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WKU[®] ABSTRACTS

Aberg, Bryce “A Single-Step Hydrothermal Synthesis of Vanadium Pentoxide–Reduced Graphene Oxide Composite Electrodes For Enhanced Electrochemical Energy Storage” (Sanju Gupta)

Increasing global demand for electrical energy has spurred research in alternative energy technology. The need for high performance electrode materials architecture drives the development of high efficiency and low environmental impact electrochemical energy storage systems (EES). Materials composed of graphene, a one-atom thick nanomaterial made of carbon, and vanadium pentoxide (V₂O₅) were synthesized using a one-step hydrothermal approach to create nanostructures such as nanobelts (GVNB). Surface observations using Raman spectroscopy, x-ray diffraction, and SEM indicated the presence of V₂O₅ nanobelts (VNB) which increase the conductivity of the GVNB's. X-ray photon spectroscopy found the presence of hydrothermally reduced graphene (rGO) in the VNB's crystalline structure, further supporting the increased conductivity of the nanobelts.

Adams, Sarah “Participation In Organizational Health and Wellness Programs” (Amber Schroeder)

Health and wellness programs are being utilized by organizations at growing rates. Research on health and wellness programs is typically confined to the program of a single organization and the employees participating in that specific program. Typically, this research examines the outcomes of health and wellness programs in organizations, such as return on investment in terms of medical costs, as well as improvements in the health of the employees. However, there is a need to examine the factors that may predict participation in health and wellness programs. Therefore, this study will examine the differences in demographic factors among participants and nonparticipants. This study will also examine differences in likelihood of participation between the three different types of health and wellness programs. It is also necessary to determine if there are differences in participation based on incentive amounts, potential punishments for not completing the program, and whether receiving an incentive is based on participation or health outcomes. Therefore, this study will also examine differences in participation based on these factors.

Adigarla, Sai Pavan “Nutritional Status and the Effectiveness of ARVs In HIV Patients In Tanzania” (William Mkanta)

HIV is an epidemic where patients are treated with a particular line of treatment using Anti-Retroviral Drugs (ARVs). Nutritional requirement is an important factor that can alter the effectiveness of ARVs. HIV patients are required to have a balanced diet along with the ARVs. The purpose of the present study is to evaluate the impact of nutrition over the effectiveness of the ARVs in HIV patients. The study was conducted at a non-government organization named, Walio Katika Mapambano na AIDS Tanzania (WAMATA) in Tanzania. Participants of the study were divided in to three groups, and were offered different levels of diet with same drug therapy. Data was collected through interviews, observation, and review of existing records from WAMATA. A study group that had balanced diet along with the therapy experienced less side-effects than the remaining groups. The study results have shown that nutritional status has a strong relation with the effectiveness of the ARVs. HIV patients need to take balanced diet along with the ARVs for better outcome including improved quality of life. There is a strong need for policies and public health interventions guiding HIV/AIDS patients in getting access to nutritional diets alongside ARVs therapy.

Agaba, Peter “Incorporating Exponential Functions Into an Optimal Control Model For a Chronic Wound” (Richard Schugart)

A chronic wound is a wound that does not heal in an orderly manner and on time. The analysis in this research project focuses on treating chronic wounds using both mathematical and biological models. These models primarily focus on the amount of oxygen supplied to the wound. This amount should be optimal since too much oxygen is toxic to the body, and can potentially lead to death. Some other models focus on capturing the significance of the length of therapy in wound treatment. The goal is to minimize the time spent in therapies since longer periods make treatments more costly. In this project, we simulate different ways of minimizing the time of therapy through the use of negative exponential (i.e., discount factors) and Gaussian functions.

Ahmed, Tithe; King, Rodney “Comparison of Bacteriophages Nearlyheadless and Hemsworth” (Rodney King)

Bacteriophages are the most abundant biological entities in the biosphere, yet few of their genomes have been completely sequenced. As mobile genetic elements, phages play an important role in the evolution of bacteria through horizontal gene transfer, and the analysis of phage genomic DNA sequences has provided important insights into their evolutionary

Author Name(s) “Paper or Poster Title” (Faculty-Staff Mentor)

interrelationships. The purpose of the Genome Discovery and Exploration Program was to gain further insight into the diversity of the bacteriophage population by isolating and characterizing new phage from the environment. The phages NearlyHeadless and Hemsworth were collected from two different locations in Bowling Green, Kentucky. Electron microscopy revealed only minor differences in the morphology of these phages. To determine genetic relatedness, the genomic DNAs were purified and analyzed by DNA restriction analysis and gel electrophoresis. Our results suggest that NearlyHeadless belongs to the A1 subcluster of mycobacteriophages and Hemsworth belongs to the D cluster of mycobacteriophages. Although unequivocal determination of genetic relatedness will require DNA sequencing, our results are consistent with the hypothesis that the phage population is large and diverse.

Alavi, Farshid “Optimization of Process Parameters In Micro Electrical Discharge Machining (EDM) of Ti-6Al-4V Alloy Based On Full Factorial Design” (Muhammad Jahan)

Ti-6Al-4V has a wide range of applications such as biomedical industry. Nevertheless, titanium alloys are very difficult to machine by conventional methods. EDM is a non-conventional machining that uses the thermal effect of precisely controlled sparks. The question raised in this research is about the effects of the micro-EDM input parameters as well as the electrode coating to achieve required output parameters including machining time, tool wear, and surface integrity. The independent variables are gap voltage, capacity, electrode rotational speed, and the electrode coating, i.e. uncoated WC electrode vs. TN-WC electrode. The response variables consist of machining time, tool wear, crater size, and surface hardness. The first purpose of this research is to find the optimum values of micro-EDM process parameters to achieve the highest surface integrity of Ti-6Al-4V alloy in terms of crater size and surface hardness. The second purpose of this research is to achieve higher productivity in terms of machining time and tool wear. An integrated approach has been applied to achieve both objectives, simultaneously. The findings are achieved through series of experiments using full factorial design.

