AND MOTIVATIONS FOR CORPORATE SOCIAL RESPONSIBILITIES - A STUDY OF TWO COUNTRIES OF DIFFERENT CULTURE AND LEVEL OF ECONOMIC DEVELOPMENT

Poster: 184
Tan, William
Faculty Mentor(s): Dr. Wendy Liu

Purpose: Analyze the perception for motives of executives in the banking industry to engage Corporate Social Responsibility (CSR) initiatives. Ten motives were chosen and research was conducted to investigate what respondents perceived are the motives for these executives in pursuing CSR initiatives, and what they thought should motivate these executives to pursue CSR initiatives. Research Approach/Method: Survey questionnaires were used to ask respondents' perception on what they thought motivates executives in the banking industry to pursue CSR initiatives and what they thought should motivate these executives to pursue CSR initiatives. Respondents were selected from two countries, USA and Malaysia. For each country, the respondents comprised of two panels undergraduate business students and employees from the banking industry. Findings: This paper reports the pilot study findings and describes how the findings and learning from the pilot study was used to refine the main study. Survey results show remarkable agreement of employees from the banking industry of both countries, that they assumed the executives are most significantly driven by branding/image as their motive. Student respondents from both countries also showed notable agreement, that they too, assumed branding/image provides the stronger stimulus for CSR engagement. However, results show some differences for what the respondents thought should motivate these executives. The US banking employee respondents thought that executives’ motivation should be driven by CSR initiatives that creates long-term value and contributes to sustainable developments, while the Malaysian banking employee respondents thought branding/image should be the motivation for engaging CSR initiatives. Practical Implication/Value: Perceived importance of CSR initiatives may be used to influence CSR initiatives decision making. This research adds to the growing body of research on perceptions and motivations for CSR initiatives, with particular reference to the USA and Malaysian context, and the comparison of the two.

FORESTRY

CAMPUS TREE WALKS: MINDFULNESS, RESILIENCE, AND EDUCATION

Poster: 185
Damron, Brianna
Faculty Mentor(s): Dr. Mary Arthur

A series of audio-guided "tree walks" were developed on the University of Kentucky's campus for the purposes of facilitating mindfulness, stress reduction, and urban canopy education. These walks are available to highly stressed populations (i.e., university students and staff; hospital patients and staff) in an effort to facilitate the philosophy of deep ecology. This ideology suggests that humans and trees are a part of something much larger than either individually; by taking care of the natural environment, we are also taking care of ourselves. Literature on other elements of nature therapy suggest that mindfully immersing oneself in the natural environment significantly lowers stress and inflammation, thus leading to increased longevity and quality of life. The aim of the Campus Tree Walk project is to enhance the relationship that people feel with trees and improve general well-being, as well as foster pathways for research on this area in the future.
CONFLUENCE OF BIODIVERSITY AND MARINE PROTECTED AREAS IN THE CORAL TRIANGLE
Poster: 186
Farmer, Ben
Faculty Mentor(s): Amber Bosse

Coral reefs are ecosystems especially vulnerable to factors such as pollution, nutrient runoff, and climate change. Corals require a strict level of water quality, and often water temperature, to survive. Through indirect methods such as nutrient pollution, as well as direct methods such as overexploitation and point-source pollution, human coastal populations are at high risk of degrading local reefs. The conservation of coral reefs is paramount to sustaining the biodiverse fish and invertebrate communities which depend on the reef network. The highest amount of marine biodiversity in the world is found in the Coral Triangle (CT), an area of the Indo-Pacific including mor-Leste, Malaysia, Indonesia, the Philippines, the Solomon Islands and Papua New Guinea. Because of increasingly high human population densities in the Coral Triangle, particularly on the coast, there is an immediate need for conservation efforts in this area. Marine protected areas (MPAs) provide an established method of conservation on national and local scales. MPAs currently cover nearly 2% of the exclusive economic zones of the six CT countries. Understanding where new MPAs would best serve the CT is of critical importance as overfishing and development become more prominent. This study uses geographic information systems (GIS) to analyze data made available through the Coral Triangle Atlas (CTA) by comparing biodiversity indicators with ranges of existing MPAs. Findings from this research reveal there are major areas of high biodiversity, as recently as 2014, that are not supported by an equally high number of MPAs. This study concludes that, 1.) these areas could benefit from the creation of MPAs, as they represent an area that may strongly benefit from being managed, and 2.) GIS can be an effective tool for informing decision around the creation and effectiveness of the growing network of MPAs.

UNDERGRADUATE EXPRESSIONS OF EMOTION IN OLD AGE: FINDINGS FROM THE GERONTOLOGICAL LITERACY NETWORK
Poster: 187
Avery, Morgan
Faculty Mentor(s): Dr. Graham Rowles

The purpose of this research was to explore undergraduate students’ views of emotion in older age. We sought to understand if students had an overall positive or negative emotional perception of aging. Data were collected from 1,468 students aged 17–22 at four different universities as part of the Gerontological Literacy Network’s ongoing longitudinal study on student perceptions of aging and old age. Utilizing a standard protocol, students were asked to “draw” aging and provide a brief description of their drawing. Data were coded and analyzed for the presence of emotional perceptions or meanings in the drawings and descriptions. Findings indicate the presence of an array of emotions including: depression, anger, loneliness, stress, and contentment. The most common emotions were depression, anger, and loneliness. The findings reinforce the notion that undergraduate students perceive aging as pervaded by negative emotions. This contrasts with evidence that older adults themselves view their aging through the lens of generally positive emotions. The increasing gerontophobic and ageist society experienced and perpetuated by younger individuals today has had a profound negative effect on how students perceive older people’s emotional state as they age. These findings suggest an acute need for educational interventions that will bridge the gap among generations in perceptions of the emotional experience of aging.
HEALTH SCIENCES

MYONUCLEAR TRANSCRIPTIONAL RATE DIFFERS IN YOUNG VERSUS MATURE MICE
Poster: 188
Crow, Samuel
Faculty Mentor(s): Dr. Kevin Murach, Dr. Charlotte Peterson

Skeletal muscle fiber hypertrophy occurs in mature mice (>4 months old) in response to synergist ablation overload in the absence of satellite cell-mediated myonuclear accretion, whereas young mice (2 months old) are not able to hypertrophy without satellite cells. We hypothesize that young mice have higher myonuclear transcriptional activity at rest than mature mice due to the demands of developmental muscle fiber growth. Age-related differences in transcriptional rate may in part explain why young mice cannot mount the robust myonuclear transcriptional response required for overload-induced hypertrophy without satellite cells. Purpose: To determine whether baseline myonuclear transcription differs between young (2 months) versus mature (5 months) mice. Methods: Young and mature mice (n=4 males/group) were pulsed with 5-ethynyl uridine (EU), a modified uridine that incorporates into nascent RNA, via intraperitoneal injection then sacrificed after a 1-hour chase. Myonuclei were defined as DAPI-positive nuclei within the myofiber, delineated by dystrophin immunostaining. EU-labeled nascent RNA was detected histochemically on frozen muscle cross-sections, and myonuclear EU intensity was quantified with semi-automated thresholding software. Muscle fiber cross-sectional area (CSA) was quantified via the detection of fiber borders using automated software. Results: The number of EU+ myonuclei did not differ between young and mature mice. Mean transcriptional intensity per myonucleus was 10% higher in young versus mature mice, and muscle fiber CSA was 18% smaller (P < 0.05). Myonuclear transcriptional rate normalized to muscle fiber size appeared 30% higher in young versus mature mice, but did not reach statistical significance (P = 0.07). Conclusion: Likely due to lower normalized myonuclear transcription relative to young mice, mature mice may possess a transcriptional reserve that allows for hypertrophy in the absence of myonuclear accretion, as previously shown by our laboratory. The current data indicate that murine developmental age could be an important consideration for hypertrophy experiments. These results will be verified in a larger cohort of mice that will also include females.

DIGITAL HEALTH LITERACY PROJECT FOR COMBATTING THROWING ARM OVERUSE INJURIES IN LITTLE LEAGUE BASEBALL
Poster: 189
Fields, Rachel
Faculty Mentor(s): Dr. Jami Warren

Youth sports injuries are becoming more prevalent, particularly in Little League baseball. Many of these injuries stem from throwing arm overuse and it has been estimated that 50% of them are preventable (Valovich McLeod et al., 2011). These injuries not only have immediate consequences, but they can also have consequences for players in the future (i.e., arthritis and growth related disorders). National and state baseball organizations have created guidelines and rules to combat these preventable injuries. Although 73% of Little League baseball coaches claim to implement recommendations for pitching correctly, only 43% were able to answer questions about these recommendations (Fazarale, Magnussen, Pedroza, & Kaeding, 2012). This indicates a clear need for coaches to be educated on proper prevention methods for Little League baseball injuries. A digital health literacy project that includes information on rules and guidelines for pitching, prevention methods such as warm up routines, proper pitching techniques, and signs of injury will help educate coaches on causes of injuries as well as mechanisms to prevent them. I hypothesize that educated coaches will better protect their players from injury and prevalence rates will drop.
POSTER ABSTRACTS

A HOLISTIC APPROACH TO ADMISSIONS IN A PHYSICIAN ASSISTANT PROGRAM
Poster: 190
Hanebuth, Cannon
Faculty Mentor(s): Dr. Michelle Butina

Over the past decade, the methods used to evaluate applicants for healthcare graduate degrees have shifted from a focus on cognitive components to a more holistic approach as test scores and grade point averages (GPA) do not fully reflect who a person is. Many Physician Assistant programs have adopted a holistic approach, to look at the whole person, in an effort to create future healthcare practitioners that are compassionate and competent professionals. The Physician Assistant literature has limited research regarding which holistic components contribute to student success in graduate programs. Data was collected from three of the most recent Physician Assistant (PA) graduating classes, spanning from 2014-2016 (150 students) at a research institution in the southeast. A multiple linear regression analysis will be used to determine what holistic components are the greatest predictors of student success in this program. The holistic variables include hours of patient care experience, community service, work experience, health care shadowing, and undergraduate research experience. End of program GPA and national certifying exam scores will be utilized as the variables of program success. Furthermore, the cognitive components (undergraduate GPA and Graduate Record Examination scores) will be analyzed in sequence to further evaluate applicants in an effort to determine the factors that predict success. These results are expected to indicate that students who have more experience in certain categories will score higher in GPA and on national certifying exams. These results can help graduate programs to better determine which factors, holistic and/or cognitive, predict student success in these competitive programs.

HISTORY

A CARTOON HISTORY OF PRE-WORLD WAR II UNITED STATES
Poster: 191
Center, Douglas
Faculty Mentor(s): Dr. Mark Summers

The years of 1938 through the end of 1941 in the United States have often been overshadowed by the memory of the commencement of World War II. What is forgotten by most Americans is how America made the transition from a nation reeling from the Great Depression, concerned with the New Deal, the New York Yankees, and isolationism to a nation at war. One of our best resources to understand this transition and capture the essence of the American mind during those crucial years is by means of political cartoons. Newspapers across the nation published cartoons that reflected the diverse attitudes of the everyday American. These cartoons tell the story of how America’s sentiments changed over time to carry the nation into war. To understand this transition, I researched three newspapers and their political cartoons: the Lexington Leader, the Chicago Daily Tribune, and the St. Louis Post Dispatch. These three newspapers published some of the most widespread and popular cartoons in the nation. I researched cartoons pertaining to WWII during the most active months of the pre-war and early-war periods during which the most landmark events occurred as these times held the most cartoons. I organized the cartoons that I found by event, subject, and artistic theme. Through this organization and grouping, I discovered a narrative by which the transition of the attitudes of the American people toward war can be seen. With each major event, public opinion slowly turned from isolationism toward support of the war. I also discovered the wide range of beliefs and opinions of Americans regarding isolationism, war hawk mentality, anti-communism and anti-fascism, and the criticism of political and war leaders. Certain events had a larger effect than others, but all worked together to bring America to the world stage of war.

** Denotes STEMcats project
**POSTER ABSTRACTS**

**HONORS**

THE ROLE VOCATIONAL ANTICIPATORY SOCIALIZATION (VAS), ORGANIZATIONAL ANTICIPATORY SOCIALIZATION (OAS), AND CALLING IN STEM DEGREE AND CAREER DECISION MAKING: A STUDY OF HONORS COLLEGE STUDENTS  
Poster: 192  
Goodknig, Elizabeth  
Faculty Mentor(s): Dr. Kimberly Stoltzfus

Past research has demonstrated that there is a deficit of Science, Technology, Engineering, and Mathematics (STEM) workers in the United States workforce. Some research suggests that, while there is not a deficit of STEM majors at American universities, there is a trend towards STEM majors diverting to non-STEM careers following graduation. VAS is a socialization concept that examines the social influences on an individual’s career decision, while OAS examines the social influences on an individual’s choice of educational or vocational institution. While VAS and OAS are well established paradigms that have been used to study the career and degree decision making process in students, a sense of “calling” is still not included in the criteria for determining VAS and OAS. We believe that “calling” may be an important factor in both of these paradigms. Thus, we investigated the interaction of VAS, OAS, and calling as it relates to the degree and career decision-making process in a population of University of Kentucky Honors College students. We believe that clear results on this could help elucidate potential reasons for the deficit of STEM workers in the workforce, and why college students choose to leave the STEM field after graduation. Methods: We will use a survey given to honors students via email to obtain a goal sample size of n=200. Key Findings: This study is still pending results.

**LANDSCAPE ARCHITECTURE**

RECOMMENDATIONS FOR INCREASING THE URBAN TREE CANOPY COVERAGE  
Poster: 193  
Hunerkoch, Michelle  
Faculty Mentor(s): Chris Sass

Urban trees provide positive ecosystem services by filtering pollutants and absorbing stormwater runoff, reducing urban heat islands, sequestering atmospheric carbon, and filtering air for human health. Association with a green space can have a beneficial effect by increasing the health of newborn humans. However, urban trees can also provide negative ecosystem services. An ecosystem disservice is a function or property of an ecosystem that is perceived as negative for human well-being. A few urban tree disservices to consider are the costs related to initial purchase, pruning, watering, storm cleanup, and the release of greenhouse gases. Despite the disservices, urban trees on balance provide more services than not. This project focused on strategic ways to increase the tree canopy coverage in the city of Lexington, Kentucky to meet a 30% canopy coverage goal. A limiting factor in getting trees to grow is the locations and conditions in which the trees are planted. Therefore, tree wells and tree diameter at breast height were measured in situ and recorded in nine Lexington neighborhoods to identify conducive growing conditions. In addition, 2010 U.S. Census data block groups were used to determine how formal education level, median household income, and house value variables related to the amount of existing tree canopy in nine neighborhoods, which represented a cross section of home age and socioeconomic status. This project is intended to inform homeowners and homeowner’s associations about which trees are best suited to their neighborhood and which trees are to be avoided. The creation of urban tree planting guidelines is intended to influence local retail outlets and the nursery industry to stock recommended trees as well as the neighborhood development industry to design neighborhoods that create optimal urban tree growing conditions.

** Denotes STEMcats project
A CITY BUILT ON COAL: A MASTERPLAN FOR JENKINS, KY

Poster: 194
Lockwood, Erin
Faculty Mentor(s): Dr. Jayoung Koo

During this past semester, Erin Lockwood worked on a masterplan for a lakeside trail, boardwalk, and cultural trail through the town of Jenkins, Kentucky. The City of Jenkins is located in Letcher County, on the border of Kentucky and Virginia, at the foot of Pine Mountain. The Mayor of Jenkins requested ideas for a masterplan of Elkhorn Lake, a large water body adjacent to the downtown core. The town also wanted ideas for the recreational park connected to the lake, as well as a pedestrian connection from the lake and park, to downtown. After visiting Jenkins, Erin saw great potential for the quaint, mountain town. She proposed a masterplan that allowed residents to be more active in their community with various trails and paths connecting from the downtown region, around Elkhorn Lake, and onto the school campus. Inspired by the large black and white photos around the city, a main focal point of the design was a cultural trail that wound through Jenkins, and even utilized an abandoned rail bed. The photos showcased the pride the residents had in the history of their town, and the goal of the masterplan was to enhance that pride and allow their history to carry through to their future. The design also proposed a floating boardwalk that juts out into the lake, providing opportunities for scenic views and relaxation. Wayfinding and signage show pedestrians distances they have traveled, as well as how long they are from their destination. The driving force behind Erin’s masterplan was that if the residents of Jenkins were active in their community and continued to be proud of their city, then more people would be interested in visiting and staying in town. The City of Jenkins is a jewel that should be experienced by everyone.

EXPLORING NATURE PLAY AND NATURAL LEARNING WITH THE CHILDHOOD DEVELOPMENT CENTER OF THE BLUEGRASS

Poster: 195
McKinley, Thomas
Faculty Mentor(s): Jordan Phemister, Brian Lee

This semester Thomas McKinley worked with the Childhood Development Center of the Bluegrass exploring designs for a potential nature playscape for the students to use for natural learning and free play. Using natural elements (gardens, plant material, loose parts, water, odor, shadows, etc.) for children to create their own play experience for motor development as well as educating students about the importance of the natural environment. Thomas organized charrettes and design activities for: parents, faculty, and students to learn from the stakeholders of this project. This method involves community members from the very beginning of the project so that the final design reflects their needs rather than a “rubber stamp” approach of placing the same playground in different locations without accommodating the space to its contextual environment. Thomas completed analysis of the site, created multiple concepts for a nature play space, and developed a schematic design package for the Childhood Development Center of the Bluegrass.
JENKINS, KY | A TOWN OF TRAILS
 Poster: 196
 Schultz, Beck
 Faculty Mentor(s): Dr. Jayoung Koo, Ryan Sandwick

Jenkins, Kentucky is a community that was developed as a company town for the Consolidation Coal Company located deep in the Appalachian Region. Being proud of their heritage, the City of Jenkins is looking for opportunities to embody the historical spirit through physical designs that can address public open space, urban condition, recreation, wayfinding, environmental education, green infrastructure, and walkability. Through research, inventory, and analysis two focal areas were identified, Elkhorn Lake and the Downtown district. With the current infrastructure, it is a challenge for pedestrians/bicyclists to move freely while feeling safe within Jenkins. There are several amenities both inside and surrounding the city that could potentially be utilized. The proposed designs will improve connectivity in Jenkins by implementing a trail system along with several pocket parks that will reinforce the subtle space transition in town. The trail system will also tap into other trails surrounding the city, reinforcing the community vision of becoming a Kentucky “Trail Town”. A masterplan that showcases the trail system and examines the importance of each trail as to how it contributes to the overall plan as well as why it ultimately improves connectivity throughout the city, is presented.

SPENCER COUNTY EXTENSION OFFICE: REVIVING COMMUNITY CONNECTIONS
 Poster: 197
 Trejo Jr, Felipe
 Faculty Mentor(s): Ned Crankshaw, Dr. Jayoung Koo

This project involves discovering the needs and wants for the Spencer County Extension Office offered programs, and how they will correlate to the site’s landscape. The Spencer County Extension Office was integrated into its landscape in 2013 with a blank landscape canvas and has since been the same. They are looking to implement landscape designs that will emphasize sustainability and the current programs offered. Overall landscape improvements, educational demonstration areas, and a walking trail within their property boundary, will contribute to a higher quality of life for this growing community located southeast of Louisville. The current physiography of the landscape is a challenge for new development due to its steep sloping hills, shallow soils, and hydrology constraints. Felipe identified four areas of interest on the site after conducting research, site inventory, and analysis: the educational rain garden, seating and gathering spaces, natural stream source, and the trailhead connection. Developing these landscapes will allow natural trail connections and transitions, with themed environments that support the extension office programs, and provides a safe environment for children. These four areas of interest will be scaled and rendered along with presenting an illustrative masterplan analyzing the importance of these areas and how a revitalization of the extension office creates a community connection.

** Denotes STEMcats project
LINGUISTICS

VOWEL DEFORMATION AS A FUNCTION OF TABOO AVOIDANCE
Poster: 198
Meek, Haley
Additional Authors: Aleah Combs
Faculty Mentor(s): Dr. Kevin McGowan

The goal of this study is to investigate vowel deformation as a function of taboo avoidance. Sets of stimuli were derived from one speaker taking incremental steps between a minimal pair consisting of a nonsensical word and a curse word (ie shit and sheit). These sets were created from four unique curse words: shit, fuck, dick and bitch. Participants will be asked to choose the less offensive word of two given from the same set. To insure distinguishability, the stimuli are at least two incremental steps away from one another in their acoustic progressions. Density of the lexical neighborhood will be controlled for. However, it is our expectation that there will be a marked decrease in the offensiveness of taboo words with a more dense lexical neighborhood as opposed to the words with a sparse lexical neighborhood.

MARKETING

CONSUMER EMBARRASSMENT DURING ONLINE SHOPPING
Poster: 199
Fernandez, Molly
Faculty Mentor(s): Dr. John Peloza

As ecommerce becomes more and more prevalent, businesses must understand what consumer attitudes are towards online or in person purchasing. With the increase in privacy concerns due to big data, are consumers changing their attitudes towards online purchasing in favor of shopping in store? This study looks specifically at embarrassment levels in regards to online and in store purchases of adult diapers. In order to see if online privacy concerns lead to more embarrassment than in store purchases, the study divided participants (n=211) into two groups, online and instore, and asked them to record their embarrassment levels throughout the entire purchase process. The study showed that while embarrassment is experienced during online shopping, there is significantly more embarrassment experienced when shopping in store. The results suggest that consumers are not influenced by privacy concerns when purchasing embarrassing products online.

** Denotes STEMcats project
MATHEMATICS

DIFFICULTY OF PARTITIONS
Poster: 200
Appel, Jessica
Additional Authors: Jackson Morris, Kristopher Andrew
Faculty Mentor(s): Dr. Dave Jensen, Christopher Manon

A partition can be defined as a division of a larger object into smaller parts. For example, a partition of an integer N is a way of writing N as a sum of positive integers. Partitions are an important concept in many fields of mathematics, including combinatorics, number theory, representation theory, and geometry. In this experiment, the group investigated a recently defined invariant of a partition, known as the difficulty. This invariant has applications in particular to the geometry of algebraic curves. Since the difficulty is such a new concept, several issues were investigated throughout the semester. The team worked to develop a computer program that will calculate the difficulty of any given partition, analyzed data to find the best method for calculating the difficulty of a partition by hand, and worked to find an upper bound on the difficulty of any a x b box shaped partition with a, b ≥ 3.

MICROBIOLOGY

UNCULTURED CANDIDATUS SACCHARIBACTERIA BETA-GALACTOSIDASE IN SITU ACTIVITY
Poster: 201
Dunning, Stephanie
Faculty Mentor(s): Dr. Cleber Oouverney

More than half of the phyla in the Bacteria Domain cannot be cultured. This is known as the “Great Plate Count Anomaly”. Candidatus Saccharibacteria (TM7) is an uncultivable bacteria phylum. This organism does not grow under usual laboratory conditions. Determining type and function of TM7 bacteria requires other methods. We hypothesized that oral TM7 bacterial cells will have a functioning lactase gene therefore producing the lactase enzyme when Fluorescein Di- β-D-Galactopyranoside, a lactose analog, is introduced to the bacteria. An oral sample from a patient was collected and the DNA isolated. PCR was used to screen if the patient had oral TM7 using the primers Bac8F and TM7_1177. The PCR sample is being sequenced to confirm that the patient has TM7. In order to use the FDG lactose analog we grew E. coli and lactase positive cultures in a minimal broth that contained no carbohydrates then add FDG as the bacteria’s source of sugar. The lactase positive has the vector containing the TM7 16S rRNA gene and the E. coli culture is the positive control. In the weeks to come the goal is to measure lactase activity from uncultured TM7 using Fluorescence In Situ Hybridization (FISH) and confocal microscopy. FISH utilizes primers that bind to the 16s rRNA of TM7 and are equipped with fluorescent probes. This, in combination with FDG, will allow us to visualize TM7 breaking down lactose. This project was funded by NSF DBI grant# 1004350.

** Denotes STEMcats project
**GENERATION OF A FLUORESCENT REPORTER FOR C-DIGMP PRODUCTION IN BORRELIA BURGDORFERI**

**Poster: 202**  
Khenner, Elizaveta  
Faculty Mentor(s): Dr. Brian Stevenson

The causative agent of Lyme disease is the tick-borne spirochete Borrelia burgdorferi. If untreated, Lyme disease can lead to neurological deficits, carditis, and chronic joint inflammation. B. burgdorferi is an obligate intracellular bacterium with an enzootic life cycle, and as such cannot survive outside of a tick or mammal host. The different environments of ticks and mice provide a challenge to survival of the bacterium, so Borrelia must be able to differentially regulate their gene expression according to their host environment. Such regulation requires that the bacterium be able to sense and respond to environmental changes. Signaling pathways within the tick involve the small signaling molecule cyclic di-guanylate monophosphate (c-diGMP). It is known that c-diGMP is used as an important signaling molecule in most bacterial species; however, its specific role in aiding B. burgdorferi survival has not yet been elucidated. Little is known about the subcellular location and time point of c-diGMP production. In this project, a genetically encoded fluorescent reporter for c-diGMP within borrelial cells is being created. This reporter and FRET imaging will allow visualization of c-diGMP within the cell. Further experiments will examine c-diGMP production throughout the replication cell cycle of B. burgdorferi, as well as the effect of modulating environmental conditions on c-diGMP production, degradation, and bacterial survival. This reporter can also be used for future studies using live animal models to examine the expression and effects of c-diGMP in vivo.

**MODERN AND CLASSICAL LANGUAGES**

**A SILENT WAR: THE INVASION OF TRIBALISM ON NOLLYWOOD**

**Poster: 203**  
Koutone, Edith  
Faculty Mentor(s): Dr. Jacqueline Couti

Nigeria has overcome a lot since its independence in 1960 and has made many advancements to build itself up from colonialism that had amplified the tension between tribes. One of Nigeria’s biggest advancements is Nollywood, Nigeria’s film industry. As the industry grew, the fight for power and control between the dominant tribes began to worsen. The dominant tribes—Yoruba, Igbo, Hausa—which controlled the government pre-independence and post, now want a hand inside one of the biggest industries in Nigeria. Movies from pre-independence and post-independence are compared and analyzed to understand why and how the tension between these tribes have not improved with Nigeria’s changing political environment. As films from Nollywood’s sub-industries, which are run by the Yoruba, Igbo, and Hausa, are dissected, they reveal the subliminal jabs each tribe throws at each other. From the clothes to the women to the dialect, these tribes have found ways to show superiority over the less prominent tribes and each other. The Yoruba, Igbo, Hausa tribes have taken a piece of Nollywood and made it into their own. In doing so, they began to construct their own depiction of Nigeria and misconstrue Nigeria’s true identity. The Hausas and Yoruba are constantly tired of the Igbos rule over everything. The Igbos think they are the only sophisticated tribe in Nigeria. Weddings and communal gatherings are seen as a way to show out. With issues such as these, the notion of mind control comes into play. As these tribes try to manipulate the minds and viewpoints of Nollywood viewers, Nigeria begins to suffer. As Nigeria strives to move forward and be seen as this diverse and inclusive country, the cold war between the dominant tribes within the film industry pushes the country back one film at a time.
HDAC REGULATES PATHWAYS ASSOCIATED WITH TISSUE REGENERATION AT THE TIME OF INJURY
Poster: 204
Blichmann, Dana
Additional Authors: Shivam Khatra, Anne Crowner, Kaitli Pardue
Faculty Mentor(s): Dr. Randal Voss

Tissue regeneration is associated with complex changes in gene expression and post-translational modifications of proteins, including transcription factors and histones that comprise chromatin. We tested 258 compounds designed to target epigenetic mechanisms in an axolotl (Ambystoma mexicanum) embryo tail regeneration assay. A relatively large number of compounds (N = 31) reproducibly inhibited tail regeneration, including multiple histone deacetylase inhibitors (HDACi). In particular, romidepsin reproducibly inhibited tail regeneration when embryos were treated continuously for 7-days post-amputation (7 dpa) or acutely for 1-minute post-amputation. After 7 dpa, romidepsin-treated embryos regenerate some but not all tail features and thus show severe patterning defects. Finally, romidepsin altered early, transcriptional responses 3 hpa, increasing the expression of genes associated with cell cycle inhibition and growth arrest, as well as regulators of signaling pathways associated with cell survival and tissue regeneration. Our results show that HDAC activity is required at the time of tissue injury to regulate pathways associated with tissue regeneration.

DIURNAL LOCALIZATION OF A HUMAN HUT BACTERIUM, ENTEROBACTER AEROGENES, WITHIN A HETEROLOGOUS HOST TISSUE
Poster: 205
Fluharty, Haley J.
Faculty Mentor(s): Dr. Jiffin Paulose, Dr. Vincent Cassone

This study explores the motility of the human gut commensal bacterium, Enterobacter aerogenes, within the colon of the laboratory mouse, Mus musculus. E. aerogenes has been shown to express circadian rhythms of motility outside of the host (in vitro) and increases swarming behavior in the presence of the brain/gut hormone melatonin. The purpose of this study is to test whether Enterobacter aerogenes will follow the same circadian rhythm cycles as its host: the human or the mouse, or both. The main test is rhythmicality: the bacteria move within the gut tissue, either closer or farther away from the lumen, depending on the time of day. An infection was established in the mice through a feeding tube with fluorescent bacteria. The mice were then imaged, in vivo, and colon samples from the six infected mice were taken at six time points over 24-hours, with three points in the dark and three in the light. The colon tissues were cryosectioned and stained for an antibody against a mucin protein family member to label the mucosal section to determine the location of the gut bacteria across the tissue section. Preliminary data show that the bacteria are expressing a positive signal from the lateral edges of the tissue at certain times of day. Prior research has been conducted regarding bacterial pathogens for humans in a hospital setting, but there has been no direct investigation that displays the localization of this specific species of gut bacteria within the gut across the time of day. This research would contribute to the understanding of how specific bacteria survive in humans by communicating and adapting using environmental cues.

** Denotes STEMcats project
HYPERHOMOCYSTEINEMIA AS A MODEL FOR VASCULAR DEMENTIA
Poster: 206
Grau, Elizabeth
Faculty Mentor(s): Dr. Linda Van Eldik, Dr. David Braun

Vascular dementia, though being the most common form of dementia following Alzheimer’s disease, has received very little attention. As a result, very little is known regarding its mechanism of action and the resulting implications. This experiment characterizes vascular changes in a hyperhomocysteinemia (HHcy) model of vascular dementia. Elevated homocysteine levels in the blood has been identified as a risk factor for vascular disease and dementia in patients, and in rodents it can induce cognitive impairments, neuroinflammation, and microhemorrhages. In the present study, mice were fed a diet deficient in B12, B6, and folate while simultaneously supplemented with excess methionine for 4, 8, or 12 weeks. We found evidence of increased leakiness of the blood brain barrier in the hippocampus and cortex by 4 weeks on diet. We are currently exploring whether these changes in BBB integrity are also associated with infiltration of peripheral immune cells in these regions.

INVESTIGATING POTENTIAL MECHANISMS OF CLOVE OIL (EUGENOL) IN MODEL CRUSTACEANS
Poster: 207
Hall, Kaylee
Faculty Mentor(s): Dr. Robin Cooper

Clove oil contains eugenol as an active ingredient and is used a topical anesthetic in mammals to remedy pain and to anesthetize fish for short periods. We examined the potential use of eugenol for crustaceans. The exact mechanisms in the effects are still not fully understood. We examined the resulting activity of eugenol on neuronal activity in sensory and motor neurons in the Red Swamp crayfish (Procambarus clarkii), Blue crab (Callinectes sapidus) and Whiteleg shrimp (Litopenaeus vannamei) with electrophysiological recordings. The neurogenic heart rate in the 3 species was also monitored along with behaviors and responsiveness to sensory stimuli while exposed to eugenol. The activity of the primary proprioceptive neurons was reduced at 200ppm and ceased at 400ppm for both crayfish (i.e., muscle receptor organ) and crab (i.e., leg PD organ) preparations when saline containing eugenol was directly applied to exposed sensory organs. Flushing out eugenol resulted in recovery in the majority of the preparations within 5 to 10 minutes. Administering eugenol to crayfish and crabs both systemically and through exposure in their aquatic environment resulted in the animals becoming lethargic. Direct injection into the hemolymph was quicker to decrease reflexes and sensory perception but heart rate was still maintained. Eugenol at a circulating level of 400ppm decreased electromyogram activity in the claw muscle of crabs. Surprisingly, this study found no change in heart rate despite administering eugenol into the hemolymph to reach 400ppm in crabs or crayfish but shrimp preparations decreased. Overuse of topical eugenol or ingestion may silence neurons in mammals by the same mechanisms as in our model crustacean animals. Our next focus is to determine the mechanism of action by intracellular recordings from neurons to support scant evidence of blocking voltage gated-sodium channels and thus decrease neuronal excitability.
RAPID IDENTIFICATION OF MENDELIAN MUTANTS IN THE LARGE AXOLOTL GENOME: CARDIAC IS ASSOCIATED WITH A MAJOR DELETION IN TROPOGIN C

Poster:  208
Hardy, Drew
Faculty Mentor(s): Dr. Randal Voss, Dr. Jeramiah Smith

A variety of Mendelian mutants are known for the primary salamander model, the Mexican axolotl. While many of these mutants have received considerable study at developmental and molecular levels, their genetic bases remain largely unknown. We reasoned that mutant loci can be rapidly mapped if Single Nucleotide Polymorphisms (SNPs) are identified and genotyped between the expressed transcripts of mutant and wildtype siblings. To test this idea, we isolated RNA from wildtype and cardiac (c) individuals of a single spawn and then formed two pools for RNA-Seq. A total of 55.2 and 70.8 million reads were generated for the pools and these yielded 102,330 high-confidence, gene-anchored SNPs. Because the density of genotyped loci greatly exceeded the content of the existing axolotl meiotic map and spanned distances larger than the existing axolotl genome assembly, we performed association analyses using positional information from human and chicken. These analyses revealed a distinct genomic interval with Troponin T2 (tnnt2) predicted to occur under the association peak. PCR analyses of genomic DNA confirmed that tnnt2 polymorphisms diagnosed wildtype and c individuals, and c is associated with a deletion of exon 8. Our study reveals a rapid approach to identifying discreet genomic loci associated with mutant phenotypes that is compatible with the large size of the axolotl genome and should be directly applicable to other species, without the development and optimization of additional resources.

INFLUENCING EFFECTS OF CIRCADIAN RHYTHM DISRUPTION ON PERFORMANCE AND HEALTH

Poster:  209
Hollenbach, Reiss
Faculty Mentor(s): Dr. Marilyn Duncan

Disruption of natural circadian rhythms is becoming a major health concern in the United States. Circadian rhythms are the physiological cycles an organism undergoes throughout the day, controlling characteristics like hormone levels. Research indicates that unsatisfactory functioning of physiological circadian mechanisms can lead to chronic disorders, such as drowsiness, and even potential diseases such as cancer and diabetes. Further studies have also suggested an important circadian role in individual performance, efficiency, and productivity. Various reports on cycle disrupting schedules have provided evidence for the effects of biological rhythms on individual performance. It is also theorized that modern practices, such as shift work and light exposure at night, seem to exacerbate these overt negative effects by interfering with natural evolutionary clocks, which cannot adapt to such drastic changes so quickly. By reviewing the literature of a vast number of studies and analyzing their distinct data and conclusions, the study sought to compile evidence explaining the impact of circadian rhythm disruption on health and performance and explore future options for mitigating these effects. The evidence overwhelmingly indicated that practices which interfere with natural circadian rhythms often result in a number of poor health outcomes, and decreased levels of performance. The research results were used to formulate a number of strategies to help diminish the deleterious effects many modern practices have on our circadian rhythms, including technological and work components.
MP201 TREATMENT IMPROVES COGNITIVE FUNCTION RELATED TO HIPPOCAMPAL NEURON DENSITY AFTER TRAUMATIC BRAIN INJURY
Poster: 210
Lee, Regan
Additional Authors: John Geisler, Chris Harwood, W. Brad Hubbard
Faculty Mentor(s): Dr. Patrick Sullivan

Traumatic brain injury (TBI) results in cognitive impairment, which can be long-lasting after moderate to severe TBI. Currently, there are no FDA-approved therapeutics to treat the devastating consequences of TBI and improve recovery. MP201 is a prodrug that is metabolized into 2,4-dinitrophenol, a mitochondrial uncoupler that has been previously shown to improve mitochondrial function, decrease production of reactive oxygen species during cellular respiration, and limit uptake of calcium by mitochondria (Pandya et al., 2007). The hypothesis for this project is that the treatment of mice with MP201 can be used to prevent neuronal death in the hippocampus after traumatic brain injury (TBI). Using a model of cortical impact in male C57/BL6 mice, MP201 (80 mg/kg) was provided orally 2 hours post-injury and once a day for 2 weeks. At 2 weeks post-injury, brains were perfused with saline and fixed with formalin before sectioning at 40 Åµm thickness. Nissl-stained sections containing series of the hippocampus were prepared. These sections were analyzed stereologically, with the observer blinded to treatment group, to determine neuronal count within the dentate gyrus (DG) and entire CA3 subregion, with section cut thickness of 40.00 Åµm and dissector height of 16.00 Åµm. Analysis of neuronal count was used to determine if treatment of mice with MP201 following TBI can successfully prevent neuronal cell death within the hippocampus at 2 weeks post-injury.

In addition, mice treated with MP201 post-injury demonstrated improved cognitive outcome (p = 0.04) compared to vehicle-treated mice. These results suggest that acute mitochondrial dysfunction can be targeted to give neuroprotection in the hippocampus and improved cognition. This study highlights the potential for safe, effective therapy by MP201 to alleviate negative outcomes of TBI.

UTILIZATION OF POST-TRANSLATIONAL MODIFICATIONS IN DESIGNING TARGET-SPECIFIC BINDING PROTEINS
Poster: 211
Scalf, Stephen
Additional Authors: Lydia Fletcher, Katherine Kloska, Emily Major, Andrew Reedy, Kara Tauer
Faculty Mentor(s): Dr. Luke Bradley, Dr. Roberta Magnani

Calmodulin (CaM) is a highly integrated protein in various mammalian cell signaling systems including (but not limited to): metabolism, smooth muscles contractions, memory, and olfactory recovery. In the presence of calcium, CaM is activated upon a conformational change and acts as an intermediate in many signal transduction pathways through binding to various protein partners. CaM has four domains for Ca2+ binding, each 12 amino acids long, and a central linker region that acts as a hinge to bind to target proteins. Near the third calcium binding domain of CaM is a lysine residue which is a target for trimethylation by calmodulin methyltransferase (CaM KMT). This post-translational modification alters the large conformational changes of CaM upon Ca2+ binding, suggestive of changes in protein binding specificity. Utilizing CaM KMT as a tool, we previously established a protein combinatorial library with trimethylation post-translational modifications, using CaM as a model protein scaffold. As a step in the widespread application of this technology, the recognition sequence of CaM KMT needs to be identified. We rationally designed and constructed a series of single amino acid substitutions, three residues on each side of the trimethylation site, to alter charge and size properties around the lysine residue. The mutant CaM proteins were subsequently recombinantly expressed, purified, and characterized. Changes in the efficiency of trimethylation for the CaM mutants suggests a relatively conserved recognition sequence for CaM KMT. Application of post-translational modifications to library design may serve as a potent biomedical tool in generating combinatorial protein libraries with increasingly exact and unambiguous target specificity.
THE EFFECTS OF A KETOGENIC DIET ON BEHAVIOR AND SYNAPTIC TRANSMISSION IN A DROSOPHILA MODEL
Poster: 212
Stanback, Alex
Additional Authors: LaShay Byrd, Clare Cole, Samantha Danyi, Sushovan Dixit, Jenni Ho, Katherine Johnson, Hunter Maxwell, Brecken Overly, Emma Rotkis, Christa Saelinger, Ruth Sifuma, Maddie Stanback, Madan Subheeswar
Faculty Mentor(s): Dr. Robin Cooper

The ketogenic diet is commonly used to control epilepsy, especially in cases when medications cannot. The diet typically consists of high fat, low carb, and adequate protein which produces the metabolite acetoacetate. Glutamate excitotoxicity is largely implicated in seizure disorders, and therefore is a point of research for control of these disorders. Acetoacetate is heavily implicated as the primary molecule responsible for decreasing glutamate in the synapse; it is believed that the acetoacetate interferes with the transport of glutamate into the synaptic vesicles. The effects of synaptic transmission at glutamatergic synapses was studied in relation to the ketogenic diet in Drosophila larvae for this project. Survival rates, developmental curves, behavioral assays and measure of synaptic transmission were conducted. Higher fat in the diet decreased survival and reduced behavioral responses. We are currently measuring the size of the miniature postsynaptic responses as it relates to a change in quantal response and evoked synaptic responses. We are also addressing the effects on the kinetics of synaptic transmission as well as assessing the effects of direct application of acetoacetate on synaptic transmission and larval behaviors. This research is significant in addressing the mechanism of action of acetoacetate on synaptic transmission and the developmental effects on neural systems. Funding: Sustaining Excellence-2014 Howard Hughes Medical Institute (Grant #52008116) awarded to the Univ of KY (VM Cassone, PI). The authors confirm that the before mentioned funders had no influence over the study design, content of the poster, or selection of this meeting. Personal funds were also used (RLC).