Alsolaim, Hatem “Architecture In the Work Place” (Aly Shahnaz)

The goal of my project is to combine mercantile and business and all the requirements and needs into one building located in Riyadh, Saudi Arabia. The program for my building was about how the space should be divided to achieve the right size, minimum requirements needed, and good area for each space. Research was undertaken to see how wind moves to make the design work with it, and also sun movement to see how can to get natural sunlight into the building. This enabled me to choose the location and the shape of the building. The building code research informed me of minimum sizes required for each room in the building. The design Inspiration came from domino pieces. By putting them above each other and rotating each one to a certain degree, multiple shapes were envisioned. These ideas led to the creation of a spectacular building that can work for all the criteria mentioned above.

Ambekar, Apurva; Young, Sonia “Motor Profile of Individuals With Agenesis of the Corpus Callosum: Development and Initial Stages of a Systematic Review” (Sonia Young)

Introduction: A disruption in the development of the corpus callosum during gestation results in agenesis of the corpus callosum (ACC) which can cause motor deficits and delays. The purpose of this study is to demonstrate the development and initial stages of a systematic review of the literature to create a comprehensive profile of motor deficits associated with ACC. Methods: A review protocol was developed that included the selection of the review question, inclusion criteria, and a search strategy to systematically collect and analyze the data based on relevance and quality. Results: Two reviewers systematically searched the electronic databases CINAHL, PsycINFO and MEDLINE from January 1985 through January 2016 for randomized control trials, case-control studies, and cohort studies that met the inclusion criteria using pre-selected key terms. This preliminary search yielded 2,004 articles. The next step will be confirming the presence of all 4 inclusion criteria in each article before using checklists to assess methodological quality. Motor deficits identified in selected articles will be analyzed and reported. Discussion: Initial results indicate the presence of motor deficits in individuals with ACC in the literature. The systematic review will be continued to further analyze this data to create a motor profile of ACC.

Anaya, Berenice; Lemerise, Elizabeth “Self-Regulation In Preschoolers: Hot and Cold Self-Regulation Tasks As Predictive Measures of School Readiness” (Elizabeth Lemerise)

Individual differences in self-regulation during the preschool years have been linked to greater academic achievement and socio-emotional competence, two factors that are important for school readiness. We used the Preschool Self-Regulation Assessment (PSRA) to examine hot and cold processes of self-regulation as predictors of academic achievement and socio-emotional competence respectively. We assessed 82 preschoolers between the ages of three (n = 42) and four (n = 40), who were enrolled in a blended Head Start program (n = 64 Head Start). The PSRA, selected Woodcock-Johnson subtests, and teacher ratings of social competence and emotion regulation were collected in the Fall and Spring of the school year. Results indicated that self-regulation growth from Fall to Spring was moderated by age, where three-year olds showed greater gains in hot regulation and four-year olds showed greater gains in cold regulation.

Anderson, Blake “You’re Rain Man’ – The Film Industry’s Impact On the Autism Community and Research” (Jerod Hollyfield)

In 1989, the film *Rain Man* won Best Picture at the Academy Awards after a successful theatrical run. Twenty-two years later, *Extremely Loud and Incredibly Close* was nominated for the same statuette. Although that film didn't win, both films would end up bringing mass media attention to a then mysterious neurological condition: autism. Both films featured an autistic character for the main lead, in which both actors would receive multiple accolades for their roles. However, it wasn't just their performance that was acclaimed; it was also the way the films represented the neurological condition. In making *Extremely Loud and Incredibly Close*, director Stephen Daldry stated he wanted to feature "a special child who is somewhere on the autistic spectrum, trying to find his own logic – trying to make sense of something that literally doesn't make sense to him." In this paper, I will argue that these films showed autism in a positive light to where it not only brought attention to the disorder, but also acceptance. After these films were released, new extensive research about autism was done and several autism rights groups were founded, where people finally started to see who these people really were.

Anderson, Kenneth "Growth of the Marbled Salamander (*Ambystoma opacum*) On Substrates of Varying Acidity" (Jarrett Johnson)

In terrestrial habitats with a history of mining activity and previous or ongoing reclamation efforts, understanding the effects of soil acidification on the ecology of amphibians is an important part of the restoration process and the conservation of local amphibian populations. Pond-breeding amphibians spend much of their post metamorphic life history in direct contact with the soil in upland habitat adjacent to aquatic breeding sites. Given the thin, permeable skin of amphibians, soil characteristics are likely to influence patterns of growth and survival. To evaluate the role of pH on these determinants of fitness, we reared recently metamorphosed marbled salamanders (*Ambystoma opacum*) at pH 4, 5, 6 and 7. Size was recorded every two weeks for eight months at which point the study was terminated. Our results indicate that a substrate pH of 4 was found to be lethal to recent metamorphs, while at pH 5 individuals showed a reduction in total length and snout vent length. These results suggest that substrate acidity can decrease the initial growth of salamanders even after metamorphosis. In this case even populations that metamorphosed early to escape acidic ponds would still be subject to stressful conditions in areas with acidic substrates.

Auten, Kelby "Yes Sir, She Can Tap: An Exploration of the Influence of Women In Tap Dance History" (Amanda Clark)

Tap dance is an indigenous, American art form with a rich history derived, greatly, from the dances of African slaves. While much of the evolution and development of tap dance has been attributed to males throughout the 20th century, preliminary research shows that women have also played a role in its history. The focus of my research is to examine the female role in the development of tap dance, compared to their male counterparts. This project has also allowed me to investigate how the expectations of women in the art have changed overtime opening the door for women to take on more serious work. During my investigation I had the opportunity to perform the choreography of four different female tap dancers. This research and experience has helped me to enhance my own personal artistry as a tap dancer along with broadening my historical knowledge of this art form. This presentation will document my findings and highlight the significant impact women have had and continue to have in the art form of tap dance.

Avery, Dustin; Senig, James "Potential Energy Models For Diatom and Atom Plus Diatom Molecular Systems" (Jeremy Maddox)

The molecular potential energy surface is a necessary component for essentially all theoretical studies involving chemical dynamics. In this work, we use a library of computer subroutines (POTLIB) and its Mathematica interface (POTLIB2Math) to construct a family of simple 1D potential energy functions for various diatomic and triatomic molecular systems. These parameterized models are useful representations for visualizing the energetics of chemical reactions. The models also serve as a set of well-defined toy problems that can be used to test new computational methodologies for simulating elementary reaction dynamics.