CHARACTERIZATION OF BINDING SPECIFICITY IN CALMODULIN CENTER LINKER LIBRARY PROTEINS
Poster: 213
Tauer, Kara
Faculty Mentor(s): Dr. Luke Bradley

In the presence of oxidative stress in the cell, glyceraldehyde-3-phosphate dehydrogenase (GAPDH) is S-nitrosylated and binds to the Siah 1 complex triggering cell apoptosis. It is important to find neuroprotective agents that prevent the S-nitrosylation of GAPDH and ultimately cell death. Deprenyl, a neurodegenerative disorder medication, binds with GAPDH to prevent neuronal death in patients afflicted with Parkinson’s disease. The Bradley lab has proposed alternative GAPDH binding substrates that are derived from human proteins and have higher GAPDH affinity than Deprenyl. DSNP-11 is one such peptide and has the potential to be used as a therapeutic. To better comprehend the neuroprotective properties of DSNP-11 and other substrates, the binding interactions with GAPDH must also be better understood. Although there are currently 65 known binders to GAPDH, the Bradley lab has identified over 147 novel binders through their robust protein library. Using phage display technology, this library had to undergo multiple rounds of biopanning and titering to isolate these 147 binders of the neuroprotective site. The candidates with high binding affinity were then sequenced outside of the lab to further understand their identities. However, only 4 of the 181 high affinity peptide binders screened by the Bradley lab match those documented to interact with GAPDH. Therefore, there is likely a high rate of a false positive. It is important to engineer the phage to better select for high affinity molecules as to increase efficiency for screening binding substrates.
FLUBENDAZOLE REDUCES PAIN SIGNALING AFTER EXCITOTOXIC SPINAL CORD INJURY
Poster: 214
Young, Savannah
Faculty Mentor(s): Dr. Chen Guang Yu, Dr. James Geddes

Initially, Flubendazole was used to treat intestinal and neural parasites in animals and humans, however it was recognized to induce neuroprotective affects against spinal cord injury (SCI) in the Sprague-Dawley (SD) rats. Here, we demonstrate a novel anti-nociceptive effect of flubendazole following excitotoxic SCI in SD rats. Excitotoxic SCI was produced by intraspinal microinjection of the AMPA/metabotropic receptor agonist quisqualic acid (QUIS) at T12 and L2. After the excitotoxic SCI, flubendazole was intraperitoneally administered. Flubendazole treatment began at 3 h post-QUIS injury, once daily for 7 days. Flubendazole is a benzimidazole derivative known to mildly inhibit microtubule polymerization. Assessment of excessive grooming behaviors was used to evaluate spontaneous pain. The spinal cord was processed by cryostat sectioning followed by immunofluorescent staining and analysis. Immunofluorescent data showed that Flubendazole reduced QUIS-injury-induced upregulation of acetyltransferase MEC-17, α-tubulin acetylation, endosomal EEA1, and mitochondrial cyclin B1 signaling in the dorsal horn of spinal cord at lesion site. Behavioral data demonstrated that Flubendazole attenuated pain-related excessive grooming behaviors after QUIS injury. Overall, the results demonstrate that Flubendazole administration reduces spontaneous pain following spinal cord injury.

EFFECT OF DORA-22 ON MEMORY AND SLEEP IN 5XFAD MICE
Poster: 215
Yun, Do Hyun
Additional Authors: Lauren Crabtree, Hannah Farlow, Chaitra Tirumalaraju
Faculty Mentor(s): Dr. Marilyn Duncan

Alzheimer’s disease (AD), which is characterized by neurofibrillary tangles and amyloid beta (Aβ)-containing plaques in the brain, is associated with sleep disruption as well as memory loss. Because sleep plays a crucial role in memory formation, retention, and brain clearance of neurotoxic products, it may be a useful therapeutic target in the treatment of AD. Although previous studies have shown that sleep loss decreases clearance of Aβ from the hippocampal interstitial fluid, the effect of enhanced sleep on memory in AD has not been tested. This study investigated whether sleep enhancement would improve memory in a well-characterized transgenic AD model, 5XFAD mice. These mice exhibit accelerated Aβ plaque development, memory impairments, and sleep perturbations in a progression similar to many AD patients. Therefore, this study tested a dual orexin receptor antagonist (DORA), which unlike traditional sleep-inducing medications, does not impair memory. 5XFAD and wild-type (WT) mice of both sexes were treated daily for 5 weeks with DORA-22 (100 mg/kg) in a vehicle solution or vehicle alone, by oral gavage. Before and during treatment, sleep was monitored with a piezoelectric system and short-term spatial memory was assessed via performance in the Y-maze spontaneous alternation test. The results indicated that 5XFAD mice had less total sleep than WT mice (N= 47/genotype; p&lt; 0.01). DORA-22 improved sleep percentage in female 5XFAD mice (p<0.05) and sleep during the day (inactive phase) of both sexes (p<0.01). Concerning Y-maze performance, there was no significant effect of DORA-22. However, in contrast to previous studies, 5XFAD mice performed as well as their WT counterparts. Future work to expand this project could address the effect of DORA-22 on older 5XFAD mice, and/or on performance in tasks assessing different types of memory, such as remote memory stabilization, which are also impaired in 5XFAD mice and in human AD patients.
AN ENVIRONMENTALLY RELEVANT PHTHALATE MIXTURE INHIBITS OVULATION AND DISRUPTS LUTEINIZATION IN MOUSE ANTRAL FOLLICLES IN VITRO

Poster: 216
Lane, Madison
Faculty Mentor(s): Dr. Thomas Curry

Phthalates are known endocrine-disrupting chemicals used as plasticizers and solvents in personal care, building, and medical products. Because women are ubiquitously exposed to phthalates daily, this could possibly lead to defects in ovulation and fertility. Fertility requires oocyte release from the ovarian antral follicle in response to luteinizing hormone/human chorionic gonadotropin (hCG), transformation of the follicle into the corpus luteum (CL), and progesterone production. To examine whether an environmentally relevant phthalate mixture directly inhibits ovulation and alters CL functionality, isolated antral follicles from CD-1 mice (~20 follicles/treatment/replicate) were cultured for 96hr in media containing follicle-stimulating hormone to induce pre-ovulatory development, and treated with vehicle control (dimethylsulfoxide, DMSO) or phthalate mixture (PHTmix; 1-500μg/ml). Media were then replaced with maturation media ±hCG to induce ovulation and treated with DMSO or PHTmix for 18hr. Next, ovulation was determined, media collected for progesterone measurements, and the follicle/CL collected for gene expression analysis (n=3-9, p≤0.05). Treatment with hCG+PHTmix resulted in a dose-dependent decrease in ovulation rates compared to hCG alone. Treatment with hCG increased progesterone levels compared to DMSO, but interestingly, hCG+PHTmix further increased progesterone levels compared to hCG. Treatment with hCG alone increased mRNA levels of Cyp11a, Parm1, Cdkn1a, Fzd4, and Wnt4 compared to DMSO (n=5-9, p≤0.05). Treatment with hCG+PHTmix decreased Cyp11a1 and Parm1 expression, but increased Star expression compared to hCG. Collectively, these changes in genes involved in progesterone production/metabolism are consistent with increasing progesterone levels. Treatment with hCG+PHTmix decreased expression of Cdkn1a, Fzd4, and Wnt4 compared to hCG. These decreases in genes regulating CL formation/functionality suggest impaired luteinization, corresponding to inhibited ovulation. These data suggest that an environmentally relevant phthalate mixture directly inhibits ovulation and disrupts normal luteinization by altering progesterone production and decreasing regulation of CL functionality. Such interruptions could lead to infertility and impaired reproductive health. Supported by P01HD071875, K99ES028748.

INVESTIGATION OF N-TERMINAL ACETYLTRANSFERASE A AS A POTENTIAL TARGET FOR CANCER THERAPEUTICS

Poster: 217
Hillard, Hannah
Faculty Mentor(s): Dr. Sylvie Garneau-Tsodikova

N-terminal acetylation is an important co-translational protein modification performed by N-terminal acetyltransferases. N-terminal acetylation plays a crucial role in the regulation and functionality of proteins. N-terminal acetyltransferase A (NatA) is one subclass of N-terminal acetyltransferases in humans and is composed of two protein subunits: catalytic Naa10 and auxiliary Naa15. NatA transfers an acetyl group from acetyl coenzyme A to the N-terminus of a substrate after the cleavage of methionine. NatA has been identified as necessary for cell proliferation and survival; therefore, it is a potential novel target for cancer therapeutics. For this project, I cloned Naa10 and truncated Naa15 into pDUET1 and transformed them into E. coli for small scale expression. Other various successfully cloned constructs were transformed into E. coli for large scale expression and protein purification. The purified protein of the construct with the highest expression of NatA will be used for crystallography to determine the structure of this complex.
THE EFFECTS OF SHP-2 ON THE PD-L1 PATHWAY
Poster: 218
House, Brent
Faculty Mentor(s): Dr. Esther Black

SHP-2 is a ubiquitously expressed tyrosine phosphatase involved in regulating many signaling pathways (Ras/Erk, Akt, and Jak/STAT). Gain-of-function mutations in the gene coding for SHP-2 (PTPN11), which interfere with this auto-inhibitory function and lead to sustained phosphatase activity, have been discovered in multiple types of cancer, such as leukemia, lung, breast, and gastric cancers. SHP-2 is thought to have a role in regulating STAT3 as levels of STAT3 phosphorylation have been shown to decrease in cells with hyperactive SHP-2. Activated STAT3 is upregulated in many lung adenocarcinoma due to oncogenic signaling downstream of epidermal growth factor receptor (EGFR), the oncogene KRAS. STAT3 is a transcription factor that has been shown to occupy a vital position in tumor progression and survival. STAT3 regulates the transcription of many genes, including PD-L1 which is responsible for an important immune checkpoint that is often utilized by cancer cells to trick the immune system. Constitutive activation of the SHP-2 mutant E76K has been shown to reduce the levels of active pY STAT3 in bone marrow. We believe SHP-2 and activated STAT3 modulate the role of PD-L1 in immune evasion. Further study is needed to fill the gap in knowledge of the impact of SHP-2 function in tumor cell biology, and its involvement in regulation of the PD-1/PDL1 pathway. We hypothesize that SHP-2 affects the expression of PD-L1 in non-small cell lung cancer, allowing immune system evasion by cancer cells and tumorigenesis. In order to test this hypothesis, cell-based models will be used to measure PD-L1 expression in tumor cells. The cells will be exposed to patient plasma, transfected with hyperactive SHP-2 mutants, and exposed to SHP-2 siRNA ablation.

CHARACTERIZATION OF NOVEL N-METHYL TRANSFERASE FOR THE ALTERNATIVE ALKYLATION OF NUCLEOSIDES
Poster: 219
Manauis, Elena
Faculty Mentor(s): Dr. Steven Van Lanen

Albomycin is a "Trojan Horse" antibiotic produced by soil-dwelling bacteria. Initially it acts as a ferrichrome siderophore, which the bacteria cell takes up to sequester iron from its host. Once inside the cell, peptide bonds within the compound become hydrolyzed, splitting it into two fragments: the acting ferrichrome siderophore and the nucleoside compound SB-217452. This nucleoside inhibits bacterial protein synthesis and causes cell death. During the biosynthesis of albomycin, a unique N-3 methylation occurs on the nucleoside end of the compound. This rare methylation can be attributed to an N-methylation specific enzyme in the albomycin gene cluster known as abmI. Using genomic DNA, we were able to amplify and clone the abmI gene into a pET28a(+) vector. We then used E. coli BL21 (DE3) cells to express the protein. Currently, we are using activity assays to characterize AbmI’s activity with the putative nucleoside precursor, cytidine. These assays will help determine where in the biosynthetic pathway this N-methylation occurs and whether or not AbmI can N-methylate alternative substrates for the purpose of diversifying other nucleoside antibiotics.
**POSTER ABSTRACTS**

**ESTABLISHING AN EDI FOR EPIGALLOCATECHIN IN FOOD**

Poster: 220  
Maynard, Christopher  
Faculty Mentor(s): Dr. Robert Lodder  

Epigallocatechin-3-gallate (EGCG) is a polyphenol compound commonly found in green tea. As an antioxidant, EGCG has potential as a chemotherapeutic, as well as a treatment for inflammation and cardiovascular issues. In the United States, heart disease is the top cause of death. For 2015 alone, this amounts to 633,842 deaths. Consumption of tea has been shown to be inversely related with death by heart attack, suggesting the compound therein may yield relevant health benefits. This study seeks to determine the Estimated Daily Intake (EDI) of epigallocatechin in the American food supply based on data from the National Health and Nutrition Examination Survey (NHANES). Determination of an EDI can provide an appropriate maximum dose for future clinical trials that investigate the utility of EGCG as a drug for humans.

**USING GENE EXPRESSION TO DETERMINE HEPATIC EFFECT OF PCFS**

Poster: 221  
Miller, Wayne  
Faculty Mentor(s): Dr. Hollie Swanson  

Perfluorinated chemicals, PFCs, are commonly used in many manufactured products including food packages, clothes, and stain resistant carpeting. These chemicals are a concern because they persist in the environment and exhibit toxicity in animal models. In addition, population studies indicate there is a high exposure level in several diverse communities. While the potential adverse effects of PFCs are currently under investigation, some evidence indicates that they may activate receptors involved in oxidative stress and proinflammatory responses. Two receptors of interest are the aryl hydrocarbon receptor and the NRF2 which up regulate the target genes, 1A1 and NQO1, respectively. The hypothesis tested here is that PFCs would upregulate the both 1A1 and NQO1. Towards this end, human hepatoma cells were treated with several structurally distinct PFCs and the mRNA levels were evaluated using quantitative real time polymerase reactions. Our initial results indicate that there is significant upregulation for both genes when tested with at least one PFC, perfluorooctanoic acid. Further research will be performed to determine the extent to which PFCs upregulate oxidative stress and proinflammatory responses.

** Denotes STEMcats project
SEX DIFFERENCES IN RENAL FUNCTION FROM MICE EXPOSED TO POSTNATAL NEGLECT COMBINED WITH A HIGH FAT DIET  
**Poster:** 222  
**Ritter, Celia**  
**Additional Authors:** Haris Ashfaq, Stephanie Hayden, Tharunika Venkatesan  
**Faculty Mentor(s):** Dr. Analia Loria

Exposure to early life stress or adverse childhood experiences is associated with a greater body mass index (BMI) and a higher risk of cardio-metabolic disease risk. It has been previously shown that maternal separation and early weaning (MSEW) increases cardiovascular disease risk by exacerbating adipose tissue expansion, even in mice fed a regular diet. In mice fed a high fat diet, MSEW exacerbates metabolic dysfunction and obesity induced hypertension. Decreased kidney function can cause hypertension, which increases the risk of metabolic and cardiovascular disease. We hypothesized that MSEW males and females would have a lower glomerular filtration rate (GFR) than the control counterparts, and that MSEW mice on a high fat diet would have the greatest decrease in renal function, associated with hypertension. Because males tend to have poorer renal function and higher blood pressure as compared to females, we also hypothesized that MSEW males would have a lower GFR than MSEW females. MSEW was performed by separating the pups from their mother for periods of 4 to 8 hours during postnatal days 2-16. Mice were weaned at postnatal day 17 (P17). Control mice remained undisturbed in the home cage at all times and were weaned P21. 8-week old mice were fed on low fat diet (LF) or high fat diet (HF) for 12 weeks. Urine was collected to measure proteins and creatinine and GFR was measured in all mice. Male MSEW mice showed an increased GFR when fed a LF. However, a HF reduces GFR only in MSEW mice. Female MSEW do not show compensatory effects on GFR when fed a LF; however, GFR is reduced when fed a HF. This data suggests that decline in renal function correlates with high blood pressure in male and female MSEW mice when fed a HF.

PHYSICAL THERAPY

BLOOD FLOW RESTRICTION TRAINING IMPROVES FUNCTIONAL TESTS ASSOCIATED WITH RETURN TO SPORT AFTER INJURY  
**Poster:** 223  
**MacDonald, Mia**  
**Faculty Mentor(s):** Dr. Brian Noehren

Traditional strength training requires high load resistance exercise that is not practical for patients with orthopedic injuries. Blood flow restricted training (BFRT) is an emerging way to increase strength using low loads and high repetitions. However, whether this training method also affects function is unknown. We hypothesized that BFRT would significantly improve muscle strength and hop test performance in healthy subjects when compared to a control group. Methods: 4 females and 7 males 24.5 ± 7.25 years old were in the BFRT group and 3 females and 1 male 19.75 ± 1.26 years old were in the control group. Kaatsu BFRT bands were placed on the subjects’ thighs while they performed leg extension, calf raises, and leg press exercises starting at 30% of their 1 RM max 3 times per week for 6 weeks. Weights were adjusted every other training session. Isometric quadriceps strength and rate of torque development (RTD) were measured isometrically on the Biodex. Single leg hop and triple jump were measured before and after the study. Groups were compared with an independent samples t-test. Results and Conclusions: Significant improvements were found in the BFRT group for peak strength (pre: 170.0 ± 47.98° Nm, post: 197.1 ± 57.2° N, p=.037), single leg hop (pre: 128.9± 33.8cm, post: 154.2± 33.4cm, p=.0079), and triple jump (pre: 405.5± 106.4cm, post: 428.4 ± 104.1cm, p=.025). The combination of BFRT and low-load resistance exercise resulted muscle hypertrophy and novel functional improvements in healthy BFRT subjects. Hop testing results were indicative of functional improvements associated with ACL rehabilitation, leading to the possibility of creating BFRT programs that target injury-specific muscle groups when high load resistance training is contraindicated. Although sample size was small, additional subjects are being recruited to verify results. Future studies should aim to establish whether long-term ACL patients and acute pre and post-ACL patients make functionality improvements.
MODELING THE NAB EXPERIMENT ELECTRONICS IN SPICE  
Poster: 224  
Blose, Alexander  
Faculty Mentor(s): Dr. Christopher Crawford  

The goal of the Nab experiment is to measure the neutron decay coefficients $a$, the electron-neutrino correlation, as well as $b$, the Fiery interference term to precisely test the Standard Model, as well as probe for Beyond the Standard Model physics. In this experiment, protons from the beta decay of the neutron are guided through a magnetic field into a Silicon detector. Event reconstruction will be achieved via time-of-flight measurement for the proton and direct measurement of the circuitry needs to preserve fast timing, provide good sample resolution, and be packaged in a high-density format. We have designed a SPICE simulation to model the full electronics chain for the Nab experiment in order to understand the contributions of the components have been determined where available. We will present a comparison of the output from the SPICE model, analytic solution, and empirically determined data.

** COMPACT HIGH VOLTAGE MULTIPLIER FOR USE IN THE NEDM EXPERIMENT  
Poster: 225  
Authors: Rhett Croley, Ryan Hopkins  
Faculty Mentor(s): Dr. Christopher Crawford  

The electric dipole moment of the neutron, a property that has never been observed, would be evidence of the violation of time reversal symmetry necessary to explain the existence of matter in our universe. A vital component of any experiment measuring this property is a sufficiently large electric field. The electric field causes precession of the neutron’s dipole moment about the field, which is a sensitive frequency-based observable. In an effort to streamline the experimental measurement, we have created a new high voltage multiplier capable of generating extreme electric fields over a large experimental volume. This apparatus operates similar to a Marx generator, which generates high transient voltages by charging capacitors in parallel and then discharging them in series. We present the design of this new, compact, high voltage multiplier, which charges a series of thin conducting plates one at a time in parallel, to generate high voltage from the ground up, one slice at a time.

SERVER PROGRAMMING FOR THE NAB EXPERIMENT  
Poster: 226  
Dennis, Mitchell  
Faculty Mentor(s): Dr. Christopher Crawford  

The purpose of this project is to produce effective servers for the Nab experiment. The Nab experiment is a research collaboration of numerous universities around the globe being conducted to measure the correlation coefficient “$a$” and the Fierz interference term “$b$.” This experiment attempts to further the understanding of one of the forces of particle physics, the “weak interaction.” The data collection server will have multiple sockets for collecting data, controlling the server, and then export the data to three different types of storage including Google Drive. The server model will then be used to construct another server that extracts the data from Google Drive then runs preliminary analysis before sending the data to a super cluster of GPU’s running code designed using the CUDA language that allows for parallel processing amongst thousands of cores. This is significantly more efficient than running the data through the traditional gcc compiler because of how parallel processing handles code. For lines of code run multiple times, such as in indexed “for loop”, the CUDA code allows the many cored GPUs to execute the many of the lines of code in parallel, significantly decreasing the run time of the code.

** Denotes STEMcats project
ANALYSIS OF CURRENT-MODE DETECTORS FOR RESONANCE DETECTION IN NEUTRON OPTICS TIME REVERSAL SYMMETRY EXPERIMENT
Poster: 227
Forbes, Grant
Faculty Mentor(s): Dr. Brad Plaster, Dr. Christopher Crawford

One of the most promising explanations for the observed matter-antimatter asymmetry in our universe is the search for new sources of time-reversal (T) symmetry violation. The current amount of violation seen in the kaon and B-meson systems is not sufficient to describe this asymmetry. The Neutron Optics Time Reversal Experiment Collaboration (NOPTREX) is a null test for T violation in polarized neutron transmission through a polarized La^{139} target. Due to the high neutron flux needed for this experiment, as well as the ability to effectively subtract background noise, a current-mode neutron detector that can resolve resonances at epithermal energies has been proposed. In order to ascertain if this detector design would meet the requirements for the eventual NOPTREX experiment, prototypical detectors were tested at the NOBORU beam at the Japan Proton Accelerator Research Complex (JPARC) facility. Resonances in In and Ta were measured and the collected data was analyzed. This presentation will describe the analysis process and the efficacy of the detectors will be discussed.

OPTIMIZATION OF ELECTRODE GEOMETRY
Poster: 228
Mullins, Andrew
Faculty Mentor(s): Dr. Christopher Crawford

Electric fields are often required for low energy neutron experiments, either for sensitivity to the electric dipole moment, or to accelerate low energy protons for detection in neutron decay experiments. In order to attain the highest fields, special care must be taken in the design of the electrodes to prevent arcing that could damage the equipment and halt the experiment. In this project, I use the finite element analysis software COMSOL to optimize the geometry of cylindrical high voltage electrodes providing a uniform electric field in experiments to measure the electric dipole moment of the neutron.

PRECISION MAGNET DESIGN USING THE MAGNETIC SCALAR POTENTIAL
Poster: 229
Royal, Kevin
Faculty Mentor(s): Dr. Christopher Crawford

As more stringent constraints of new physics are set, the search for physics beyond the standard model requires an unprecedented level of precision. An experiment is being planned at the ORNL SNS to measure the electric dipole moment of the neutron with two orders of magnitude higher precision. An important component of this experiment is precision spin transport electromagnetic coils to guide the spin of polarized neutrons and Helium-3 atoms into the spin-precession measurement cell. To design such coils, we use the magnetic scalar potential and numerically solve for the wire paths needed to produce highly uniform magnetic fields. Once the magnetic geometry is known, the coil frame is printed using stereolithography and then hand wound with magnet wire. We will present measurements of field uniformity while driving the coil with a low-frequency AC current to filter out the earth’s background fields.
PHYSIOLOGY

CLARIFYING VARIANTS OF UNCERTAIN SIGNIFICANCE IN LONG QT TYPE TWO SYNDROME
Poster: 230
Chester, Annissa
Faculty Mentor(s): Dr. Brian Delisle

Long QT syndrome type 2 (LQT2) is an autosomal dominant genetic condition that is commonly caused by loss-of-function missense mutations in the KCNH2 gene. KCNH2 encodes the voltage-gated potassium channel (Kv11.1) that is important for normal repolarization of the cardiac ventricles. Patients with LQT2 are at increased risk for cardiac arrhythmias and sudden death. Unfortunately, genetic testing for LQT2 has little clinical value, because it often identifies variant so uncertain significance (VUS). Therefore, the purpose of this research is to clarify the physiological significance of VUS. Several VUS in KCNH2 were identified from a group of patients using genetic testing. To determine if these VUS cause a loss of function, they will be generated in Kv11.1 copy DNA (cDNA), amplified, and expressed in a human cell line. Testing of the VUS in the cell line will be performed to determine whether they cause a loss of Kv11.1 protein function. This strategy will determine if these VUS are candidate LQT2-causing variants and improve the clinical value of the genetic tests.

PERK MEDIATES BIOCHEMICAL CHANGES AFTER TRAUMATIC BRAIN INJURY
Poster: 231
Chishti, Emad
Faculty Mentor(s): Dr. Joe Abisambra

The endoplasmic reticulum (ER) offers an optimal environment for proper protein folding to occur. However, chronic ER stress may alter protein folding; in turn, excessive production of misfolded proteins leads to formation of protein aggregates, which is a classical hallmark of many neurodegenerative disorders. While the primary effects of traumatic brain injury (TBI) involve tissue damage, recent data suggest that secondary effects induce ER stress. In response, the unfolded protein response (UPR) is triggered causing activation of PERK (protein kinase ER-like kinase). Chronic PERK activity promotes cell death, and this phenomenon has been reported in various diseases of tau aggregation. We hypothesize that PERK mediates neuronal dysfunction after traumatic brain injury. To test this hypothesis, we will perform open head injuries in PERK conditional knockout (PERK cKO) mice and measure changes in brain structure and function. We expect that reducing PERK after TBI will alleviate negative outcomes. PERK cKO mice received injuries 2 months after birth. MRI scanning was conducted using a 7T small animal scanner 14 days post-injury. Tissue was harvested for western blot analyses 15 days post-injury. Our results demonstrate that PERK knockout mice survive after experiencing a severe open head injury and are also sufficiently stable for longitudinal MR imaging. We found that head injury causes measureable changes in brain volume in PERK cKO mice. These data suggest that changes in brain volume occur within the first 14 days following injury. Western blot analysis showed that injury caused broad alterations to the UPR. These preliminary data show feasibility of injuring a genetically modified PERK mouse model and performing longitudinal non-invasive brain imaging measurements. This approach has not been previously performed, and it could offer extrinsic merit by impacting multiple fields of neurodegeneration and other types of injury.
HOW DOES AN ALZHEIMER’S DISEASE ASSOCIATED SNP ALTER EXPRESSION OR SPLICING OF MEF2C?
Poster: 232
Jordan, Osei
Faculty Mentor(s): Dr. Steven Estus

Recent genome wide association studies have identified a series of single nucleotide polymorphisms (SNPs) that are associated with Alzheimer’s disease (AD). One of these SNPs, rs190982, is near the gene Myocyte Enhancer Factor 2C (MEF2C). To evaluate whether this SNP is associated with MEF2C expression, we began by using PCR and cloning to determine the MEF2C splice variants found in human brain. We identified a 92 bp portion of exon 11 that is variably spliced. We then set an assay to quantify total MEF2C expression by using qPCR and exons that are consistently present. We then analyzed expression in a set of 60 human brain cDNAs. In preliminary studies, we have found that MEF2C expression is increased in AD brain. Expression did not correlate with the AD SNP. However, further examination revealed a SNP, rs10044342, which is in modest linkage disequilibrium with the AD SNP and resides near an initial MEF2C exon. When we analyzed MEF2C expression as a function of rs10044342 and AD status, we found that MEF2C expression was correlated with rs10044342 and AD. Current studies are focusing on identifying alternative transcription start sites in the MEF2C gene.

PLANT AND SOIL SCIENCES

ANALYSIS OF PECTIN DEGRADING GENES IN HEMP-ASSOCIATED MICROBES
Poster: 233
Arnold, Adrienne
Faculty Mentor(s): Dr. Luke Moe

Though still strictly regulated because of their relationship to marijuana, industrial hemp strains of Cannabis sativa are emerging as cash crops for farmers willing to brave the legal uncertainties associated with them. Kentucky tobacco farmers in particular stand to benefit from this new market. With next to no established industry and little knowledge of growing technique, however, more research is needed before the hemp industry in America can become profitable. This project focuses on the retting process, a tricky step in hemp fiber production in which valuable fiber is unfastened from the rest of the stalk by the microbial degradation of pectin. This loosening is necessary for successful decortication, the mechanical process that finishes the separation of fibers from the woody core of the hemp stalk. Optimal retting is crucial for effective decortication. If hemp is under-retted, it is too difficult to separate out the fibers, but if hemp is over-retted, the fibers are degraded along with the rest of the stalk. An understanding of the microbes that control retting is essential to improving fiber quality. In this project, hemp-associated bacteria that have been identified as pectin degraders are checked for the presence of common pectin degrading genes. There are many enzymes capable of breaking down pectin and many different mechanisms by which they act. These enzymes also demonstrate wide variation in their pH and temperature optimums. A better understanding of which enzymes our bacteria are producing will enable us to test the enzyme activities under the appropriate conditions, allowing for better analysis of their pectin degrading abilities. Once the best bacteria have been identified, they will be tested in controlled retting trials with the goal of increasing fiber quality and homogeneity by manipulating the bacterial community of the hemp stalk.

** Denotes STEMcats project
HOW GRAZING COVER CROPS AFFECTS SPECIES COMPOSITION FOR WEED MANAGEMENT  
**Poster:** 234  
**Copher, McKaylee**  
**Faculty Mentor(s):** Dr. Erin Haramoto

The aim of this project is to look at weed management strategies by examining cover crop biomass production. This project is focused on how grazing affects cover crop biomass production and species composition. Two species are planted, wheat and rye, both inter-cropped with crimson clover, and having variation in planting date. Cows were set to graze on both species, and samples of the biomass were to be taken and separated bi-weekly. The samples were taken in attempt to quantify the regrowth of biomass after grazing. Due to a harsher winter, followed by constantly changing weather, this project has been delayed. The winter caused the cover crops to grow slower than in past years, so not enough biomass was accumulated for grazing. When the cover crops eventually grew enough, the weather continued to be very wet, to where the cows could not come out and graze due to potential injury. While waiting for the cows to be able to graze, there was an attempt to quantify the winter kill on the cover crops, and determine which cover crop had more winter kill. Utilizing samples taken in mid-February, the biomass was separated into four components: live grain, dead grain, live clover, and dead clover. The fresh dry weights of all four components were collected. Overall, the wheat had 25% more winter kill than the rye, and there was also 56% more dead clover in the wheat plots than in the rye plots. It can be stated that the wheat, including the clover in the wheat suffered more over the winter than the rye. Although these findings are not what the project set out to find, the findings contribute data that could help when analyzing future results. The original project is still in continuation, and the cows first grazed in late March.

MUTANT FIP1 AND ALTERNATIVE POLYADENYLATION OF ARABIDOPSIS THALIANA  
**Poster:** 235  
**Liew, Josiah**  
**Faculty Mentor(s):** Dr. Arthur Hunt

The central dogma of biology that DNA codes for RNA, which is then translated into protein is a foundational principle of life. Regulation of RNA production serves a crucial role in cellular responses to stress as well as development. One novel RNA regulation mechanism is alternative polyadenylation. The formation of poly(A) tails is mediated by the polyadenylation complex, of which the Fip1 linker protein is a functional component. Fip1 has a disordered protein structure that allows for flexible tethering of the poly(A) polymerase (Pap1) with cleavage and polyadenylation factor (CPF). This tethering is necessary for the recognition of the 3’ pre-mRNA poly(A) signal followed by efficient processing at the site for poly(A) tail formation. This project aims to profile the global changes in poly(A) site choice leading to alternative polyadenylation, in the model system Arabidopsis thaliana. Fip1 mutants of A. thaliana have distinct morphological features. These observed phenotypic differences can be attributed to changes in the alternative poly(A) profiles of genes. In order to accomplish this profiling, we will employ poly(A) tag sequencing (PAT-Seq) protocols to study poly(A) site choice in three tissue types: leaves, shoots, and roots. The high-throughput data will be dissected computationally to determine changes in poly(A) site choice and gene expression. We expect to identify genes that show different poly(A) usage in the altered Fip1 relative to the wildtype. Identification of these genes provides information that will help in understanding the phenotypes associated with the mutation, as well as functional importance of the Fip1 protein.

** Denotes STEMcats project
RHIZOSPHERE PROCESSES INFLUENCE TRANSFORMATION OF SOIL ORGANIC MATTER
Poster: 236
Williams, Paige
Faculty Mentor(s): Dr. Dave McNear

The rhizosphere, one of the most biologically active regions on Earth, is the soil region in which plant roots interact with the soil. Exudates released from the roots alter the biological and physiochemical environment of the rhizosphere. The purpose of this study was to investigate the effects of rhizosphere processes on the transformation of soil organic matter as corn plants grow in a high-phosphorus soil. We assessed the influence of soil regions (bulk and rhizosphere) and vegetative growth stages of corn on soil organic carbon and nitrogen, particulate and non-particulate organic matter (POM and n-POM, respectively) -C, -N, and -P, dissolved organic -C, -N, and -P, and dissolved phosphate. The corn plants were grown inside a greenhouse in high-P Maury silt loam soil which is a common agricultural soil in central Kentucky. We collected bulk and rhizosphere soil samples at different vegetative growth stages. The soil samples were dispersed using sodium chloride and passed through a 53 µm sieve for partitioning into POM (>53 µm) and n-POM (<53 µm). Total C and N soil organic matter, POM, and n-POM samples were analyzed using a Flash Elemental Analyzer 1112. The results showed that the amounts of POM-C and -N were significantly higher in the rhizosphere soil than in the bulk soil across the growth stages, which indicate an increase in root residues or microbial biomass in the rhizosphere as the plant grows. Conversely, at the V9 and V12 vegetative stages the amounts of n-POM-C and -N were significantly lower in the rhizosphere soil than in the bulk soil, suggesting that rhizosphere processes enhance aggregation of n-POM and decreased the amount of n-POM-C and -N. This study highlights the importance of rhizosphere processes on transformation of soil organic matter in an agricultural soil.

POLITICAL SCIENCE

ARTIFICIAL REPRESENTATION OF WOMEN: MACHISMO AND GDP
Poster: 237
Riveros Salazar, Fiorella
Faculty Mentor(s): Dr. Stephen Voss

Due to the lack of women in the parliament, domestic and international organizations have promoted the incorporation of gender quotas to ease women into governmental positions. Latin America is an example where quotas have created a momentum allowing women to enter the political race. Nevertheless, Latin America has a long history of sexism or machismo. The higher number of women in the parliament does not negatively correlate to the high levels of machismo. After looking at survey data to quantify machismo attitudes in Latin America and comparing it to the number of women in the parliament, there is no correlation between machismo and the number of women in government. Searching for an explanation of what leads to high levels of machismo in Latin American nations, this study explores how the agricultural sector of each Latin American nation’s GDP can predict the levels of machismo. Gender quotas have allowed women into government, but do not impact how women are valued within a sexist society. This lack of an organic development in the fight for equal treatment between genders cannot be resolved by merely engaging in gender quotas.
MONEY AND POWER: HOW THE PRIVATE PRISON INDUSTRY AND DISTRICT ATTORNEYS MAKE A LIFE FROM INCARCERATING MILLIONS

Poster: 238
Wilson, Sylvia
Faculty Mentor(s): Dr. Stephen Voss

Currently 2.2 million Americans are being held in prison or jail. As this number only seems to increase, the criminal justice system has been brought under scrutiny. Many advocates for prison reform believe this trend to be a result of the War on Drugs, a 1970s political movement that was aimed to stop drug offenses. While it is believed that the War on Drugs played an initial role, advocates failure at reducing incarceration by targeting drug legislation hints that additional sources to high incarceration exist. The aim of this study is to determine if an alternative theory better explains the trends observed today. The theory proposed is that the War on Drugs created an environment where additional players could flourish, these players being private prisons and district attorneys. A complex system has been created where private prisons profit from the States need for financial assistance, and district attorneys can win elections by being “tough on crime” and charging individuals with harsher crimes to fill the lock-up quotas created by the private prison industry. The data showed that the original theory of the War on Drugs being a sole contributor is questionable as drug use remained relatively stagnant over the time considered, and does not correlate with the increasing incarceration rate. The utilization of private prisons showed a statistically significant difference in mean incarceration rates between states that do and do not use the private industry. Finally, in relation to district attorneys no statistically significant data proved that an election system results in higher incarceration than an appointment system. However, interesting trends were found in relation to how increasing competition in an election related to the ratio of probation to prison sentences, showing that the more competition, the more likely a prosecutor will choose a charge that results in prison time compared to probation.

PSYCHOLOGY

A BAD TASTE IN THE MOUTH REPLICATED: GUSTATORY DISGUST INFLUENCES MORAL JUDGMENT

Poster: 239
Ares, Elena
Additional Authors: Brianna Baker, Patrick Bates, Mary Lenhof, Micaela Mclean, Carl Mullins, Andrew Stewart, Emily Wrenn
Faculty Mentor(s): Dr. Steven Arthur, Dr. Andrea Friedrich

It has been suggested by David Hume that moral disgust and judgements are not solely based on reasoning, if at all. Rather, Hume suggested that moral judgements occur based on emotions. This very suggestion has inspired research on the link between physical disgust and moral disgust throughout the field of social psychology (Eskine, 2011). Past research has shown that there does seem to be a link between the participant’s physical environment and the level of his or her moral judgements (Eskine, 2011). This research leads to the question whether or not there is a link between physical environment and moral disgust, rather than solely moral judgement. Researchers found that when participants were exposed to conditions that had strong, unpleasant scents, they were more likely to make harsher judgements than a participant who was in the control group (Eskine, 2011). With these findings, studies have arisen researching the physiological reaction between oral disgust and moral disgust; they have found that the three types of disgust stimulate the same muscle in the lower jaw, the levator labii. This facial muscle is closely associated with taste throughout human evolution and is thought to be linked to taste preference (Eskine, 2011). These findings lead to the relationship between oral taste and moral disgust. The muscle used for each distinct category of disgust is closely associated with taste preference, and therefore could link physical disgust with moral disgust. Both physical and moral disgust seem to be connected through the same physiological, cognitive, and behavioral mechanisms (Eskine 2011). In order to attempt to fully understand the relationship between physical and moral disgust, two specific tastes are going to be emphasized: Sweet and bitter. Since the tastes are contrasting, it will help the study explore the link between taste and moral disgust.
THE EFFECT OF RESISTANCE ON CHILD SEXUAL ASSAULT CASES
Poster: 240
Bedingfield, Brooke Anne
Additional Authors: Gabby Schott
Faculty Mentor(s): Dr. Jonathan Golding

The statistics on child sexual assault is quite startling. The United States Department of Justice (2012) estimated that as many as one in three girls and one in seven boys are sexually abused at some point during their childhood. The rape of a child is never an easy topic to discuss, in any context, but especially in the court system. Previous research has investigated child sexual assault in the courtroom and shown that children (especially younger children) are often believed (especially by female jurors). A previous study done by Leclerc, B., Wortley, R., & Smallbone, S. (2011) looks at the types of resistance and found that the most effective were saying that they do not want sexual contact and saying "no" to the offender. They found this was especially effective in the case with younger girls versus older girls. The study also found that when the girls fight back and try to resist, they were less likely to stop the offender. We predict this will be the similar in the age aspect of our study. In our study we investigated child sexual assault in the courtroom by examining how jurors perceive a child who attempts to resist sexual assault- especially because there is no published research on this issue. Our study uses a 3 (Type of Resistance: none, fight back, scream) x 2 (Age of Victim: 6 or 15 years old) x 2 (Participant Gender) between-participants design. We predict a main effect of victim age, such that a younger victim will lead to more guilty verdicts than an older child. In addition, we predict a main effect of type of resistance, such that if a victim resists this should lead to more guilty verdicts than if there is no resistance. We also predict a main effect of participant gender in that females will choose more guilty verdicts than male participants.

EFFECTS OF NARRATIVE STRUCTURE AND RECIPROCAL TEACHING INTERVENTIONS ON CHILDREN WITH ADHD
Poster: 241
Boelstler, Natasha
Faculty Mentor(s): Dr. Richard Milich, Dr. Elizabeth Lorch

Attention Deficit Hyperactivity Disorder (ADHD) is medical condition diagnosed in children. ADHD children are often more inattentive, hyperactive and impulsive compared to peers. ADHD children have lower standardized test scores and prone to more academic problems. Specific abilities that are impaired in ADHD children are narrative comprehension skills and reading (general motivation). The two components that increase successful narrative comprehension are motivation and reading strategies. Improving reading motivation helps build the children confidence, which leads to an increased inclination to read. Struggling readers do not practice reading strategies, henceforth why ADHD children struggle with narrative comprehension. To address these problems two interventions, in the current study, were made towards improvement of narrative comprehension skills and strategies for reading. In the first sample group of participants, they are 33 total. 13 of which are involved in the narrative structure intervention. The narrative structure intervention targets specific comprehension skills and how to identify story structure elements. 15 participants are in the reciprocal teaching intervention. The reciprocal teaching intervention solely focuses on teaching strategies for reading comprehension, such as predicting, clarifying and summarizing. Participants for this study were teacher referred and must be in the bottom half of the class for reading. Most importantly, participants must exhibit elevated symptoms of ADHD. The metacognitive awareness of reading strategies inventing (Marsi) is used to evaluate children in the pre/post-test session. The Marsi examines reading strategies children use when they read and is predicted to show growth in the post-test results; since it correlates to the reciprocal teaching intervention. The motivation for reading questionnaire (MRQ) examines why and what children read. This measure is additionally expected to show growth in the post-test session, but not as much as the Marsi.

** Denotes STEMcats project
DOES PERCEIVED WEALTH INEQUALITY INFLUENCE PEOPLE'S ATTITUDES TOWARD BEING GREEDY?

Poster: 242
Brown, Kendall
Faculty Mentor(s): Dr. Jazmin Brown-Iannuzzi

Wealth inequality is growing both nationally and internationally. Broadly speaking, wealth inequality is the gap in wealth between the rich and the poor. In the U.S., this gap in wealth is currently the highest since the Great Depression. The current research investigates the psychological impact wealth inequality may have on individuals’ attitudes and behaviors. Previous research has demonstrated that being or perceiving oneself to be rich can result in anti-social behaviors, such as being greedy (Piff et al., 2010; Piff et al., 2012; Stellar et al., 2012; Trautmann et al., 2013). The current research seeks to investigate whether the distribution of wealth – whether it be equal or unequal – may also lead to such anti-social behaviors. In particular, we hypothesize that high inequality may lead to extreme upward social comparisons, which in turn may make people greedier than when they are in situations of low inequality. To begin testing our hypothesis, we administered a between-subjects experimental design on Amazon’s Mechanical Turk. We developed two pie charts ostensibly demonstrating the level of inequality (equality) in the respondent’s state of residence. The participants were asked the extent to which they endorsed items related to being greedy (e.g., To be successful, it’s important to look out for yourself.). Finally, we collected demographic measures (e.g., age, political affiliation, socioeconomic status, gender, etc.). With these findings, we hope to provide a much-needed understanding of the psychological processes behind people’s willingness to prioritize present benefits over future consequences in situations of high (vs. low) inequality.