Bailes, Lauren; Lickenbrock, Diane "Examining Predictors of Paternal Sensitivity: The Role of Paternal Personality and Infant Temperament" (Diane Lickenbrock)

Parents play critical roles in their infants' social and emotional development (Zeifman, 2003). High parental sensitivity contributes to positive developmental outcomes, such as greater infant attachment security (De Wolff & van Ijzendoorn, 1997). Personality influences how parents respond to their infants; parents higher in neuroticism are more controlling and less responsive (Kochanska et al., 2004). Infant temperament can also contribute to parental sensitivity; positively reactive infants have more sensitive parents (Rothbart & Bates, 2006). Previous research examining these associations has been mixed and has primarily been done with mother-infant dyads; research with father-infant dyads is scant. The present study examined how paternal personality and infant negative reactivity contributed to paternal sensitivity in early infancy. The study involves 4-month old infants and their fathers, who are part of a larger, ongoing study. Fathers completed questionnaires to assess their personality (Carver & White, 1994) and their infant's temperament (Gartstein & Rothbart, 2002). Trained coders rated paternal sensitivity during a face-to-face play task (Tronick et al., 1978). Preliminary results from a subset of the sample (n=38 dyads) revealed that fathers high in BAS fun seeking decreased in sensitivity as infant negative reactivity increased.

Subsequent models will examine these associations in additional dyads.

Bailey, John “Language Proficiency Benefits of an Arabic Language Immersion House” (David DiMeo)

Study abroad has been celebrated as the pinnacle of language learning due to its immersive qualities. However, recent research has shown that students use their first language more frequently than intended during study abroad, rendering study abroad less effective than originally thought. This has caused institutions to develop new methods to immerse students in the second language. One of these solutions is to provide campuses with language immersion houses that mandate the use of a second language regularly. If demonstrated to be effective, more of these facilities could be incorporated on campuses nationwide. In order to determine the true effectiveness of language immersion houses, this research will utilize surveys that examine students’ proficiency levels and identify the different methods of language learning to reveal which of those increase proficiency most effectively. In order to quantify their proficiency, “ACTFL Can-Do Statements,” an internationally recognized measure of proficiency, will be used to measure the individual’s proficiency at the time the study is conducted. Furthermore, a review of related literature will be analyzed to pinpoint what qualities an immersion house must have in order to be successful for acquiring a second language.

Bal, John; Blair, Eric; Huffman, Kassie; Sweatt, Barry “DVT Prevention” (Joel Lenoir)

Deep vein thrombosis (DVT) is the dangerous formation of blood clots in veins in the human body, most commonly found in the legs but capable of breaking loose and moving to the lungs or brain. When a person is immobile for extended periods of time, such as sitting in an office chair or plane seat, the risk of a clot forming increases. Preventive measures such as medications, change of diet, and movement can be effective. The purpose of this project was to design, build, and test devices that would allow someone at risk for a blood clot to be able to move their legs in a variety of ways, while being confined to sitting for long periods of time. Each design would incorporate different forms of resistance and movement of the lower leg and feet. These devices are meant to be easy to assemble, using minimal parts in a combination of purchased or 3D printed. Our team has developed 4 different designs that we wish to test. With further testing we are determining which method is most effective for treatment of DVT.

Ballard, Chelsea; Polk, Jason; McClanahan, Kegan “Tracing Carbon In Karst Environments To Investigate the Geochemical Evolution Processes of Karst Aquifers” (Jason Polk)

In karst landscapes, the source, transport, and fate of carbon can help in the determination of carbon storage and release, contaminant transport, geochemical evolution of karst aquifers, global carbon budgeting, and changes in karst processes (evolution of caves). As water moves from the surface to subsurface through the atmosphere, soil, and bedrock of a karst system, carbon isotopes can be used to “fingerprint,” or track, carbon, as well as provide insight to the potential changes and storage of carbon over time. Over a ten-month period, weekly rainfall, soil water (using lysimeters at two different depths), surface well water (shallow and deep), as well as water samples from an interior cave waterfall were collected from an Crumps Cave in Kentucky. Samples were filtered, preserved, and analyzed for $\delta^{13}\text{CDIC}$ values. Geochemical data were collected for each sample in the form of pH, SpC, and temperature and discharge and amount of precipitation were collected at 10-minuted resolution. These data were analyzed to establish the sources of carbon and its movement through the epikarst groundwater system over varying seasons and during storm events, which helped to determine the major sources of carbon (soil, rock, etc.) and its flux through the karst system.

Baunach, Joshua “Choosing Software Metrics For Defect Prediction” (Huanjing Wang)

When software crashes, users are frequently given the option to send an “error report” containing important software metrics. Some metrics may be redundant and irrelevant, which can seriously extend the amount of time needed to build fault detection models. Fortunately, attribute selection algorithms can remove unnecessary attributes. In this experiment, a dataset containing software metrics for Eclipse was used. WEKA was used to create three new datasets containing the top five, ten, and twenty attributes of the original set by calculating the chi-square value of each software metric with respect to the class attribute. After that, various classification algorithms were used on both the reduced datasets and the original dataset to perform defect prediction. Although some classification algorithms performed slightly better on the full dataset than the reduced datasets, other classification algorithms performed just as effectively or slightly more effectively on the reduced datasets than the original datasets. These experiments show how attribute selection can be applied to the field of software engineering to determine which software metrics are most likely to cause errors in software. From this, an algorithm that combines feature selection and classification algorithms can be used to streamline the process.