** NEUROPLASTICITY IN ALCOHOL-DEPENDENT CELLS

Poster: 243
Authors: Madeline Calandrella, Victoria Graffam, Alleya Stadtmiller, Madison Webb, Lauren Williamson
Faculty Mentor(s): Dr. Mark Prendergast

The purpose of this experiment was to determine how exposure to alcohol increased the number of NMDA-glutamate receptors on hippocampal cells; this contributes to alcohol dependence and thus cell death after alcohol withdrawal. This type of response to a stimulus is an example of detrimental neuroplasticity. In the DSM-5, the terms “Alcohol Dependence” and “Alcohol Abuse” were combined to develop the overall diagnosis of an alcohol use disorder. This disorder is classified through including a variety of symptoms such as craving or dependency. Alcohol use disorder is a prevalent issue in modern America, affecting 1 out of every 7.2 people (Grant et. al 2015). To demonstrate neurotoxicity, organotypic hippocampal slices were exposed to three times the legal limit of ethyl alcohol for seven days. After seven days, the slices underwent alcohol withdrawal for 48 hours in medium containing the fluorescent cell death marker propidium iodide. Half of the slices were exposed to the glutamate receptor stimulant NMDA. The results showed that exposure to NMDA was associated with a high rate of hippocampal cell death. Contrary to our hypothesis, propidium iodide staining showed that alcohol pre-exposure did not increase NMDA toxicity. However, thionine staining of Nissl substances showed a dramatic increase in the loss of cell bodies pre-exposed to ethyl alcohol and then subsequently exposed to NMDA. This leads to the conclusion that alcohol’s effect on the neuronal plasticity allowed NMDA to efficiently induce neurotoxicity.
**POSTER ABSTRACTS**

**CHOICE, CLOSENESS, AND CONTACT: BIRTH FAMILY RELATIONSHIPS WITH LESBIAN AND GAY ADOPTIVE PARENTS**

Poster: 244  
Chatterjee, Indrani  
Faculty Mentor(s): Dr. Rachel Farr

Recently, the family landscape has shifted dramatically with the rise of marriage equality, adoption by lesbian and gay (LG) couples, and open adoption. Research has acknowledged this shift, but perspectives of adopted children's birth relatives have been underrepresented. The current study explores narratives of birth relatives who have contact with lesbian and gay (LG) parented adoptive families. “Families of choice” describes how many LG individuals receive their social support from friends rather than families of origin—this phenomenon may not be exclusive to LG individuals. Birth parents’ agency in choosing the adoptive parents, and adoption openness, may embody what they lack or desire from their own social network. Therefore, birth parents may be choosing their own families through the adoptive process. Participants in our sample are birth relatives connected to LG parent adoptive families participating in an ongoing longitudinal study. Participants completed a demographic survey and a semi-structured interview focusing on their experience of contact with the adoptive family. Using the families of choice theoretical framework, interviews were analyzed using thematic analysis resulting in four themes. Family Values describes selecting adoptive parents based on values, traits, or experiences. Family Structure describes the desired adoptive family composition (e.g., LG parents). Family Connection describes birth relatives’ feeling warmth toward the adoptive family. Finally, Contact Stability describes the birth relatives’ assurance of the longevity and strength of the relationship with the adoptive family. Consistent with the families of choice theory, birth parents’ careful and deliberate selection of adoptive parents seem to impact the quality and type of relationship had with the adoptive family. The closeness felt between these birth and LG parent adoptive families highlights the need for adoption agencies to include sexual minorities among adoptive parent candidates. Future research provide implications for how policy and practitioners can best serve all adoptive families.

**RACIAL SEGREGATION PREDICTS RACIAL ATTITUDES IN CHILDREN**

Poster: 245  
Coleman, Carly  
Faculty Mentor(s): Dr. Christia Brown

The current study investigated whether elementary school aged children’s racial stereotyping and prejudices were related to (a) the racial segregation of their friend group, neighborhood, and classmates, and (b) their self-reported ethnic and American identity. After reading brief vignettes (and accompanying pictures) about men who differed by race, the participants rated how hard each person worked, how important his job was, and how much money he made. Participants’ answers varied based on their degree of racial segregation.
INVESTIGATING THE EFFECTS OF GENDER AND TYPE OF PLEA BARGAIN ON PUBLIC OPINION IN DOMESTIC VIOLENCE CASES

Poster: 246
Decre, Julia

Faculty Mentor(s): Dr. Jonathan Golding

The National Coalition Against Domestic Violence (2015) defines domestic violence as "the willful intimidation, physical assault, battery, sexual assault and/or other abusive behavior" by an individual against their intimate partner. It is startlingly common in the United States, as 1 in 4 women and 1 in 7 men experience severe physical abuse by a partner in their lifetime. Although one might think court cases involving domestic violence would always involve a jury trial, this is not the case. In fact, more than 90% of criminal trials in the US are resolved through plea bargaining instead of a jury trial (United States Courts, 2018). This study aimed to investigate public opinion of the use of plea bargaining in domestic violence cases. Participants completed an online survey detailing a mock domestic violence case and the resulting plea bargain offered to the defendant. The study used a 2 (Defendant Gender) x 2 (Victim Gender) x 2 (type of plea bargain: probation or reduced jail time) x 2 (participant gender) mixed-factors design; defendant gender, victim gender, and type of plea bargain were within-participants variables. After reading a short descriptions of domestic violence, participants answered questions about each case. These questions included whether participants supported the plea bargain (see Golding, Lynch, Malik, & Foster-Gimbel, 2017). We predicted: (1) a main effect of participant gender—female participants would be less supportive of plea bargaining than males; (2) a main effect of perpetrator gender in that the conditions with a male perpetrator receiving less support than a female perpetrator; (3) a main effect of victim gender in that the conditions with a female victim would receive less support for plea bargaining than having a male victim; and (4) main effect of participant gender - females would support plea bargaining less than males.

THE RELATIONSHIP BETWEEN ASEXUALITY AND HETEROSEXISM

Poster: 247
Floyd, Sydney

Faculty Mentor(s): Dr. Rachel Farr

Sexuality is a nuanced construct encompassing many named identities such as those who identify as LGBQP or asexual. Although research with LGB people has increased in recent decades (Balsam & Mohr, 2007; Herek, Gillis, & Coogan, 2009), less work has focused on asexuality (i.e., those who experience little to no sexual desire; Chasin, 2011). Nonetheless, asexuality seems to represent a qualitatively distinct identity, (Brotto, Knudson, Inskip, Rhodes, & Erskine, 2010) and it is of interest to explore how this identity may influence related constructs. One such construct is heterosexism (i.e., norms through which sexual minorities are deemed less than and heterosexuality is idealized; Herek et al., 2009). Quantitative data was collected from participants through a larger study asking emerging adults about retrospective feelings of difference (N = 955). Most of the participants identified as heterosexual, with a smaller subsample identifying with an LGBTQ+ identity (n = 99). Participants were asked to complete a 16-item measure of heterosexist beliefs (Habarth, 2015) and a question asking about the first time they felt genuinely different in a negative way regarding their sexual or gender identity. LGBQPA participants who responded with retrospective feelings of difference specific to their sexual identity were included in a theme analysis (Braun & Clarke, 2006; Farr, Crain, Oakley, Cashen, & Garber, 2016). Most participants reported average endorsement of heterosexist attitudes and beliefs. There was a significant difference, t(952) = 11.20, p < .001, between LGBTQ+ and heterosexual individuals such that LGBTQ+ individuals (M = 5.73, SD= 1.01) reported lower levels of heterosexist attitudes and beliefs compared to heterosexual (M = 4.21, SD = 1.31) individuals. The theme analysis discovered several distinct themes, including discomfort with not being heterosexual, fear of disclosure (family), (in)direct harassment, and perceived atypical development.
ETHNIC DISCRIMINATION AGAINST YOUNG ADOLESCENTS
Poster: 248
Garrison, Desiree
Faculty Mentor(s): Dr. Christia Brown

Stereotyping and discrimination on the basis of ethnicity is an issue that influences various aspects of ethnic minority children’s lives (see Brown, 2017). The current study sought to examine the specific ways that ethnic stereotypes and perceptions of discrimination are associated with the social, academic, and psychological well-being of ethnic minority children in elementary school. Participants were 231 third and fourth graders from 19 different public elementary schools (48.9% female), ranging in age from 8 to 12 (M = 9.22, SD = 1). All participants were identified as Hispanic by the school, and the majority were first- or second-generation immigrants from Mexico. Participants were individually interviewed during school hours by bilingual research assistants. It was hypothesized that their perceptions of ethnic discrimination at school (i.e., whether they perceived teachers and peers to treat them negatively because of their ethnicity) and their perceptions of other Americans’ stereotypes towards Latino immigrants (e.g., whether they are perceived as criminals) would predict: (a) their perceived social support from their friends, (b) their attitudes about school (i.e., whether school success is central to their identity), and (c) their depressive symptoms and anxiety. Results from a series of regression analyses indicated that children who perceived more ethnic discrimination from peers and teachers reported less positive friendships (β = -.29, t (213) = -4.25, p &lt; .001), had worse mental health (β = -.45, t (206) = -7.13, p &lt; .001), and considered school to be less important to their self-identity (β = -.27, t (208) = -3.91, p &lt; .001), than children who perceived less ethnic discrimination. Additionally, children who perceived that Americans hold more negative stereotypes about Latino immigrants had worse mental health than children who perceived fewer stereotypes (β = -.15, t (206) = -2.41, p = .02). Taken together, the findings suggest that perceptions of discrimination and stereotypes are associated with many aspects of children’s school experience, including their friendships, their school identity, and their psychological well-being.

GENDER PRESSURE: THE IMPACT OF PARENTS' AND CHILDREN'S GENDER TYPICAL ATTITUDES AND CHILDREN'S PERCEIVED SELF-WORTH
Poster: 249
Goodman, Erika
Faculty Mentor(s): Dr. Rachel Farr

Gender identity has been a key topic in developmental psychology research throughout the years and several related outcomes have been measured (Egan and Perry 2001; Patterson 2012). Egan and Perry (2001) demonstrated an association between gender typical pressures and children’s sense of self. Parents are a direct source of gender conformity pressure through their gender typical attitudes and their personal gender typicality—especially in the child’s preadolescent stage (Goldberg and Garcia 2016). This present study aimed to examine the relationship between children’s self-reported gender typicality, parents’ self-reported gender typicality, and their child’s feelings of self-worth. It was hypothesized that children’s and parents’ self-reported gender typical attitudes would be associated with their feelings of self-worth. The data was collected from a sample of 89 families (25 two mother families, 27 two father families, 39 heterosexual parented families), with the children in question ranging in age from 5 to 12 years old (M = 8.72 years old). The children’s self-worth was assessed using the Harter’s Scale of Self-Perception (HSSP). The Child Occupation Activity and Trait scale attitudinal measure (COAT-PM) was used to assess the child’s self-reported gender typicality. The parents’ gender-typical attitudes were assessed using the Occupation Activities Trait scale attitudinal measure (OAT-AM). A linear regression was employed to predict HSSP subscale scores based on COAT-AM and the OAT-AM scores. Children’s attitudinal gender flexibility was a statistically significant predictor of their feelings of academic competency. Parental attitudinal gender flexibility was a statistically significant predictor of their child’s feelings of self-worth related to their physical appearance. The results of this study show that both parent and child’s gender flexible attitudes have a significant effect on children’s feelings of self-worth in various domains. This has implications on the future of developmental psychology and the impact that parents have on their kids.
THE RELATIONSHIP BETWEEN SOCIAL MEDIA AND SELF-ESTEEM AMONG ADOLESCENTS
Poster: 250
Grieff, Abigail
Faculty Mentor(s): Dr. Christia Brown

Self-esteem is broadly defined as feelings toward oneself, or confidence in one’s own abilities. During adolescence, peer relationships become more central to adolescents’ social lives, and the opinions of peers greatly influence adolescents’ self-esteem (Larson & Brown, 2009). High self-esteem is associated with a number of positive outcomes for adolescents, including better mental and physical health (Trzesniewski et al., 2006). Social media use is also frequent among adolescents, and 92% (age 13-17) report going online daily (Lenhart, 2015). Previous research suggests that receiving positive feedback from peers on social media can boost adolescents’ self-esteem, while receiving negative feedback can be detrimental to self-esteem (Valkenberg & Schouten, 2006). The current study sought to examine how social media use affects early adolescents’ self-esteem over time. For the first wave of data collection, participants were in 7th grade (N = 142; 99 girls, 43 boys; Mage = 12.44 years, SD = .61). The second wave of data collection occurred a year later, when the same participants were in eighth grade. Participants were predominately White/European American (45%), with sizable portions of the sample Latina/Hispanic (22%), Black/African American (19%), and multiracial (most of which identified as Black/White and Latina/White; 13%). It was hypothesized that higher frequency of social media use and higher levels of emotional investment in social media would predict lower self-esteem among early adolescents over time. Results and implications will be discussed.

EFFECTS OF NALTREXONE ON ALCOHOL AND NICOTINE USE IN FEMALE P RATS
Poster: 251
Hamid, Usman
Faculty Mentor(s): Dr. Michael Bardo

Alcohol is the most commonly abused substance worldwide. It is often co-abused with nicotine, which increases the difficulty of cessation of both substances. Despite having similar mechanisms of action, there is no single medication to treat the co-abuse. The objective of the current study is to analyze the effects of the opiate antagonist naltrexone on alcohol consumption and the co-use of alcohol and nicotine in female alcohol-prefering (P) rats. Six female P rats were trained in two phases. During Phase 1 (ethanol access), subjects had 2-bottle choice sessions with 0% (water) and 15% ethanol. In Phase 2 (concurrent access), rats still had access to ethanol bottles, but were also given access to nicotine (0.3 mg/kg/infusion, i.v.) using a standard 2-lever procedure (active vs. inactive levers). Naltrexone (0.15, 0.3, or 0.6 mg/kg s.c.) treatments were administered to determine its effects on alcohol and nicotine consumption. Half the animals received naltrexone treatments during Phase 1, and half received treatments during Phase 2. During Phase 1 (ethanol access), naltrexone had no significant effect on ethanol or water consumption. Results from Phase 2 (concurrent access) showed that naltrexone dose-dependently reduced ethanol consumption, and reduced water consumption at the highest dose (0.6 mg/kg). Naltrexone did not have any significant effects on active lever presses for nicotine, but reduced inactive lever presses only at the lowest dose (0.15 mg/kg). Naltrexone is more effective in treating alcohol use when tested in combination with nicotine rather than when tested alone.

** Denotes STEMcats project
ASSESSING KNOWLEDGE OF CHILD TRAUMA IN PARENTS WITH ADOPTED CHILDREN WITH SPECIAL NEEDS  
Poster: 252  
Harden, Rachel  
Faculty Mentor(s): Dr. Rachel Farr

The current study will investigate knowledge in parents’ that have adopted a child that is considered special needs. There is a huge gap in the literature when it comes to this topic. This study examines what adoptive parents’ think they know (perceived knowledge) and what they actually know (actual knowledge) about child trauma. It also examine if the parents’ training background is related to the knowledge of child trauma. The participants (N = 140) all were from one southeastern state and have all adopted a child through the foster care system. The participants in this studied completed an online survey. This studied hopes to gather information to help build the literature and help others become more knowledgeable about this topic.

THE EFFECT OF ETHNICALLY DIVERSE FRIENDSHIPS ON CHILDREN’S EXPLICIT AND IMPLICIT ATTITUDES  
Poster: 253  
Huber, Grace  
Faculty Mentor(s): Dr. Christia Brown

Previous research has demonstrated that children endorse racial prejudice as early as age three, such that White children evaluate White individuals more positively than Black individuals (Aboud 1988). Children may hold explicit prejudicial attitudes, which are conscious and more easily controlled, as well as implicit prejudicial attitudes, which are largely unconscious and less easily controlled (Greenwald & Banaji, 1995). Understanding how children develop prejudices is important because, as diversity in the United States continues to increase, it is likely that young children will interact with a number of ethnically diverse peers in school. Research suggests that interethnic contact (e.g., friendships between children from different ethnic groups) among young children may reduce racial bias towards the outgroup (Rutland, Cameron, Bennet, & Ferrel, 2005). The purpose of this research was to explore how the ethnic composition of children’s friend groups are related to their explicit and implicit ethnic attitudes. Participants (N = 103) included 54 boys and 49 girls, with a mean age of 8.00 years (SDage = 1.55). Participants’ ethnicities included White/European American (n = 82), Latinx/Hispanic (n = 3), Black/African American (n = 8), and other/multiracial (n = 9). Children indicated the ethnic composition of their friend groups by choosing from three cartoon photos depicting groups of children with varying degrees of racial diversity (i.e., primarily White, primarily XX, ethnically diverse). To assess explicit ethnic prejudicial attitudes, children indicated that their feelings toward ethnic groups on a thermometer scale. To assess children’s implicit ethnic prejudicial attitudes, they completed the Attitude Misattribution Procedure (Payn et al., 2005). It was hypothesized that children with ethnically diverse friend groups would have more positive explicit and implicit ethnic attitudes than children with less diverse friend groups. Results and implications will be discussed.
PERCEPTIONS OF SEXUAL HARASSMENT
Poster: 254
Huber, Hollyann
Additional Authors: Bailey Cremeans
Faculty Mentor(s): Dr. Jonathan Golding

Sexual harassment, according to U.S. Equal Employment Opportunity Commission (1980), is unlawful behavior, and can include “unwelcome sexual advances, requests for sexual favors, and other verbal or physical harassment of a sexual nature”. The EEOC also makes it clear that the harasser and victim can be of either sex. Further, harassment is illegal when it creates a hostile work environment because it is frequent or severe. A previous study by Bhattacharya and Stockdale (2016) investigated perceptions of sexual harassment scenarios from the point of view of either feminists or right-wing authoritarians. Researchers presented participants with a scenario in which a male harasser was accused of either gender harassment or unwanted sexual attention towards a female victim. However, this study did not manipulate the gender of the victim nor the harasser and did not manipulate the number of times this incident occurred. The results of this study show that the strength of evidence about the event had a more significant effect on the perceptions of sexual harassment in women, feminists and feminism supporters but not in right-wing authoritarians. The present study aims to further investigate perceptions of sexual harassment. We used a 2 (victim gender) x 2 (perpetrator gender) x 2 (number of incidents) x 2 (participant gender) mixed-factor design; victim and perpetrator gender and number of incidents will be within-participant variables. We predict main effects of: (1) victim gender: female victims will receive higher sympathy ratings than male victims; (2) perpetrator gender: male perpetrators will be rated higher on disgust than female perpetrators; (3) number of incidents: more offenses will lead to greater belief that sexual harassment occurred; and (4) participant gender: female participants will rate the situation as sexual harassment more than males.

EXAMINING SELFIES AS A FORM OF SELF-OBJECTIFICATION: ASSOCIATIONS WITH SOCIAL, APPEARANCE, AND PERFORMANCE SELF-ESTEEM
Poster: 255
Hudson, Raven
Faculty Mentor(s): Dr. Christia Brown, Ilyssa Salamon

Social media use is ubiquitous among adolescents. On social media platforms, youth often post pictures of themselves (“selfies”) with the goal of getting approval from others. Because of this, youth are frequently and explicitly focused to how others view them as an object of attention. Although articulated prior to the development of social media, objectification theory (Fredrickson & Roberts, 1997) suggests that people internalize experiences of objectification over time. As a result, individuals begin to self-objectify and see themselves from the observer’s point of view. Forms of self-objectification are associated with numerous negative consequences, including lower self-esteem and worse performance on tasks (Valkneburg & Schouten, 2006; Hebl, King, & Lin, 2004). Previous studies have demonstrated that self-objectification can be triggered experimentally. For example, when individuals tried on swimsuits, they performed worse on math tests and had more negative body image than individuals who tried on sweaters (e.g., Hebl, King, & Lin, 2004). The current study explored whether taking and posting a selfie, likely a form of self-objectification, negatively impacted three aspects of self-esteem: performance self-esteem (i.e., “I feel confident about my abilities”), appearance self-esteem (i.e., “I feel unattractive,” reverse coded), and social self-esteem (i.e., “I feel as smart as others”). Participants were late adolescents (N = 150, approximately 18-19 years of age) who were randomly assigned to either the selfie condition or control condition. The participants in the selfie condition then took a selfie and either posted the photo to social media or not. After the photo portion of the experiment, participants filled out a self-report measure of self-esteem. It was hypothesized that participants who took a selfie and posted it would have lower performance, appearance, and social self-esteem than participants who took a selfie and did not post it. Results and implications will be discussed.
COMPREHENSION SELF-EFFICACY FOLLOWING A NARRATIVE STRUCTURE INTERVENTION

Poster: 256
Jodts, Jenna

Faculty Mentor(s): Dr. Elizabeth Lorch, Dr. Richard Milich

Attention Deficit Hyperactivity Disorder (ADHD) includes inappropriate levels of hyperactivity, inattentiveness, and impulsivity. Children with ADHD encounter reading comprehension problems more often than their peers (Milich, Lorch, & Berthiaume, 2005). Self-efficacy may be one thing that may influence the performance of children with ADHD when they are comprehending stories. Self-efficacy is one’s belief to be able to succeed in a given situation (Zimmerman, 2000). Children with ADHD have a tendency to rank themselves higher on self-efficacy scales compared to their peers but, they are also quicker to give up when faced with difficult situations. I am examining the change in self-efficacy following two different narrative interventions: One intervention targets specific comprehension problems exhibited by children with ADHD, and one includes comprehension strategies that are effective for struggling readers but does not target the specific comprehension difficulties of children with ADHD. We are proposing to deliver interventions to 96 children this semester in third and fourth grade who are at risk for ADHD and whose teachers judge to have narrative comprehension deficits. Children are first pretested on various measures of self-efficacy related to reading comprehension. Then, students take part in either the Narrative Structure intervention (NS) or the Reciprocal Teaching intervention (RT), which is randomly assigned to their schools. The NS intervention was developed for children with ADHD and targets causal relations, goal structure, important events, and generating important inferences. The RT intervention was developed for struggling readers and includes instructions on predicting, summarizing, questioning, and clarifying. Ongoing analyses compare measures of self-efficacy administered before and after the interventions. I hypothesize that children who receive the NS intervention will show improvements on self-efficacy questions related to the NS intervention, while children receiving the RT intervention will show improvements on questions related to the RT intervention.

EXAMINING CHILDREN’S NEGATIVE AFFECT TOWARD DIVERSE FAMILIES

Poster: 257
Karpen, Jonelle

Faculty Mentor(s): Dr. Christia Brown

Previous research suggests that children as young as four begin endorsing stereotypes and prejudice (Bigler & Liben, 2007). Developmental Intergroup Theory (Bigler & Liben, 2007) suggests that prejudicial attitudes are most likely to form on the basis of perceptually discriminable features, such as skin color or gendered features (i.e., hair length). Typically, children’s attitudes are more negative toward members of minority or low-status groups, such as African Americans, and more positive toward majority or high-status groups, such as European Americans (Hailey & Olson, 2013). Although considerable research has examined ethnic and gender prejudices, little research has examined many of the other prejudices children might hold and whether those prejudices are related to one another. For example, it is unclear whether children hold prejudices about certain types of families that differ in status and numerical representation, and whether they hold negative attitudes toward family structures that differ from what they consider normative (i.e., heterosexual parents with a child of the same race). The current study explored whether children’s prejudice, defined here as negative affect, toward one type of diverse family (i.e., mixed-race families) was related to prejudice toward another type of diverse family (i.e., families with same-sex parents). It was hypothesized that higher levels of negative affect toward mixed-race families would predict higher levels of negative affect toward same-sex families. Participants included 131 elementary school students (Mage = 7.79 years; 61 girls). It was hypothesized that higher levels of negative affect toward mixed-race families would predict higher levels of negative affect toward same-sex families. Results and implications will be discussed.
THE EFFECT OF RESISTANCE TYPE ON JUROR DECISIONS IN RAPE TRIALS
Poster: 258
Kirzinger, Gretchen
Additional Authors: Candace Bone
Faculty Mentor(s): Dr. Johnathan Golding

The Effect of Resistance Type on Juror Decisions in Rape Trials Sexual violence and rape affects more than 320,000 Americans each year (Department of Justice, 2015). With the growing rates of rape and victim blaming in the United States, methods of rape prevention is a topic often studied by researchers and taught in schools. Despite rape prevention being the topic of many studies, the question of how a victim’s resistance while attempting to escape a sexual assault impacts verdicts in court is equivocal (Krulewitz, 1981). The purpose of the present study is to examine juror decision-making in rape involving victim resistance. The present experiment is a 5 (Victim Defense Strategy) x 2 (Participant Gender) between-participants design. Male and female participants read one of five narratives in which a woman was raped by a male acquaintance. The victim was described as either offering no resistance (control), resisting with pepper spray, possessing pepper spray and having no access to use it, having access to pepper spray but not using it, or having access to pepper spray but freezing in fear. A trial summary was presented, participants rendered a verdict, and then rated the victim’s and accused rapist’s credibility, honesty, believability, etc. The present study hypothesized that participants would deliver more guilty verdicts in cases where the victim resisted by using pepper spray and in cases where the victim froze compared to when the victim did not use pepper spray and the control conditions. Finally, we hypothesized that female participants would render more guilty verdicts overall than male participants, regardless of testing condition, similar to other victimization research (Krulewitz & Nash, 1978).

THE EFFECT OF A PROBLEM SOLVING INTERVENTION ON SELF-EFFICACY OF CHILDREN AT RISK FOR ADHD
Poster: 259
Loar, Mackenzie
Faculty Mentor(s): Dr. Richard Milich, Dr. Elizabeth Lorch

Attention Deficit Hyperactivity Disorder (ADHD) is a childhood disorder that impairs narrative comprehension skills; including the ability to make connections between events and identifying goal structure elements. Children with ADHD tend to have inflated self-efficacy, but give up easily on difficult tasks. Children with ADHD also exhibit social difficulties, social rejection, interpersonal relationship problems, and lowered self-efficacy. Children with ADHD experience lowered self-efficacy due to their personal judgment of how capable they perform at certain tasks. This study focused on one of the seven interventions, which was problem solving. One way a child’s self-efficacy was measured within the problem solving was with the Child Behavior Checklist (CBCL), which is a widely used report identifying problem behavior in children. These questions compared them to other their age, how many friends they have, etc. The CBCL portrays behavioral problem subscales as well as ADHD subscales. Another way the study-measured self-efficacy was with response questions throughout the lessons. Nine questions were incorporated of self-efficacy relating to what the kids are learning in the problem solving intervention. Since the research is an ongoing 5-year project, they predict the results with the data we currently have. Compared to the pre-test, they predict decreases in self-efficacy in the posttest due to the children’s ratings becoming more realistic and self-aware. It is also expected that the CBCL pre test to post test results will decrease as well due to feeling more confident. The relation between the two tests results should be positively correlated because whether or not their self-efficacy is improving it should show up on the CBCL due to a direct relationship.
SEXUALIZED GENDER STEREOTYPES' EFFECT ON MIDDLE SCHOOL GIRLS' ACADEMICS
Poster: 260
Miller, Caroline
Faculty Mentor(s): Dr. Christia Brown

Sexualized gender stereotypes (SGS) are commonly endorsed by girls (and boys) during early adolescence. These stereotypes include the notion that girls can (a) enhance their social status by prioritizing their sexualized attractiveness, which necessitates (b) downplaying other traits like intelligence. The current study examined whether early adolescent girls (n = 143, Mage = 12.44, SD = (.61)) who endorsed SGS in 7th grade had lower academic outcomes in 8th grade. Middle school girls completed surveys in 7th (Time 1) and 8th grade (Time 2), which included measures of endorsement of SGS, academic performance and motivation, self-perceived gender typicality, and self-monitoring (i.e., individuals’ sensitivity to social cues and their willingness to react to those social cues). Cluster analyses indicated a cluster of girls who scored high on endorsement of SGS, high in self-perceived gender typicality, and high in self-monitoring. Controlling for Time 1 academic attitudes and performance, this cluster of participants scored significantly lower than other participants on measures of academic self-efficacy at Time 2.

SEXUAL ASSAULT AND JUROR PERCEPTIONS OF TRANSGENDER VICTIMS IN COURT
Poster: 261
Miracle, Jennalee
Faculty Mentor(s): Dr. Jonathan Golding

Each year over one million women are raped (Golding, Lynch, & Wasarhaley, 2015). Although the typical view of rape is that it occurs between a male perpetrator and a female victim, sexual assault victims also include transgender individuals. The only comprehensive study done on transgender persons was the National Transgender Discrimination Survey in 2008 with 6,450 respondents that looked at a variety of issues facing transgender persons such as poverty, arrests, and discrimination. The study found that 1 in 2 transgender individuals have been sexually assaulted, and that the sexual assault re-victimization rates for transgender victims is up to 66%. Beyond this survey there is little research on transgender sexual assault and no research on court cases involving transgender victims. Given that there has been little research on the perception of rape involving transgender victims, the purpose of the present study was to examine juror-decision making in these types of court cases. The experiment is a 4 (Type of Victim) x 2 (Participant Gender) between-subjects design. The levels of Type of Victim are Female, Male, Transgender Female (man who identifies as woman), and Transgender Male (female who identifies as male). Participants were randomly assigned to one of the four conditions in which a case involving sexual assault was presented. The case for each condition was presented the same way as a real court case, with the Prosecution and Defense making their statements and a verdict rendered at the end. It was hypothesized that female participants would have more pro-victim judgements (e.g., guilty verdicts) than males. In addition, due to the belief of certain stereotypes on the transgender community (e.g., members have no morals or are abnormal), we predicted that the transgender females and transgender males would lead to the lowest conviction rates.
ASSOCIATIONS BETWEEN SCHOOL START TIMES AND STANDARDIZED TEST SCORES IN NEW MEXICO PUBLIC ELEMENTARY SCHOOLS

Poster: 262
Newman, Christa
Faculty Mentor(s): Dr. Peggy Keller

Early school start times are a risk factor for poor sleep in adolescence. Given the importance of sleep (Paavonen et al., 2000), many school districts have undertaken efforts to delay middle and high school start times, often resulting in elementary schools starting earlier (Kirby et al., 2011). However, there has been very little research on the possible effects of early start times on elementary aged children. One study found that earlier elementary school start times were associated with lower standardized test scores (Keller et al., 2014). By making elementary schools start earlier, school systems may simply be shifting sleep debt onto younger children. Indeed, earlier elementary school start times are associated with less sleep for students (Dexter, Bijwadia, Schilling, & Applebaugh, 2003) Additional research is therefore needed to further examine start times in all school levels. Associations between school start times and average standardized test scores in math, reading, and science in the state of New Mexico were tested. New Mexico has very low levels of educational attainment in the US, making it an ideal state to examine. Average test scores and demographic features of the schools were obtained from the New Mexico Public Education Department website. School start times were obtained through school websites or by calling school offices. A marginal association between later school start times and higher proficiency scores in science was observed for elementary schools, but not for middle or high schools. The potential benefit of later start times in middle and high schools varied depending on how many of the students qualified for free or reduced cost lunches and the percentage of students who identify as Hispanic. Schools in rural areas exhibited stronger potential benefits of later start times.

THE EFFECT OF SEXUALIZED GIRL STEREOTYPES ON ATTITUDES ABOUT SEXUAL HARASSMENT

Poster: 263
Patel, Astha
Faculty Mentor(s): Dr. Christia Brown

According the American Psychological Association, both girls and boys in the US are developing within a culture in which girls are consistently sexualized and objectified (APA, 2007). This culture of sexual objectification also includes sexualized gender stereotypes (SGS), in which boys are supposed to be hypersexual and aggressive and girls are supposed to be passive recipients of that sexual attention. Not surprisingly, because of its links with sexualization and aggression, previous research has linked adolescents' endorsement of SGS with their attitudes about sexual harassment (defined as unwanted sexual attention). It is unclear based on previous research, however, how early in development these commonly held stereotypes begin to predict attitudes toward sexual harassment. The current study asked middle school students (N=142) to rate statements about the acceptability of sexual harassment as well as their endorsement of sexualized gender stereotypes. Results indicate that early adolescents' endorsement of SGS concerning girls as sexual objects (but not their attitudes about boys) was positively correlated with their attitudes about sexual harassment, regardless of age or gender. The results of this study suggest that cultural stereotypes are shaping attitudes about sexual violence from the very beginning of puberty.
ATTITUDES THAT PREDICT TEEN DATING VIOLENCE PERPETRATION IN COLLEGE STUDENTS
Poster: 264
Patel, Parth
Faculty Mentor(s): Dr. Christia Brown

The current study examined the relationship between the perpetration of teen dating violence (TDV) among late adolescent college students (N = 250; 178 young women, 72 young men) and their perceived gender-based norms and attitudes. Specifically, adolescents’ perceived peer norms about the acceptability of sexual harassment, their sexualized gender stereotypes (i.e., men are sex-focused and women are sexual objects), and their perceived own-gender typicality predicted self-reported perpetration of overall TDV, as well as specific types of TDV (namely, threatening, sexual, relational, and emotional TDV), while controlling for exposure to parental conflict and age when they began dating. As hypothesized, gender and perceived gender typicality moderated many of these relationships between gender-based norms and attitudes and perpetration of TDV. Results indicated that young women who endorsed sexualized gender stereotypes perpetrated more TDV than less stereotypical women, whereas young men who were highly gender typical and perceived peer norms supporting sexual harassment perpetrated more TDV than their male peers.

PLEA-BARGAIN ROLE PLAYING
Poster: 265
Ray, Madison
Faculty Mentor(s): Dr. Jonathan Golding

The vast majority of criminal cases do not end up in front of a jury. Instead, most criminal cases result in a plea bargain, where a defendant pleads guilty and receives a lesser penalty than they would have if convicted in court. Despite the number of plea bargains, very little research has investigated the factors that lead defendants to plead guilty. Gregory, Linder, and Mowen, (1978) found that guilty “defendants” (participants in the study) in a robbery trial were more likely to accept a plea-bargain compared to those that were not guilty of the crime. In addition, Bordens (1984) found that “defendants” in a negligent homicide by automobile trial were more willing to accept a plea bargain if the conditions are right and would be more likely to be found as guilty during trial. The present study extends this earlier research by investigating factors that might impact defendants choosing to plead guilty in a different type of case—child sexual assault. The present experiment used a 2 (guilt or innocence of defendant) x 2 (weak—only victim testimony vs. strong-victim testimony + DNA evidence) within-participants design with only male undergraduate participants. The participants read each of the four case descriptions and role played being the defendant in each case. It was hypothesized that the percentage of defendants who would plead guilty would be: guilty/strong > innocent/strong > guilty/weak > innocent/weak. These results would (1) support prior research that showed a defendant’s guilt is a critical factor in deciding to plead guilty; (2) generalize the prior results to a child sexual assault context; (3) show the importance of evidence strength in making a plea bargain decision; and (4) show that there are instances when an innocent defendant will feel “forced” to plead guilty (i.e., when the evidence is strong). Of course, the last predicted outcomes is of great concern since innocent defendants will carry the weight of a guilty plea for the remainder of their life.

** Denotes STEMcats project
PERCEPTIONS OF CHILD PHYSICAL ABUSE: WHICH FORM IS CONSIDERED THE MOST SEVERE?

Poster: 266

Rose, Callie

Faculty Mentor(s): Dr. Jonathan Golding

According to The Federal Child Abuse Prevention Act, child abuse is defined as “any recent act or any failure to act on the part of a parent or caretaker which results in death, serious physical or emotional harm, sexual abuse, or exploitation” or “an act or failure to act which presents an imminent risk of serious harm” (Children’s Bureau, 2018). In 2015, 43.9% of child abuse victims died from physical abuse. Eighty percent of these child fatalities involved at least one parent (American Society for the Positive Care of Children, 2018). The present study investigates what people actually consider to be physical child abuse and what form they consider to be the most severe. We used a 2 (form of abuse) x 2 (gender of participant) between-subjects design in which community members recruited from Amazon’s Mechanical Turk read a survey and received the possibility of reading three different child abuse scenarios. The three scenarios were as follows: a father who slapped his child, a father who spanked his child, or a father who struck his child with a belt. Each condition also provided an identical photo of the bruise the child received from the abuse. The participants were then asked various questions concerning the guilt of the defendant, credibility of the victim, and the severity of the abuse. We hypothesized that female participants would think the abuse was more severe overall, and that the belt condition would be considered the most severe of the three conditions because there was an object involved. We hypothesized that slapping would also be considered worse than the spanking condition.

THE CRYING VICTIM: DOES THE DEMEANOR OF A RAPE VICTIM ON THE WITNESS STAND EFFECT GUILTY VERDICTS?

Poster: 267

Rush, Molly

Additional Authors: Sophia Sawaya

Faculty Mentor(s): Dr. Jonathan Golding

Adult rape is a pervasive problem in our society today; statistics show one in every six American women has been the victim of sexual assault in her lifetime (RAINN, 1998). Regrettably, the prosecution of rape is also problematic with only 14-18% of rape cases actually making it to the courtroom and only 3.4% leading to a conviction (UK Center for Research on Violence Against Women, 2010). When rape cases are brought to the courtroom, it has been shown that a verdict is based less on actual evidence, and more on the credibility of the victim. Credibility may be based on a number of factors, including the demeanor, or emotional expression, of the victim when they testify. For example, Golding, Fryman, Marsil, & Yozwiak (2003) examined the effect of child victim’s emotions on a mock jury’s verdict. In the study the victim was presented showing varying levels of emotion (i.e., no crying, crying a little, and hysterical crying). The results show that there were more guilty verdicts when the child was crying a little compared to no crying or hysterical crying. The goal of the present study is to examine the effect of emotion shown by adult women who are victims of sexual assault on the verdict of the defendant. Male and female participants viewed a victim having one of three levels of emotionality: no emotion, hunched over with her hands in front of her face, and teary eyes. We predicted that there should be a main effect of participant gender in which female rendered more guilty verdicts than males. We also predicted that the condition where the victim’s hands are over her face should lead to more guilty verdicts than the teary-eyed condition, which will in turn result in more guilty verdicts than the emotionless condition.
DAMNED, BUT DOING OKAY? AN INITIAL EXAMINATION OF SOCIAL SUPPORT AND LIFE SATISFACTION IN AMERICAN ATHEISTS
Poster: 268
Sirrine, Matthew
Faculty Mentor(s): Dr. Will Gervais

While many have studied the extent to which religiosity and life satisfaction are related, few studies have examined how atheism, or a lack of religious belief, influences life satisfaction. This study therefore investigates whether theists and atheists differ in reported life satisfaction by collecting data from a large sample of atheists living in the United States (N = 3,600). We also compare group differences in several relevant variables that may contribute to religious belief and life satisfaction (e.g., cultural learning, experienced discrimination, relationships with family & friends). Finally, we conduct an exploratory analysis using a new approach to distinguishing between atheists, differentiating lifelong atheists (those who were never raised to be religious) and converted atheists (those raised to be religious who no longer believe in a god). Bayesian analyses were used to infer differences between groups. We found moderate evidence that theists score slightly higher on a measure of life satisfaction compared to atheists. We also found significant differences in cultural learning, or religious upbringing, between lifelong and converted atheists. Although these findings offer initial insight, further research should continue to explore the relationship between religiosity and life satisfaction and the utility of distinguishing among atheists in this way.

ADOPTING IDENTITIES: HOW DIVERSE FAMILY SOCIALIZATION IS ASSOCIATED WITH ADOPTED CHILDREN’S OUTCOMES
Poster: 269
Sullivan, Cristin
Additional Authors: Joseph Walden
Faculty Mentor(s): Dr. Rachel Farr, Kyle Simon

Socialization – communication with others about one’s life history – is one way in which individuals impart their values. Socialization often occurs within families, from parent to child. The term family has evolved to reference more than biological connections, as adoption has become a common option for lesbian (L), gay (G), and heterosexual (H) parents. Socialization is of interest to parents who want to encourage the expression of children’s identities, even when they are not shared, such as racial-ethnic, sexual, or adoptive identities. Here, racial-ethnic and sexual minority parent socialization (SMPS) is explored alongside adoptive communicative openness (ACO). Data was collected through questionnaires and in-person interviews with 96 LGH couples and their children from the second wave of a longitudinal study. About half of the sample consisted of same-sex families and slightly less than half of the parents transracially adopted (i.e., children whose race is different from at least one parent). When parent and child identities do not overlap, it may be more likely that a parent is proactive in socialization to prepare their child for real-world conversations about their family structure. The Child Behavior Checklist (CBCL) is used here to look at child outcomes and how these outcomes are affected by the socialization practices mentioned previously. Most research on adoption has been predominantly focused on racially homogenous and heterosexual families. Because LG adoptive parents is a rapidly increasing demographic in America, and more parents are transracially adopting, research on these populations is crucial. This study fills gaps in the sparse literature that has been conducted on sexual minority parent and transracial adoptations by studying how these families navigate socialization patterns and how these patterns translate to child outcomes. By looking at adoption in these contexts, this project diminishes stereotypes surrounding families where parents and children share different ethnic and sexual identities.