Bedell, Benjamin “When They're Through With Their Work, They'll Be Out of Here Lightning Fast and That'll Be the End of Them” (Jerod Hollyfield)

In the film industry, filmmakers, specifically in the documentary genre, have come under fire for their ethics, or lack thereof regarding their projects. Robert Coles, author of *Doing Documentary Work* says, “the “real issue” is that of “attitude”: The observer’s manner of approach rather than substance of a specific agreement or commitment spelled out earlier” (Coles 76). Documentary directors, crewmembers, and the cast often spend many months and years making these documentaries building

an intimate relationship with one another, something that the audience rarely sees. It is very crucial for documentary directors to be transparent in their work. In this paper I will argue that documentaries such as “Hoop Dreams” and “Nanook of the North” abandon ethics for their productions, but with very different reasons “Nanook” to embellish scenes and “Hoop Dreams” to help the family and continue filming. However, documentarians have a responsibility to their subjects and audience to tell the truth because we are dealing with real people. By educating future documentarians to respect and protect their subjects, to inculcate a sense of responsibility to the facts for the viewers, and standing by their own artistic vision, ethical dilemmas can be alleviated thus allowing the filmmaker to make

Bellar, Claire “Carrie Nation: The Contradictions of Her Dissent Against the Shift From Traditional Gender Roles” (Anthony Harkins)

This presentation analyzes an important and surprising example of dissent from American History by focusing on Carrie Nation, a woman who committed her life around the turn of the twentieth century to the prohibitionist movement because of her deeply-held traditional religious and moral values. I compare her personal take on her religious crusade, especially in her autobiography the Use and Need of the Life of Carry A. Nation, with local and national newspapers, and place it in a larger historical context provided by academic scholars. Nation railed against not just alcohol but public drinking by women that she saw as undermining traditional gender roles. Yet she unknowingly represented the shift to modern gender roles by making an issue that had previously been localized instead national. Her use of symbolic violence including smashing saloons with a hatchet and her understanding of how to gain media attention through highlighting her public persona, ironically supported the entrance of women into the public sphere. I conclude that her dissent was made less effective by these tactics, because they were criticized by both the press and other prohibitionists, but that it also highlights the shift in gender roles from the nineteenth century to the twentieth century.

Bertram, John; Nee, Matthew “TiO₂ Embedded In PDMS - a Buoyant, Microstructured Photocatalyst” (Matthew Nee)

Organic pollutants contaminating bodies of water are an increasing concern, resulting in tainted water supplies and harmful environments for aquatic life. Photocatalysts, like titanium dioxide (TiO₂), speed up the degradation of organic compounds by harnessing ultraviolet (UV) radiation from sunlight to break down large pollutants into smaller, less harmful compounds like carbon dioxide (CO₂). Unfortunately, TiO₂ dispersed in bodies of water is difficult to retrieve, thus it is beneficial to embed TiO₂ on the surface of a material that can be exposed to sunlight and easily retrieved upon completion. To accomplish this, we embed TiO₂ particles in polydimethylsiloxane (PDMS) through an emulsion-curing process which results in hydrophobic, microstructured beads. Their high surface-area makes them ideal substrates for photocatalysis, while buoyancy is achieved due to their low density. Electron microscopy images and elemental analysis data reveal the successful implementation of TiO₂ on the PDMS surface. The degradation of methylene blue (MB), an organic-dye, exposed to UV radiation in water can be monitored using UV-visible spectroscopy. Quantitative measurements of MB degradation in the presence of TiO₂/PDMS beads are currently being conducted to determine the rate constant for degradation, confirming the increased degradation rate, and comparing TiO₂ load variations within PDMS.

Bhattarai, Indu; Gani, Nahid “Quantitative Geomorphic Analysis and Digital Processing of Aster Imagery In the Siwalik Foreland Basin, Nepalese Himalaya: An Investigation of Landscape Response To Neotectonics” (Nahid Gani)

The Himalaya, one of the active seismic zones, is undergoing continuous uplift and erosion followed by sediment deposition in the foreland basin in Nepal known as the Siwalik. The Siwalik is bounded in the south and north by two east-west trending thrust fault systems, Main Frontal Thrust and Main Boundary Thrust, respectively. Because of the active erosion and deposition of sediments in the Surai Khola section of the Siwalik, it is important to study the longitudinal profile of the rivers flowing in north-south direction perpendicular to these east-west trending faults. We integrate longitudinal river profile that preserves important information on tectonic signals, and the digital processing of ASTER satellite data to identify regions of active structures. Longitudinal profiles of the Surai Khola section are extracted and analyzed from 30-m resolution ASTER using quantitative stream power-law function in GIS. Our initial river profile analyses suggests presence of transient knickpoints along the faults separates areas of high and low uplift, and digital image processing of ASTER data provides evidences of unidentified faults, erosional variability and geological constraints in the formation of these knickpoints. Results of this integrated study would help comprehending the neotectonic deformation and adjustment of the Nepalese Himalaya.

Biddle, James; King, Rodney “Isolation, Characterization, and Comparison of Two Novel Bacteriophages” (Rodney King)

The purpose of this research project was to gain insight into the distribution and diversity of bacterial viruses, also known as bacteriophages, by comparing two phages that specifically infect *Mycobacterium smegmatis*. The novel mycobacteriophages, Biddle and Flare16, were isolated from two independent soil samples collected from Bowling Green, KY. The morphological attributes of the purified phage particles were examined by transmission electron microscopy and their genetic relatedness was determined by restriction analysis and gel electrophoresis of their double stranded DNA genomes. By comparing our results with the Mycobacteriophage Database, it appears that Biddle belongs to the K cluster of mycobacteriophages. Flare16

appears unique since it did not closely match anything in the database. These results show Biddle and Flare16 differ genetically, even though they were collected from the same geographic region. Our results are consistent with the hypothesis that the bacteriophage population is highly diverse.

Bidwell, Micah “Sustainability In Business” (Shahnaz Aly)

In the future of Western Kentucky University and all organizations what will be important is sustainability. I am designing an alternate plan for WKU’s new Business College as indicated in the Master Plan of WKU. Western Kentucky University will be constructing a new business college in the near future to better accommodate the faculty and students of the business discipline. The project goal in addition to the base parameters will be researching areas to make the building environmentally friendly and efficient in areas such as water conservation, solar energy and natural daylighting. The building will be four stories tall, 148,620 square feet, and on the corner Kentucky Street and 14th Street. It will have 29 classrooms, 300 seat auditorium, two 100 seat auditoriums, two MBA Executive classrooms, an Atrium, and a Café. I have been researching in these areas in order to produce a virtual building model demonstrate the results of my findings in sustainable architecture.