** Denotes STEMcats project
DEFICITS IN EXECUTIVE FUNCTION ASSOCIATED WITH SUBSTANCE ABUSE: A COMPARISON BETWEEN ALCOHOL AND MARIJUANA USE
Poster: 270
Vanegas, Olivia
Faculty Mentor(s): Dr. Rachel Farr, Kyle Simon

According to the National Council of Alcoholism and Drug Dependence, alcohol and marijuana are the two most commonly abused substances in the United States, and the problem only seems to be growing (Wilcox, 2015). It is important to study executive function and its relation to addiction because it can help explain escalation and relapse. Previous research can lead us to believe that these deficits can be attributed to disrupted activity in the prefrontal cortex (which is highly correlated with substance use disorders); however there has been little investigation of the specific changes in cognitive function that correlate with alcohol and marijuana abuse (Klenowski, 2018). The current study will examine deficits in response inhibition, set shifting, and working memory in relation to alcohol and marijuana use. Method: Participants were 145 undergraduate students from the University of Kentucky between the ages of 18 and 24. Participants came to the laboratory to complete the following measures: Behavioral Rating Inventory of Executive Function-Adult (BRIEF-A), Cambridge Neuropsychological Test Automated Battery Attention Switching Task (CANTAB AST), CANTAB Rapid Visual Information Processing (CANTAB RVP), Conners’ Continuous Performance Test-II, Version 5 (CPT-II), Stop-It Task, Comprehensive Trail-Making Test (CTMT), Letter-Number Sequencing (LNS), CANTAB Spatial Working Memory computer task (CANTAB SWM), and National Institute of Mental Health (NIMH) Young Adult Diagnostic Interview Schedule for Children (YA-DISC). Planned Analyses: We plan to use Pearson correlations to analyze the data. We hypothesize that alcohol abuse will be associated with greater deficits in response inhibition, while marijuana abuse will be more highly associated with impairments in set shifting and working memory.

OVERMEDICATION OF AN ELDER IN A HOME CARE VERSUS NURSING HOME SETTING
Poster: 271
Wesloh, Cory
Faculty Mentor(s): Dr. Jonathan Golding

The World Health Organization (WHO, 2018) defines elder abuse as the act, or lack of action, which causes harm or distress to an elderly person. Last year alone, the WHO (2018) found that 1 in 6 elderly persons experienced elder abuse. One type of elder abuse is neglect, when a caretaker does not respond to an elder’s needs (National Institute on Aging, 2018). A subtype of neglect is overmedication. According to Human Rights Watch (2018), “nursing facilities in the United States administer antipsychotic drugs to over 179,000 people who do not have diagnoses.” Overmedication likely occurs because the drugs make individuals docile, leading to potentially less frustration and work for caregivers. Such incidents of overmedication may make their way to courtroom as part of a criminal case. The present study investigated courtroom perceptions of elder overmedication using participants as mock jurors. The experiment used a 2 (victim gender) x 2 (perpetrator: nursing aide vs. daughter of elder) x 2 (participant gender) between-participants design. The primary dependent variable was conviction rate. We hypothesized more guilty verdicts for the nursing aide than the daughter. The worker’s job is to look after the elderly patient, while the child may have other responsibilities in their life, so mock jurors may hold more sympathy for the child. Additionally, we hypothesized victim gender going two ways. The first hypothesis is the female victim condition would have a higher conviction rate because people have more sympathy for the woman. The other hypothesis is that male participants would sympathize with the male victim and vice-versa for female participants. Finally, we hypothesized that female mock jurors would render more guilty verdicts. Past research on gender and elder abuse has found women more likely to render guilty verdicts than men (Golding, Yozwiak, Kinstle, & Marsil, 2005).
EFFECTS OF A JAILHOUSE INFORMANT ON SEXUAL ASSAULT CASES
Poster: 272
Whisenhunt, Meredith
Faculty Mentor(s): Dr. Jonathan Golding

According to Neuschatz, Wilkinson, Goodsell, Wetmore, Quinlivan, and Jones, the U.S. Supreme court states that confession evidence is the most powerful evidence against a defendant. Often in cases pertaining to rape, confession evidence and the defendant and victim testimony is the only evidence available. In cases like these, secondary confessions from outside parties, such as jail house informants, may have a large influence on the final verdict. Neuschatz et al. (2012) define secondary confessions as statements that are made by one person stating that another person has admitted guilt. Studies have shown that secondary confessions were more persuasive in rendering a verdict for a case that did not involve a sexual crime than eyewitness or character testimony non-sexual (Wetmore, Neuschatz, Gronlund, 2014). The possibility of a similar impact of a jail house informant may occur in certain types of rape cases where the case may involve the word of the victim versus that of the defendant. The present study investigated mock jurors’ perception of a jail house informants’ testimony in a criminal court case pertaining to first-degree rape. The experiment used a 2 (Victim Age: 6 years old and 26 years old) X 2 (Jail House Informant: presence or absence) X 2 (Participant Gender) between participant’s design. Each participant was presented with a criminal trial summary, and was then asked to render a verdict and answer several questions about the case (e.g., victim credibility, victim believability). We hypothesized a main effect of victim age, such that the 6 year victim old would render more guilty verdicts compared to the 25 year old victim. We also hypothesized a main effect of participant gender, such that female participants would be more pro-victim (e.g., more guilty verdicts) than males.

PUBLIC HEALTH

FEASIBILITY AND PRELIMINARY EFFICACY OF SMARTPHONE-DELIVERED AUTOMATED VIDEO-ASSISTED SMOKING CESSATION TREATMENT
Poster: 273
Shore, Madison
Faculty Mentor(s): Marilyn Underwood

To determine the feasibility and preliminary efficacy of an automated video-assisted smoking cessation intervention delivered via smartphones to underserved smokers. METHODS: Participants (n=40) were recruited from two sites (a safety net HIV clinic and a food bank distribution center) located in the greater Oklahoma City area. Participant inclusion criteria included: age 18 or older; willing to make a quit attempt within one week, smoking history of >/=100 cigarettes; and smoking at least 5 cigarettes per day. Individuals with a contraindication for nicotine replacement therapy (NRT) were excluded. Participants were randomized to standard treatment (ST) or automated treatment (AT). ST participants received proactive phone counseling + NRT. AT participants received an automated smartphone-delivered intervention + NRT. The smartphone intervention consisted of brief weekly assessments, followed by individually tailored (based on smoking status, stress, motivation, and self-efficacy) video clips and daily text messaging. Data were collected through week 12 post-enrollment. RESULTS: Participants had a mean age of 45 years and were 49% female, 35% African American, 10% Latino, and 13% American Indian. Almost 80% reporting an annual household income of <$20,000. Dependence levels were moderately high with 63% reporting smoking within 30 minutes of waking. AT participants completed 64% of proactive sessions, while ST participants completed 50% of sessions. With access to on-demand treatment included, participants in AT completed an average of 9 video sessions vs. 2.5 human-delivered sessions in the ST group. As hypothesized, 7-day abstinence rates (as assessed by self-report and portable CO monitors - iCO) were similar in the groups. At week 12, abstinence in both groups was 25%. Finally, 100% of AT participants endorsed “yes – got the service they wanted”; 92% stated the program met most or all smoking cessation needs. CONCLUSIONS: Results from this pilot RCT suggest that the automated smartphone intervention is a feasible treatment approach for underserved smokers, and may produce abstinence rates comparable to more costly human-delivered counseling.

** Denotes STEMcats project
MEASUREMENTS OF SELF-EFFICACY IN MUSCULOSKELETAL REHABILITATION

Poster: 274
Applegate, Kaitlyn
Faculty Mentor(s): Dr. Tim Uhl, Kelsey Picha

Low self-efficacy is a barrier to adherence in musculoskeletal rehabilitation. Before an intervention can be implemented to improve self-efficacy, levels of self-efficacy need be determined. Self-efficacy is situation and task-specific; therefore the measure used to assess this construct should vary based on the clinician or researcher’s clinical question. It is currently unknown if a standard measure of self-efficacy has been used to assess self-efficacy in patients with musculoskeletal conditions, specifically home exercise programs (HEPs).

Objective: 1) To determine what self-efficacy scales are being used in conjunction with exercise adherence, 2) identify if any self-efficacy scale has been developed to specifically evaluate self-efficacy for HEPs, and 3) once these scales are identified determine the psychometric properties of each scale.

Design: Systematic review. Data sources: Articles were collected from several databases; CINAHL, MEDLINE, Pubmed, PsychInfo, and Sport Discus. 597 articles were produced and after the removal of 97 duplicates, 450 titles and abstracts remained to be reviewed. Upon review of titles and abstracts, 40 full text articles were reviewed. After extensive review a total of 29 articles were included. Conclusions: There are a number of reliable and valid scales used to determine patient self-efficacy within musculoskeletal rehabilitation. Fourteen scales to assess self-efficacy were identified in this review. Within the 29 articles evaluated the two most often used were the Arthritis Self-Efficacy and Self-Efficacy for Physical Activity scales. Some of the scales identified are specific to patient condition or certain tasks, and not applicable for all. Unfortunately, no scale was found to assess self-efficacy for HEPs or to help predict adherence to HEPs. As HEPs are an essential component to rehabilitation there should be a scale designed to specifically assess self-efficacy for this task.

STROKE VOLUME DURING PRACTICE AND MATCH PLAY IN JUNIOR TENNIS PLAYERS

Poster: 275
Axtell, Alexis
Faculty Mentor(s): Dr. Tim Uhl

It is not uncommon for junior tennis players to compete in year-round competition exposing players to rigorous workloads. Previous tennis work has used hitting volume as a measure of workload, with methods requiring video analysis that incorporated manual counting of strokes. While the manual counting of stokes may be accurate the demands of such a task are time intensive. Therefore, other avenues of measuring workload must be explored. The Sony Smart Tennis Sensor (SSTS) is a new device that may be capable of measuring hitting volume and stroke type.

Purpose: To determine if the sensor is capable of tracking daily training loads over time and to investigate the criterion validity of the SSTS and in a group of tennis players.

Methods: Ten high school players (16 1 age, 9 males, 1 female) were recruited to participate. Each player’s hitting volume and stroke type were tracked prospectively for 6 weeks using the SSTS. The sensor attaches to the end of the racket handle. Criterion validity was established comparing video data of two practices to SSTS data on 4 tennis players in order to determine the measurement accuracy of the Sony sensor. Strokes were categorized into forehand swings, backhand swings, overhead swings, and total volume. Results: The SSTS is able to measure hitting volume across time. On average, the daily practice and match total volume was 533 and 234 strokes, respectively. Regardless of practice or match play approximately 54% of the total volume of strokes were forehead swings. The measurement accuracy of the SSTS was above 90% for all measured strokes.

Conclusions: The SSTS is an accurate way of measuring hitting volume in tennis and can be used to track practice and match volume overtime. Monitoring workloads overtime can help prepare players for rigorous competition schedules.

** Denotes STEMcats project
RELATIONSHIP BETWEEN EXERCISE AND ADHERENCE WITH THERAPY PATIENTS
Poster: 276
Cusumano, Alexis
Faculty Mentor(s): Dr. Timothy Uhl, Kelsey Picha

Adherence to rehabilitation is a precursor to improved patient outcomes, yet is low in musculoskeletal populations. Barriers to adherence must be identified early in patient care to create the most effective recovery plan. A patient’s prior exercise level at baseline has been identified as an adherence barrier. Identification of prior exercise may help clinicians effectively construct rehabilitation programs. Objective: To examine the relationship between previous exercise and in-clinic and home exercise program (HEP) adherence within a musculoskeletal patient population. Methods: Eighty-two patients (age 41 ± 17) with varying musculoskeletal conditions participated. At initial visit, patients were asked “Prior to your injury, in a typical month, how many times do you exercise strenuously (breaking a sweat, breathing hard) for at least 30 minutes?” This was recorded as sessions/month. Patients were then provided an activity log to document their adherence to their HEP. In-clinic adherence levels were determined by dividing the number of visits attended by the number of visits scheduled. This was recorded as a percentage. HEP logs were returned at the conclusion of the study and also recorded as a percentage. A Pearson correlation coefficient was used to examine the relationship between prior exercise, in-clinic, and HEP adherence. Results: Average exercise frequency was 12 ± 8 sessions/month. Average in-clinic adherence was 78.5 ± 18.8%. HEP logs were returned by 34 patients and average adherence was 69.4 ± 28.2%. No significant relationship was identified between previous exercise frequency and adherence to in-clinic rehabilitation (r=−0.201, p=0.111) or between previous strenuous exercise and HEP adherence (r=0.038, p=0.831). Conclusion: In this patient population, prior exercise did not correlate with adherence. The results of this study may guide clinicians to assess other barriers to adherence that have been found to have stronger and significant relationships. This could then lead to modifications of rehabilitation programs.

EFFECTS OF AGE, ACTIVITY LEVEL, AND SATELLITE CELL DEPLETION ON SKELETAL MUSCLE SPINDLE FIBER STRUCTURAL REMODELING IN A MOUSE MODEL
Poster: 277
Wayland, Jennifer
Faculty Mentor(s): Dr. Esther Dupont-Versteegden

Muscle spindles are the sensory organs of skeletal muscle and are highly involved in balance and coordination. Previous research indicates that genetically modified Pax7/DTA knockout mice, which are depleted of satellite cells after maturation, demonstrate inhibited balance along with an increase in extracellular matrix area in their muscle spindles. The current project sought to further investigate the effects of satellite cell depletion on spindle fiber characteristics, as well as investigate potential changes in response to age or activity level. Mice at 4 months of age were satellite cell depleted and were subjected to 8 weeks of voluntary running activity at 6 or 22 months of age, or kept sedentary. Plantaris muscle sections were stained with WGA and imaged. The images were then analyzed using ZEN Blue software to obtain the total spindle area, average size of intrafusal fibers or lobes, and the extracellular matrix (ECM) index, which was the ratio of the ECM area to the area of the entire spindle. Data analysis using a three-way ANOVA indicated main effects of age and satellite cell depletion on spindle area and lobe size, and an effect of age on ECM index. Aged mice show smaller spindle areas and fiber size, and a larger ECM index, indicating that more of the spindle is composed of ECM. Satellite cell depleted mice show smaller spindle areas and fiber size, but there was not a significant change in ECM index with or without satellite cells. Finally, there were no significant differences in any of the analyzed variables between running compared to sedentary mice. These results suggest that age and the absence of satellite cells have a significant effect on skeletal muscle spindle morphology, which likely affects balance and coordination of the animal.
SOCIOLOGY

AN ASSESSMENT OF DISABILITY ACCESS AT THE UNIVERSITY OF KENTUCKY
Poster: 278
Coffinbarger, Megan
Faculty Mentor(s): Dr. Robyn Brown

The Americans with Disabilities Act was established in 1990 to ensure that Americans with disabilities are not discriminated against in public spaces, workplaces, schools, and transportation. The law includes five titles: Employment, State and Local Governments, Public Accommodations, Telecommunications, and Miscellaneous Provisions. This study was conducted to analyze the ADA compliance on the University of Kentucky’s campus and to determine which buildings and services are in most need of and update to better serve students with disabilities. Twenty buildings frequently used by undergraduates were evaluated using the ADA Checklist for Existing Facilities. Data were collected over two weeks (July 20, 2017-August 3, 2017) and then evaluated using descriptive analysis. Data were analyzed looking across checklist items, buildings, checklist categories, and construction dates. The average number of buildings complying with each checklist item was 18.485 out of 20 total buildings. The least compliant checklist items were signs and signs including braille. Looking across buildings, the average number of compliant checklist items per building was 64.7 out of 70 items. Looking across checklist categories, compliance ranged from 83.34 percent compliance to 100 percent compliance. The least compliant checklist category was signs and the most compliant checklist categories were access to goods and services and general seating. Buildings constructed after the ADA had 8.02 percent more compliance than buildings constructed before the ADA. In order to better accommodate students with disabilities, the University of Kentucky should make revisions to better comply with ADA standards-focusing on signs, elevators, ramps, and door handles.

SPECIAL COLLECTIONS RESEARCH

FRAGMENTA NE PEREANT: AN ANALYSIS OF THE ENDPAPERS OF MS LATIN KENTUCKIENSIS III
Poster: 279
Mertka, Alyssa
Faculty Mentor(s): Carol Street

Previous scholars of MS Latin Kentuckiensis III, a 15th-century book of hours located in the collection of the University of Kentucky Special Collections Research Center, have extensively studied the core text of the manuscript. However, little is known about the unique pages that form the endpapers of the book. While overlooked by scholars, these endpapers could provide insight into the origins of the book, lead to a greater understanding of the workshop that produced it, or uncover an unstudied text. Differing in handwriting style from the core text, the endpapers are likely recycled pages from an earlier or contemporary work from the bookbinder’s workshop. When materials were scarce, bookbinders often used pieces of old manuscripts to bind new books. As a result, pieces of older works were integrated and preserved with the later bindings, but scarcely studied due to their fragmentary nature. This research to transcribe and translate the Latin text of the unidentified flyleaves and pastedowns of MS Latin Kentuckiensis III will shed light on the physical construction of the book and the context in which the book was originally created. Research methods include understanding what is currently known about the book of hours, deciphering the difficult to read Latin text of the endpapers, and translating the text into English. Once the context of the endpapers is determined, research will establish the original purpose of the text and investigate why it was possibly repurposed into a later binding.
UNCOVERING SARTRE: ANALYSIS OF AN UNPUBLISHED JOURNAL
Poster: 280
Samadi, Dealla
Faculty Mentor(s): Carol Street

Discovering a French journal in the collection of the University of Kentucky Special Collections Research Center purported to be written by the famous existential philosopher Jean-Paul Sartre led to questions regarding its provenance and what secrets it contained within its covers. Beyond the excitement of reading a famous author’s text that hadn’t yet been analyzed, the first research question that demanded to be answered was whether or not it was truly written by Jean-Paul Sartre. Unsigned and undated, there was no physical evidence that the journal was written by the hand of Sartre other than the item’s accession record in the archives’ database. During a yearlong internship in the archives, research was conducted to ascertain the authenticity of the journal by transcribing the handwritten French script and translating the transcribed French into English. The translated text could then be analyzed for content to determine what he was doing at what time and the location, which could be compared to Sartre’s highly documented life as a public figure. The text would also be compared to Sartre’s handwriting in other collections and known writing style from his numerous published journals. Once the provenance was established with relative certainty, examples of the text and findings would be forwarded to a Sartre expert for validation. If truly an unknown and undocumented Sartre journal, the text could provide valuable insights into the life of the famous French philosopher and allow Sartre experts a new opportunity for scholarship and research. Dissemination of the findings would take place through national and regional conferences on undergraduate research and philosophy, as well as promoted through the University of Kentucky Libraries publications and social media.

EXPLORING EVOLUTIONARY MEDICINE THROUGH 19TH CENTURY MEDICAL COLLECTIONS: APPLICATIONS IN ARCHIVAL STUDIES
Poster: 281
Sturgill, Taylor
Faculty Mentor(s): Carol Street

Evolution has been a paradox in the field of science, but, the study of evolutionary medicine applies both the evolutionary game theory and medicine. This study was conducted to explore evolution by analyzing two 19th century collections of medical formulations and prescriptions while compared to the trend of public health and pathogenic mechanisms. Analysis of organic structure in historical prescriptions, descriptive epidemiology in Kentucky, and the idea of the germ theory will be used explicitly to show the evolutionary change of health and disease. Results of this study intend to provide an intersection between evolution and historical medical formulations. Paleoanthropological studies have been shown to prove our better understanding of basic evolutionary biology.
SPINAL CORD AND BRAIN INJURY

USING MAGNETICALLY-LABELED ANTI-TOM22 MICROBEADS TO ISOLATE MITOCHONDRIA FROM MOUSE BRAIN TISSUE: ADVANTAGES AND APPLICATIONS

Poster: 282
Harwood, Christopher
Faculty Mentor(s): Dr. Patrick Sullivan

Mitochondria are small (0.5-2 um) organelles that perform multiple life sustaining functions such as energy production, calcium homeostasis, and regulating programmed cellular death. Literature shows that mitochondrial dysfunction is a major contributor to the pathophysiology of many neurological disorders, including traumatic brain injury (TBI). Until now, mitochondrial isolation techniques have been limited to crude differential and separation by density gradient ultracentrifugation. These procedures require higher amounts of brain tissue in order to aggregate a sufficient amount of mitochondria, eliminating the possibility to assess specific brain regions. To address these needs, we used magnetically applied cell separation (MACS) to isolate pure, intact, and functional mitochondria in the cortex and hippocampus. We used a mitochondrial isolation kit, (Miltenyi Biotec) which contains magnetic anti-TOM22 antibodies, to tag the mitochondria before the sample was passed through a strong magnetic column. To optimize collection of non-synaptic mitochondria, antibody was added at 1-4 uL/mg of tissue. The elute of this initial pull-down contains synaptosomes, which were collected, ruptured, and then separated again at 0.1-1 uL/mg of tissue. Mitochondrial protein levels were measured to determine the yield of mitochondria per sample, while mitochondrial respiration was evaluated using the Seahorse XFe24 Flux Analyzer (Agilent) to assess functionality of the sample. Protocol optimization showed that non-synaptic and synaptic samples were most effective with the antibody concentration of 4 uL/mg of tissue and 1 uL/mg of tissue respectively. In the hippocampus (35 mg of tissue), we were able to isolate non-synaptic and synaptic yields for downstream analysis. With samples from synaptic hippocampal tissue, MACS yielded six times the amount of mitochondrial protein than ultracentrifugation did with comparable respiration. This demonstrates the usefulness of the MACS system to assess mitochondria from smaller brain regions. Ongoing studies in our lab use this system to analyze mitochondrial function in mild TBI.