Biechele-Speziale, Dana; Jones, Kolton; Dovletgeldu, Seyitliyev; Gumus, Selahaddin; Er, Ali Oguz “Shape Memory Alloy Patterning On Niti Surfaces Via Laser Shock-Assisted Direct Imprinting” (Ali Er)

Shape memory alloys (SMAs) are a unique class of smart materials with the ability to modify their shapes with temperature and stress. SMAs are playing a growing role in supplying key actuation forces and sealing functions in oil and gas, automotive, aerospace and biomedical industries. Their ability to remain elastic under large deformation makes SMAs potential candidates for super-elastic devices in civil structures, and their super elasticity, remarkable corrosion resistance, biological and magnetic resonance compatibility and high bending resistance have already resulted in their implementation in biomedical devices. In this experiment, the surfaces of SMAs were patterned by laser shock-assisted direct imprinting. This approach is more simplistic and efficient than traditional indentation techniques, and has also shown to be an effective method in patterning these materials. Different laser energy densities ranging from 5 mJ/pulse to 56 mJ/pulse were used to observe recovery on SMA surface. The temperature dependent heat profiles of the NiTi surfaces after laser scribing at 56mJ/pulse show the partially-recovered indents, which indicate a “two-way shape memory effect (TWSME).” Further investigations are underway to improve the TWSME such that the indents are recovered to a greater extent.

Biggs, Austin “Conservatives v. Moderates: Baptist Culture Wars” (Tamara Van Dyken)

The principle question that this paper sets out to answer is that of the why the crisis of the 1960’s -1980’s occurred in the Southern Baptist Convention and why it culminated in the takeover of the denomination by a previously marginalized fundamentalist minority. The primary sources consulted were drawn from the collections of the Southern Baptist Convention Library and Historical Archive in Nashville, TN and included denominational publications, newspaper articles, conference sermons and personal correspondences. The secondary sources included works on the denomination crisis itself, works dealing widely with Evangelicalism, and works on the rise of the Religious Right. This paper finds that the forces that drove the denomination to crisis were a combination of the societal upheavals that the nation experienced in the post-World War II decades and the denomination’s coming to terms with itself as a denomination in the aftermath of a period of exponential growth in earlier decades. More specifically, these upheavals produced a cultural difference between the Moderates who had been at the helm of the denomination through its extraordinary period of growth and the fundamentalists who began to increasingly identify with the broader Religious Right movement even as they gained control of the denomination.

Bishop, Amber “Finding a Link Between Circadian Rhythms and the Immune System of Captive Zebra Finches (*Taeniopygia guttata*)” (Noah Ashley)

Circadian rhythms are commonplace in organisms and are normally controlled by a master clock. More recent evidence suggest that autonomous clocks operate in various systems in the body, including the immune system. In this study, captive zebra finches were used and exposed to different light and dark cycles and blood samples were taken every six hours. Birds were exposed to 12 hours of light and dark (LD), 24 hours of darkness (DD), or 48 hours of DD. After collecting the whole blood, RNA was isolated and RTPCR was utilized to assess the expression of cytokine genes. It is predicted that cytokine gene expression will exhibit rhythmicity in birds exposed to both LD and DD conditions. Alternatively, a lack of a rhythm in DD would suggest that activity of leukocytes is not controlled by an intracellular clock. This research has important implications for assessing biological rhythms in immunity and the effectiveness of different drug regimens depending upon the time of day they are administered in humans.

Blackshire, Michael “Their Eyes Were Watching Brooklyn: Cinema’s Use of Racial and Social Issues In Brooklyn and How Gentrification and Appropriation Define a Borough” (Jerod Hollyfield)

“Brooklyn, the fourth largest city in the United States, has recently become an excellent place to study for researchers with a special interest in the issues of diversity, mobility, and gentrification” (Desena 250). When Christopher Wallace said “live from Bedford Stuyvesant, the livest one, Representing BK to the fullest,” he was speaking on a particular section of Brooklyn that’s a majority African American. The borough of Brooklyn is a vastly diverse section of New York City, with each

neighboring section having a different racial demographic from the other. Neighborhoods such as Dumbo are more financially renowned than the Marcy housing projects and Bushwick neighborhoods. Spike Lee and Woody Allen in particular show two different sides of the borough of Brooklyn, which is of a Jewish culture and mostly prominent African American demographic. My paper will argue how neighboring sections of the borough translated into each director's films, and how each community dictated the movies narrative. The paper will also examine and argue Spike Lee's loquacious soliloquy against gentrification in current day Brooklyn and examine the reasoning behind Woody Allen consistent lack of vast minorities in his films centered on Brooklyn while still representing one particular minority group.

Blanchette, Matthew "You Look...Interesting': Consumers Meet a Growing World of Independent Cinema" (Jerod Hollyfield)

Nielsen Media Research shows that within the last sixteen years, viewership of major television broadcast networks has dropped nearly 20%. This decrease in broadcasting effectiveness is commonly attributed to the replacement of conventional broadcasts focused on mass appeal with new niche-driven, internet-based platforms. This phenomenon has become inversely known in the broadcast industry as "narrowcasting." Primarily, narrowcasting has been made possible through advances in technology that allow users to access their favorite content more conveniently, as well as reduce creators' costs to production equipment and online video databases. Narrowcast distribution models have significantly affected the broadcast industry and its associated job markets. Broadcast, however, is not the only media-based industry affected by advancements in consumer technology. Hollywood and big-budget film distribution is also experiencing similar trends. Moviegoers are increasingly resorting to more convenient forms of viewing as provided by mobile technology and internet steaming platforms such as Amazon and Netflix. In this paper I argue that advancements in consumer technology and increased cultural integration and expectations for content control is prompting the rapid formation and expansion of narrowcast markets which will provide huge opportunities for smaller independent cinema productions to effectively fill growing demands on niche and scattered platforms.