THEATRE AND DANCE

EVALUATING THE INFLUENCE OF AUGUSTO BOAL’S THEATRE OF THE OPPRESSED MOVEMENT ON MODERN DRAMA THERAPY

Poster: 283
Hasl, Brooke
Faculty Mentor(s): Herman D. Farrell III

Throughout history, theatre and other creative art forms have served as vehicles for both social change and personal expression. Augusto Boal’s Theatre of the Oppressed movement, which originated in Brazil in the 1970s, expanded on the previously established concept of psychodrama to create an artistic framework through which practitioners can facilitate a variety of therapeutic experiences. Boal’s Theatre of the Oppressed (TO) movement generated credibility and global exposure for the art form in addition to initiating significant shifts in the development of the use of expressive arts in both modern drama therapy and nonclinical interventions. The author seeks to provide a concise history of the TO movement along with an analysis of a selection of the literature surrounding Boal’s influence on the drama therapy field in order to comment on the efficacy of TO in both a sociocultural and psychological context. Although the current research remains limited, Augusto Boal’s methods appear effective in a variety of contexts including juvenile prisons, college campuses, and in working with trauma victims, suggesting its potential to serve not only as a catalyst for social change, but also as an alternative or complementary approach to traditional psychological treatment options.
UNDERSTANDING THE ROLE OF TGF-β2 AS A DRIVER OF THERAPEUTIC RESISTANCE IN ADVANCED PROSTATE CANCER
Poster: 284
Dicken, Haley
Faculty Mentor(s): Dr. Natasha Kyprianou

The purpose of this project is to dissect the underlying mechanisms of treatment failure and development of resistance in patients with advanced prostate cancer. The androgen receptor (AR) is a critical driver of therapeutic response in patients with metastatic castration resistant prostate cancer (CRPC) and persistent AR signaling is a validated therapeutic target in CRPC. Work from the lab first established that Docetaxel inhibits AR nuclear localization in androgen-sensitive prostate tumors, while in CRPC AR splice variants remain capable of nuclear trafficking contributing to taxane therapeutic resistance, signaling interactions between transforming growth factor-β (TGF-β), and epithelial-mesenchymal transition (EMT). In these studies, the continuation of EMT to the development of the neuroendocrine phenotype—a newly appreciated pathological characterization of prostate tumors in the context of the tumor microenvironment is discussed. The phenotype is aggressive, therapy resistant, and metastatic—deeming it a cause worthy of greater exploration. Apart from the neuroendocrine phenotype, this research investigates sequencing and combination treatments using cell models of prostate cancer cells that are sensitive to antiandrogens, but resistant to taxane chemotherapy. Two cell lines were used, LNCaP and LNCaP TβRII. The LNCaP cells are androgen sensitive human prostate cells. The LNCaP TβRII cell line consist of human prostate cancer cells derived from metastasis, responsive to TGF-β and sensitive to androgens. First, both cell lines were treated with cabazitaxel alone and dose response (0nm, 10nm, 35nm, 50nm, 100nm, 500nm for 72 hours) and time course assays (35nm for 0hr, 24hr, 48hr, 72hr, 96hr) were completed. Next, both cell lines were treated with cabazitaxel and antiandrogens in combination. The findings will potentially lead to insights into the mechanisms of therapeutic resistance in advanced prostate cancer.

INFLAMMATORY EFFECTS OF EXTRACELLULAR VESICLES RELEASED FROM THE NORMAL TISSUE TARGET OF DOXORUBICIN
Poster: 285
Thompson, Hannah
Faculty Mentor(s): Dr. Daret St. Clair

According to the National Cancer Institute, there were an estimated ~1.7 million people diagnosed with cancer in the US in 2016. Patients with high grade cancer or metastasis are often treated with chemotherapy. 50% of FDA-approved chemotherapeutic agents cause oxidative stress leading to severe side effects in patients. One of these potent chemotherapeutic drugs is Doxorubicin. The use of Doxorubicin can result in dilated cardiomyopathy characterized by thinning of the heart muscle and difficulty in cardiac contraction. Incidences of cardiomyopathy are dose dependent, limiting the maximum clinical dosage for patients. Extracellular Vesicles (EVs) play an important role in intercellular communication and are a potential biomarker for tissue injuries resulting from the harmful effects of Doxorubicin. By using a mouse model of doxorubicin-induced cardiac injury, it has been demonstrated that EVs can be used as an early diagnostic tool for such injury. Previous studies have suggested that EVs are released to remove oxidized proteins that are toxic to the cells and are released from the target tissues of Doxorubicin, including the heart and liver. Here we found that EVs play an important role in oxidative stress response by inducing changes in the macrophage phenotype. By performing RT-PCR of several inflammatory (Tumor necrosis factor alpha, Interleukin-6, inducible nitric oxide synthase) and anti-inflammatory (Interleukin-10) cytokines, we found that EVs from the heart induced pro-inflammatory cytokines. In contrast, EVs from the liver induced anti-inflammatory cytokines. These results suggest the differential effects of EVs from the heart and liver on immune cells during chemotherapy.

** Denotes STEMcats project
EFFECTS OF OLD AGE ON INNATE IMMUNE RESPONSES IN HORSES

Poster: 286
Jackson, Sophia
Faculty Mentor(s): Dr. Amanda Adams

Advanced age (>20 yrs) in horses, as with other species, is eventually associated with a decline in body condition, muscle tone and immune function. Like other species, aged horses exhibit immunosenescence, an overall decrease in immune responses, and inflamm-aging, or a low-grade, chronic inflammation. More specifically, we have shown that age affects adaptive immune responses of horses however little, to no research has been conducted to characterize age-associated changes in innate immune responses. Thus, the objective of this study was to compare whole blood (WB) cytokine responses of old horses to young horses. We hypothesized that old horses would mount a greater inflammatory response to LPS whole blood stimulation when compared to young. WB samples were collected into EDTA tubes (3 mls) from 5 old horses and 5 young horses. The WB samples were either stimulated with LPS (1 ug/ml) or left unstimulated, followed by a 3 hr, 37°C incubation. Afterwards, the entire contents of each tube were transferred into tempus tubes which were incubated at room temperature overnight, followed by RNA extraction. RNA samples were used to perform reverse transcription, followed by real-time PCR (RT-PCR) to measure pro-inflammatory and anti-inflammatory cytokine gene expression. Relative quantity (RQ) values were calculated, and t-tests were used to statistically compare RQ values between young and old horses, with significance determined at P ≤ 0.05 and trending considered if P ≤ 0.10. Results showed that aged horses had higher (P<0.10) levels of IL-1beta, IL-6, TNF-alpha, as well as IL-10 cytokine responses when compared to young horses. The results suggest that the elevated cytokine releases may be caused by interactions of LPS with serum factors in the blood of aged horses. Such an overproduction of inflammatory cytokines by innate immune cells, monocytes and neutrophils, may be in part responsible, for the inflamm-aging response.
ECONOMICS

HEAD-START WITH THE ARTS: IMPACT OF ADOLESCENT ARTS EXPOSURE ON LONG-TERM SUCCESS

Table:  1
Heltzel, Avelyn
Faculty Mentor(s): Dr. Gail Hoyt

While it is generally accepted that youth exposure to the arts is a positive thing, researchers have found it difficult to quantify and demonstrate the impact that arts can have on youth development. Using an economic perspective, this study will attempt to answer the question of: What impact do music and dance lessons during adolescence have on student’s success during college? A large survey is being administered to students at the University of Kentucky, which will gather information on students’ experience with both music and dance lessons. Regression analysis and descriptive summary statistics will be used to analyze indicators of success such as college GPA and community involvement. Potentially confounding variables such as family income will be accounted for through variables such as whether students received government aid during adolescence, and whether they currently receive financial aid to attend college. It is expected that there is a positive relationship between the presence of music or dance lessons during adolescence and students’ success in college. In addition, it is hypothesized that the number of years a student participated in the lessons will have an additional impact on the indicators of college success, and that these results will be more dramatic if students who received government aid during adolescence are isolated.

ENGLISH

CREATIVE WRITING IN DIGITAL SPACES

Table:  2
Authors: Wesley Barnett, Alec Faust, Erin Foulke, Juliana Lavey, Christian Tipton
Faculty Mentor(s): Dr. DaMaris B. Hill

Creative Writing in Digital Spaces is a collaborative effort among five students in Dr. DaMaris Hill’s ENG 407 Intermediate Creative Writing Workshop course. The project consists of a modified table presentation to allow people to interact with the pieces. The students will display their interactive digital writing, which includes video games that describe ethical dilemma, 21st auto-ethnographies, Twitter fiction.
The purpose of this research is to investigate the effects of several established geographic determinants of health and model their distribution within Fayette County, KY. This research was performed in four distinct steps. First, a review of the current literature was performed to identify the presence and strength of the relationship between health outcomes and several geographic factors. These factors include Primary Care Facilities, Educational Facilities, and Nutritional Resources. Additionally, evidence is presented for the use of Median Household Income as a proxy for health outcomes in areas where complete health outcome data is unavailable due to the strength of the relationship between income and health. Second, the relevant data specific for Fayette County was gathered and modeled to create a visual representation of geographic trends in and around Lexington, KY. This data was then used in step three, which was an analysis of the distribution and intersection of these variables to predict health disparities within Fayette County. The effectiveness of this modeling method in identifying health disparities was then assessed using available health data. Finally, several recommendations are made to guide interventions designed to alleviate these health disparities.
2017 OSWALD RESEARCH AND CREATIVITY COMPETITION WINNERS

BIOLOGICAL SCIENCES

First Place: JOSHUA PRESTON - Maternal Nicotine Exposure Prior to and during Pregnancy and Nursing Increases Offspring Obesity Risk
Second Place: KELLY SOVACOOL - Does Perceived Wealth Inequality Influence People's Attitudes Toward Being Greedy?

DESIGN

First Place: BROOKE HOLLEY - Freedom of Fluidity
Second Place: ALEXANDER KISTLER - The Woodlands, A Naturally Designed Residential Landscape

FINE ARTS

First Place: LIZ MOORE - Micro in the Macro
Second Place: MEREDITH MATIA - Ichigo, Ichie
Honorable Mention: SCHUYLER BAAS - The Remembrance

HUMANITIES: CREATIVE

First Place: BRIDGET NICHOLAS - Lessons for Women
No Second Place

HUMANITIES: CRITICAL

First Place (tie): ANDREW JOHNSON - Kentucky Slavery: The Historiography of Human Property Records
First Place (tie): ISABELLE MARTIN - A Single Particle Among Billions: Yayoi Kusama and the Power of the Minute
Second Place: BEAU REVLETT - Aristotle and Game Theory on Human Nature and Ethics
Honorable Mention: CAITLIN DORRIS - Complete History of the Nursing Home Ombudsman Program

PHYSICAL AND ENGINEERING SCIENCES

First Place: GRANT FORBES - Analysis of Current-mode Detectors for Resonance Detection in Neutron Optics Time Reversal Symmetry Experiment
Second Place: RHETT CROLEY - Spin Transport of Polarized Helium-3 Atoms

SOCIAL SCIENCES

First Place: VERONICA SCOTT - Memes: The Interaction Between Imagery and Subculture
Second Place: MARTHA TILLSON - An Exploratory Study of Syringe Exchange Program Awareness and Perceptions in Kentucky
Alexis Axtell  
Mentor: Dr. Tim Uhl, Natalie Myers  
*Stroke Volume During Practice and Match Play in Junior Tennis Players*  

Kendall Brown  
Mentor: Dr. Jazmin Brown-Iannuzzi, Stephanie McKee  
*Does Perceived Wealth Inequality Influence People’s Attitudes Toward Being Greedy?*  

David Chen  
Mentor: Dr. Xianglin Shi  
*Exposure to Chromium (VI) Enhances the Motility of Colorectal Cancer Cells through Activation of FAK*  

Christopher Kositzke  
Mentor: Dr. Ricardo Bessin  
*Development of an Innovative Cucumber Beetle Monitoring Trap*  

Sarah Mac  
Mentors: Ms. Carissa Truman  
*Evaluating the Ability to Detect Calving Time in Dairy Cattle Using a Precision Technology that Monitors Tail Movement*  

Emily Major  
Mentor: Dr. Luke Bradley, Dr. Robert Houtz, Dr. Roberta Magnani  
*Development and Characterization of a Model Post-Translationally Modified Protein Library*  

Honour McDaniel  
Mentor: Dr. Corrine Williams  
*Preliminary Analysis of Male Perceptions of Reproductive Coercion*  

Amelia Metz  
Mentor: Janie Heath, PhD, APRN-BC, FAAN; Joel Anderson, PhD; and Karen M. Butler, DNP, RN  
*E-cigarette and Marijuana Safety: Nurses’ Perceptions*  

Madelyn Miles  
Mentor: Dr. Sarah Kercsmar  
*Understanding Government Influence on Healthcare Legislation*  

Israel Mullins  
Mentors: Dr. Jeffrey Bewley; Ms. Carissa Truman  
*Validation of an Automated Body Condition Scoring Camera for Dairy Cattle*  

Adam Nolte  
Mentors: Dr. Junfeng Zhu  
*Sinkhole Mapping of Woodford County Kentucky Utilizing LiDAR*  

Connor VanMeter  
Mentors: Dr. Rebecca Dutch  
*Role of Human Metapneumovirus Phosphoprotein Domains in the Viral Lifecycle*  

Joseph Walden  
Mentor: Dr. Rachel Farr  
*Adopting Identities: How Socialization Varies Between Adoptive Families*  

Jeremiah Wayne  
Mentors: Dr. Matthew Gentry; Katy Brewer  
*Personalized Diagnosis for Lafora Disease, a Fatal Epilepsy*
PRESENTER INDEX

Student presenters are listed alphabetically by last name.

Abner, Landyn, 24
Adam, Amar, 84
Adamczyk, Michelle, 16
Addington, Chris, 100
Ahmed, Habiba, 55
Ahmed, Izah, 24
Ahmetagic, Benjamin, 85
Al Balushi, Noura, 63
Alturkistani, Ahmad, 68
Amaya, Alyssa, 35, 36
Andreason, Emily, 63
Andrew, Kristopher, 116
Appel, Jessica, 116
Applegate, Kaitlyn, 152
Appleton, Ibrahim, 93
Archambeau, Lauren, 55
Archer, Luke, 25
Ares, Elena, 133
Arnold, Adrienne, 131
Ashfaq, Haris, 127
Ashton, Erica, 20
Avery, Morgan, 109
Axtell, Alexis, 152
Bahena, Evelyn, 25
Bailey, Rebecca, 24
Baker, Brianna, 134
Balaji, Kaishwarya, 47
Barnett, Wesley, 157
Basham, Ross, 68
Bates, Patrick, 134
Bedingfield, Brooke Anne, 135
Benzenhober, Kelly, 59
Beyerle, David, 26
Bhuuto, Umar, 26
Blakeman, Elyse, 106
Blanchette, Brooke, 63
Blanford, Evan, 27
Blichmann, Dana, 118
Blood, Ryan, 56
Blood, Stuart, 56, 57
Blose, Alexander, 128
Boelstler, Natasha, 135
Bolin, Justin, 26
Bolvin, Shannon, 69
Bomkamp, Andrea, 85
Bone, Candace, 143
Bossle, Megan, 56
Brackett, Gavin, 16
Brancheau, Lane, 55
Breetz, Katherine, 27
Breitenstein, Marissa, 93
Brickeen, Xavier, 55
Brothers, Samantha, 25
Brown, Kendall, 136
Browning, Shelby, 94
Bryan, Sarah, 86
Bryant, Joseph, 56
Buckley, Tiffany, 28
Budoi, Megan, 69
Burnay, Aziza, 28
Bush, Jacob, 70
Busse, Aundrea, 70
Bustle, Emilia, 8
Byrd, LaShay, 122
Calandrella, Madeline, 136
Calderaro, Thomas, 56
Campbell, Keely, 47
Casto Jr., Will, 35, 36
Caudill, Austin, 29
Caudill, Elizabeth, 57
Center, Douglas, 111
Chadwell, John, 71
Chadwell, Lauren, 71
Charles, Ayinde, 29
Chatterjee, Indrani, 137
Chavez, Andrew, 8
Chen, David, 30
Chen, Xiao-Yin, 89
Chesser, Anissa, 130
Childress, Adam, 86
Chipman, Avery, 9
Chishti, Emad, 130
Clark, Sophie, 56
Clayton, Aaron, 16
Cloyd, Conner, 9
Coffinbarger, Megan, 154
Coffman, Tabbi, 26
Coldiron, Kara, 72
Cole, Clare, 122
Cole, Kelsey, 95
Coleman, Carly, 137
Coleman, Destiny, 31
Coll, Dylan, 57
Collins, Davis, 22
Combs, Aleah, 113
Conrad, Gerald, 35, 36
Cook, Holly, 44
Copher, McKaylee, 132
Conor, Kelsey, 90
Corey, Jordan, 24
Cornett, Justin, 30
Corwin, Adrienne, 60
Coyne, Katie, 62
Crabtree, Lauren, 123
Craighead, Aimee, 64
Crane, Mark, 31
Cremeans, Bailey, 142
Criswell, Olivia, 35, 36
Croley, Rhett, 128
Crow, Samuel, 110
Crowner, Anne, 118
Crowner, John, 9
Culler, Jacob, 61
Cusumano, Alexis, 153
Dalrymple, Emma, 104
Damron, Brianna, 108
Daniel, Wesley, 72
Danyi, Samantha, 122
Davis, Olivia, 24
De Jesus, Samantha, 94
Decre, Julia, 138
Deeb, Adan, 104
Defervelle, Julia, 44
Delpuech, Caroline, 26
Dennis, Mitchell, 128
DePaso, Avery, 73
Dicken, Haley, 157
Ding, YuJie, 32
Dixit, Sushovan, 122
Do, Lilly, 26
Doerr, Ashley, 73
Douglas, Allyson, 95
Douglas, Tsage, 87
D'Souza, Shane, 22
Dunning, Stephanie, 116
Dyment, Madison, 10
Eades, Allison, 17
Edwards, Ashton, 55
Elder, Katherine, 95
Elliott, Carla, 19
Elmore, Layne, 32
Enbody, Brandon, 96
Evers, Gabrielle, 31
Eversole, Samantha, 23, 33
Farlow, Hannah, 123
Farmer, Ben, 109
Farrell, Kasey, 63
Thomas, Hannah, 63
Thomas, Tiffany, 90
Thompson, Hannah, 157
Thompson, Jada, 32
Thompson, Robbin, 66
Thornberry, Hannah, 35, 36
Tipsword, Jordyn, 15
Tipton, Christian, 157
Tirumalaraju, Chaitra, 123
Tobin, Katherine, 32
Toler, Jessica, 90
Tran, Sarah, 52
Trasmonre, Brandon, 16
Trejo Jr., Felipe, 114
Triplett, Makayla, 32
Turnbaugh, Evelyn, 26
Vance, Alyssa, 24
VanDierendonck, Alyssa, 67
Vanegas, Olivia, 150
Vanhoose, Mikayla, 32
Vastag, Erin, 56
Veazey, Sarah, 58
Venkatesan, Tharunika, 127
Via, Katelyn, 32
Von Deylen, Madison, 52
Vorkpor, Gbutue, 22
Voshell, Siarra, 16
Walden, Joseph, 149
Walker, Hannah, 56
Wayland, Jennifer, 153
Webb, Madison, 136
Webber, Hayley, 53
Wendroth, Robert, 53
Wesloh, Cory, 150
Whisenhunt, Meredith, 151
Will, Caroline, 89
Williams, Paige, 133
Williams, Taylor, 33
Williamson, Lauren, 136
Williamson, Tyler, 33
Wills, Savannah, 21
Wilson, Sylvia, 134
Wing, Anthony, 84
Woodard, Constance, 32
Woofolk, Maya, 54
Wrenn, Emily, 134
Young, Savannah, 123
Yun, Do Hyun, 123
Zahrn, Lauren, 92
Zimmerman, Savina, 55
WHAT WE DO?

- Funding for undergraduate/graduate study
- Professional development - help with resume, essays, interviewing skills
- Clarify graduate study and career goals
- Get a head start preparing applications for graduate study and other scholarships

WHY APPLY?

- Start early
- Review the NCA website for scholarships
- Contact the NCA office to set up an appointment or refer a student

HOW TO BEGIN

- Recruit students for prestigious awards
- Help students with the application process
- Provide feedback on application materials
- Interview preparation
- Coordinate campus selection process
- Compile and submit application materials

Dr. Pat Whitlow
Director, Nationally Competitive Awards
pat.whitlow@uky.edu
(859) 257-4984

www.uky.edu/chellgren/competitive-awards
Presenting at Showcase?

GET PUBLISHED

Questions?

Adrian Ho, Director of Digital Scholarship
Email: adrian.ho@uky.edu
Phone: (859) 218-0895