Boone, Lauren "Poster Design: Exploring Methods and Materials" (Matt Tullis)

When asked to incorporate an important figure as the focal point of your work, the challenge lies in unearthing the tiny details and lesser-known facts and using that information to create an image in a way no one ever has before. I knew I wanted to feature an individual who was visually striking but also had a unique personality. Aldous Huxley, author of fantasy novels such as *Brave New World* and *The Doors of Perception*, is notable not just for his literary presence but also his interests. Huxley devoted his life to the pursuit of knowledge, specifically human behavior and the boundaries of consciousness, seeking his answers in the ancient texts and research of Eastern religion. The aim of the design was to balance equal parts handmade and computer crafted work. The use of walnut ink for the main stencil created a beautiful earthy, billowing effect, perfectly complimenting the weathered paper texture of the background. Key areas of concentration were the composition, theme and variation, texture and handcrafted quality of the design. The use of faint, indiscernible patterns and imagery support the idea of exploring consciousness, leaving the viewer wondering what exactly they are seeing.

Bottles, Savannah "Shared Spaces" (Sheila Flener)

The concept of this design was inspired by the need for rehabilitative and directional centers in High Point, North Carolina. Upon research, it was discovered that there is an increasing drug issue in the High Point community. Many initiatives have been taken by local officials to attempt to fix this problem; however, it seems to still be an imposing threat. This design will create a space for members of the interior design community, to gather in a calm, productive environment where they can design facilities designated to solve these issues. The environment of the space will encourage involvement and creativity. Working together, students and professionals will have a common goal and build a sense of community, and it is intensified by peer-to-peer situations. It is always helpful for students to learn from professionals and vice versa. These interactions ensure that tasks will be done correctly, while simultaneously utilizing new design concepts.

Boudreaux, Scott "Comparison of Shoulder Torque Production In Make-and-Break Tests As Performed By DPT Students Using a Hand-Held Dynamometer" (Kurt Neelly)

Purpose: This study investigated whether there was a difference in torque output between make and break manual muscle tests (MMT) as measured by DPT students using a handheld dynamometer. There is limited research demonstrating a difference in torque production between these two tests and none utilizing DPT students as the examiners. Subjects: 25 healthy adults ages 18-30 with no reported shoulder pathology. Methods: Shoulder flexion, abduction, and extension make and break MMT were performed on the dominant upper extremity in a randomized fashion. Results: Pilot testing revealed the student examiner was reliable across all shoulder MMTs, (ICC \geq .963). Paired sample t-tests revealed significantly greater ($p \leq .05$) torque production in the break MMT compared to make MMT for all shoulder MMT. Conclusion: Shoulder torque produced by the break tests were significantly larger than the make test for all positions. The findings of greater shoulder torque production from the break MMT compared to make MMT needs to be considered in clinical environments. The break test requires isometric and eccentric contractions while the make MMT relies on concentric contractions to produce torque. Additionally, DPT students can be reliable when using a handheld dynamometer.

Bowers, Isaac “The Severe Weather Outbreak of March 2, 2012: An Analysis of Remote Sensing Techniques” (Joshua Durkee)

Given the important utility of radar and satellite technologies in meteorology, it is important to identify and recognize the advantages and disadvantages of both when conducting investigative analysis. This case study identifies shortcomings via remote sensing re-analysis of the severe weather outbreak of 2 March 2012 using multiple sources of remote-sensing data. Methods to reduce these shortcomings are also discussed. In this study, although dual-polarization radar data was not available, radar technology served well. However, most of the problems inherent with radar technology were eliminated by site selection and volume coverage patterns. Neither of these eliminated the problem of features passing between two sites into areas with poor resolution. Satellite technology also served well, although archived satellite sounding data was not readily available and certain satellite imagery could not identify some atmospheric circulation features alone in this case. The spatial resolution of satellite technology was also unsatisfactory for mesoscale (local) features. In conclusion, proper satellite and radar utility requires tandem analysis to achieve highest possible accuracy, while both applications rely strongly on in situ observations for confirmation.

Bowins Hardy, Jamye “Benefits of Regular Volunteerism For Undergraduate Students” (April Murphy)

Several research studies have concluded that volunteerism positively impacts undergraduate student outcomes. This study explores the perceived benefits of regularly volunteering while pursuing a bachelor’s degree. Electronic surveys were sent to students who volunteer on a regular basis through campus student organizations at Western Kentucky University. a quantitative approach was utilized to collect data on student’s perceived benefits of volunteering on a regular basis in regards to these three categories: academic engagement and achievement, community awareness and involvement, and preparation for the work force. This study concludes with data that universities can use to promote regular volunteerism and its benefits to current students who are not actively engaged in service.

Bravenec, Rachel “Zarzuela: North America's Lost Performance Genre” (Liza Kelly)

Western Kentucky University students are exposed to and given performance opportunities in a number of different vocal performance genres such as Opera, Art Song Recitals, and Musical Theater. One genre that is missing from the WKU curriculum is Zarzuela, a Spanish genre that incorporates operatic and popular song as well as dance. While very popular in Spanish speaking countries around the world, American audiences and performers remain relatively unaware of Zarzuela. Therefore, our participation in the 2016 REACH Week Conference will be as an Outreach Education project: to introduce Zarzuela history and performance practice followed by a live performance. Our methodology of creating the curriculum for the presentation is from an international FUSE Grant research project. This research enabled five WKU music students to receive intensive specialized training while in residence with a professional Zarzuela company in Quito, Ecuador. The result of presenting our Zarzuela Outreach at the conference will facilitate the exposure of the WKU Community to an international vocal performance genre that is not available at American Universities and bring awareness to music outside of the traditional classroom curriculum. Discussion may then ensue of the accessibility, viability, and necessity of Zarzuela within the United States.

Brindley, Charlotte “The Hite House: Blood, Decay, and Jesse James” (Timothy Evans)

This research examines the history and architecture of the Hite House, a 19th century farmhouse located outside of Adairville, Kentucky, and its historical connection with Jesse James and the James-Younger Gang. The aim is to find primary evidence of James’s presence at the homestead and to consider the significance of the structure to local Adairville history. The research stems from different angles of James’s presence at the home, including the examination of primary sources, popular culture references to the Hite House, and on-site documentation of the physical structure. There is also an emphasis on how the Hite House was built and its poor condition, to demonstrate the need to save the structure from collapse. The research reveals a strong historical connection of the Hite House to Jesse James, and illustrates that the home is not only prominent to local Adairville history, but also the larger scope of American history and could possibly bring the small community to prominence. The investigation also emphasizes the integrity of the Hite House as a vernacular structure, and that the swift rotting of the home should encourage the Adairville community to take initiatives to save the physical proof of Jesse James in their area.

Brindley, Hamilton “A Cultural Center & Town Hall: To Propel Adairville, Kentucky's Revitalization” (Shahnaz Aly)

This project was centered on designing a cultural center and town hall for Adairville, Kentucky. Once a thriving small town, both in terms of culture and capital production, Adairville has been gradually deteriorating for over half a century, and many of its once identifying features have been lost. It is hoped that the architectural design of the cultural center and town hall will be the spear point in propelling the much-needed revitalization for Adairville. Research was conducted throughout this project, some of which being: The history of the town, studies of the town’s vernacular architecture, and research on sustainability methods and international building codes. a focus with the design process was to make the structure and its

proportions contribute to the town square's vernacular character. The result was a design that represented the best of the town, which was achieved by taking inspiration from the community's past, considering its present, and designing for its future. This project has the capability to be extremely impactful on the city of Adairville being a model of beautiful, logical, durable, and sustainable design for future development, and will hopefully become the heart of the town, and the pride of the community.

Brislin, Alex “Virtual Reality: A Film Making Tool Or Destruction of an Art Form” (Jerod Hollyfield)

This year's Sundance's Film Festival experienced an explosion of virtual reality films in the “New Frontier,” a category of future cinema. This includes a documentary called *Collision* (2016) and a narrative called *Perspective* (2016). In my paper I argue, virtual reality based on content from *Oculus Rift* and other virtual reality technologies is not an effective form of thematic expression due to freedom of viewing. When referring to cinema Rudolf Arnheim wrote, “Art begins where mechanical reproduction leaves off, where the conditions of representation serve in some way to mold the object.” Cinema is controlled on multiple levels by the film maker. a film maker's shot selection can manipulate the audience's perception of the narrative and characters in the film. In contrast Simon Ings argues virtual reality is an exciting advance in narrative perspective which generates new film making techniques to allow the audience to choose what they see. However, if a film maker allows the audience viewing freedom they lose manipulation of the film and limit artistic influence. Virtual reality lacks structural elements created by the filmmaker such as, cuts, close ups, or camera techniques. In turn thematic elements imposed by the filmmaker will be lost.

Broder, Brittany “The Rise of Nuclear Energy In Arab States: Future Impacts” (David DiMeo)

Despite the landmark nuclear agreement with Iran signed in 2015, the growing role of nuclear power in the Middle East and North Africa (MENA) region will continue to raise societal and environmental concerns. With growing energy demands and heightened environmental restrictions, not only Iran, but Arab countries like the United Arab Emirates, Saudi Arabia, and Jordan are turning to nuclear power to fuel their next generation. As countries in the MENA region seek nuclear power, they have the opportunity to utilize new reactor designs and techniques that could shape the future of nuclear energy. This presentation seeks to explore the societal impacts by analyzing job growth associated with such a large scale project and the advancement of education in response to the new industry. Additionally, this research explores the scope of the challenge posed by nuclear waste and offers a solution in the form of advanced reactor designs and radio-isotopic thermal generators, the latter of which is theoretically explained in-depth as a next step towards successful implementation of nuclear power in the region.

Brooks, Connor; Galloway, Michael “Autonomous Control of an Indoor Micro Aerial Vehicle Using a Multi-Layer Architecture” (Michael Galloway)

This project investigates the potential for autonomous micro aerial vehicle (MAV) use in indoor settings. Such settings provide challenges over outdoor MAV or drone usage due to increased local obstacle occurrence and the requirement for precise movement with little room for error. Autonomous control of MAVs in indoor settings must take into account these restraints and provide precise control, including obstacle avoidance. In this project, we work to create an indoor autonomous MAV using a multi-layer architecture with modular hardware and software components. We use a three-layered system that combines a modular control architecture with distributed on-board computing to allow for fully abstracted layers of control, allowing the individual development and testing of layers. We implement each layer individually, resulting in increasing autonomous functionality for the MAV. We require that all computing is done on-board the vehicle during time of flight so that no remote connection of any kind is necessary for successful control of the vehicle, even when flying autonomously. We utilize environmental sensors including ultrasonic sensors, LIDAR, and IMUs to acquire necessary environment information for autonomous flight. Experimental results demonstrate implementation capabilities including autonomous hovering, obstacle avoidance, and limited navigation.

Brown, Audrey; Ashley, Noah “Disruption of HPA-Axis Function In Fetal Development Alters Endocrine Responses To Stress Throughout Life” (Noah Ashley)

The Hypothalamic-Pituitary-Adrenal (HPA) Axis controls stress responses through hormones called glucocorticoids (GCs). Via a negative feedback mechanism GCs regulate their own production by binding to the glucocorticoid receptor (GR), which acts back to inhibit GC release. HPA axis responses can be altered by early life events leading to changes that persist throughout life. This dysfunction has been linked to later life consequences, including psychiatric and metabolic disorders, but it is poorly understood how. I hypothesize mice exposed to high levels of GCs embryonically will have altered stress responses during adulthood characterized by high GR expression. If mice exposed to higher GC levels intrauterinely are unable to decrease GR expression in response to GCs in adulthood, this could more dramatically inhibit the production of GCs, a hormone important in reducing inflammation. Pregnant female mice will be sleep deprived for 24h. The resulting pups and control pups will be raised to adulthood, sleep deprived in the same manner, and euthanized. Tissue samples will be taken from the brain and periphery, and RT-PCR will be run for GR expression. I expect that mice born to sleep deprived mothers will have significantly higher levels of GR after SD compared to control mice.

Brown, Cade; Yager, Edward “On Liberty: Mill's Time At Westminster” (Edward Yager)

There is an ongoing debate concerning John Stuart Mill's credentials as a consistent feminist. Some scholars read elements of the Subjection of Women as Mill's illiberal, anti-feminist concessions to the realities of paternalistic, Victorian Era England—others disagree. This debate scrutinizes a single work of Mill but impacts how we understand Mill's entire philosophy and, subsequently, Mill as a historical figure. This project broadens the discussion by (1) considering *On Liberty*, another prolific work of his and (2) comparing its maxims to Mill's three year tenure in the British House of Commons. Archival research of Mill's personal papers in London allowed me to hold the speeches, petitions, votes, and correspondence of Mill accountable to *On Liberty*'s demands for (1) an eagerness to engage with opposing viewpoints, (2) a willingness to compromise, and (3) an inclination to renounce partisanship on contested issues, to better assess Mill's consistency. Were the actions of John Stuart Mill the politician consistent with the writings of John Stuart Mill the philosopher? Since Mill prioritized women's suffrage at Westminster, redirecting the “consistency” debate to his time in Parliament will also address Mill's feminist bona fides.

Brown, Connor “Circadian Rhythms of Gene Expression In *Chlamydomonas*” (Sigrid Jacobshagen)

Chlamydomonas reinhardtii is a microorganism that has been used as a model to study the circadian clock. The circadian clock is an internal timer that, among other things, regulates the expression of some genes. The intent of this research is to study whether particular genes in *C. reinhardtii* show circadian expression using qPCR as a technique. The microorganism was first grown under 14 hour light/10 hour dark cycles and its RNA was extracted. Control experiments demonstrated that the known rhythms for the LHCBM6 and JMJD6 genes could be detected. Highest mRNA amount for LHCBM6 was in the middle of the light period whereas for JMJD6 it was at the end of the dark period. After designing primers for the RACK1 gene, it was found that the mRNA amount stayed relatively constant. Future experiments will study whether the expression of genes related to the flagella show a circadian rhythm. These studies on flagella may also relate to human cilia because they are structurally the same.

Brown, Joshua; Crandall, Jason; Olenick, Alyssa; Schafer, Mark; Lyons, Scott; Falls, Dustin “Workstations For Improving Workplace Physical Activity and Sitting Time” (Jason Crandall)

Purpose: To determine the effectiveness of using sit-stand workstations and a shared treadmill desk without a behavioral intervention. Methods: Participants (N=15) were assigned to an experimental (sit-stand workstation and treadmill workstation; n=8) or control group (n=7) for seven weeks. To measure workplace physical activity and sitting time, the International Physical Activity Questionnaire long form was given at the beginning and end of the investigation. Daily footsteps and physical activity hours were measured by activity trackers (Fitbit One) worn by the participants. A mixed between-within subject analysis of variance was used to compare groups ($p < .05$). Findings: There were no statistically significant between-group differences in the dependent variables. No group by time interactions for MET-minutes/week spent in walking, $p = 0.211$, or group by time interactions for participants' daily footsteps, $p = 0.298$, were found. Conclusion: Workday sitting decreased 61% in the experimental group, while increasing 8.3% in the control group. The mean number of footsteps taken (8897.25) was well above the recommended >5000 steps/day. Because no attempt was made to promote use of the equipment, health education may be needed, along with a larger sample size to detect significant increases in workplace physical activity and reductions in sitting time.

Brown, Katherine; Gani, Nahid “Tectonic Activities on Mars: An Analysis of Faults In the Valles Marineris Graben System” (Nahid Gani)

Valles Marineris on Mars is the largest graben system within the solar system. Despite a number of research on structures adjacent to this graben have been conducted, the complex strike-slip faults remain poorly understood. This study involves an analysis of fault structures, particularly en echelon faults, on the plateau of Valles Marineris to give insight into past tectonic activity on Mars. The purpose of the study is to investigate the existence, distribution, orientation, geometry and dynamics of these faults. Martian satellite imagery from JMARS, Google Mars and MOLA digital elevation models in a GIS platform is analyzed for instances of en echelon fault pattern on the Valles Marineris plateau. Hillshade images, three-dimensional models, scatter plots and rose diagrams are generated for analyzing and quantifying the structures including orientation, length and width, and lateral extent and offsets. Results of this study show the presence of large number of en echelon faults that form overlapping zones. The majority of these faults are north-south, and some east trending following the general east-west strike of the graben. Most of these faults might form from linkages of the overlap and relay zones. Thus, the presence of these faults provide indication of past strike-slip activity on the plateau of Valles Marineris.

Brown, Rebecca “Understanding Blazars With Space Based Optical Variability Studies” (Michael Carini)

Blazars are extreme examples of the Active Galactic Nuclei (AGN) phenomena. The blazar class includes BL Lacertae (BL Lac) objects and flat spectrum radio quasars (FSRQ). Blazars are defined by continuum variability at all wavelengths on timescales of minutes to decades. We report on the current status of our program to characterize the rapid optical variability of a sample of infrared and optically bright blazars with NASA's K2 mission. The K2 mission, through its superb

photometric precision and ability to continuously sample light curves on timescales of minutes to months, provides unrivaled information on blazar variability. In its previous incarnation as the Kepler mission, it uncovered rich and complicated variability in blazars down to the most rapid timescales sampled. Our K2 sample is a unique set of blazars with light curves sampled on timescales not possible with ground-based observatories. We are using K2's unique capabilities to determine flare timescales and frequency, which set limits to the size of the emitting region, determine the shape of any observed flares, which provides information on the process responsible for the flares, determine the shape of the power spectral density (PSD), which yields characteristic variability timescales and constrains characteristic emitting region sizes.

Brown, Trevor; Howard, Dylan; Patel, Darshan; Lackey, Thomas; Ahmad, Saad; Do, Manh “An Educational Vertical Cloud” (Michael Galloway)

The educational vertical cloud architecture, tentatively known as TopperCloud, is a cloud-based computing service that allows students to access their own virtual machine through the TopperCloud web interface. TopperCloud will allow the students to work on homework assignments in an environment with the appropriate software and a small amount of personal storage to save their assignments to be graded by professors. TopperCloud will be free and accessible by all WKU Computer Science students. The students will be able to login to the web interface, check their announcements, find the contact information for professors, and launch their cloud computer all from a simple dashboard. Professors will be able to monitor student activity on the virtual machines, collect assignments by accessing student personal drives, send announcements, and post important dates for the students to remember. Administrators will be able to modify anything the professors can, in order to regulate for abuse. Also, the administrators will be able to view all VM activity and modify current VM connections. TopperCloud was developed initially with the capability of launching and delivering VMs to users, but lacked a storage option. Further development will incorporate storage and improved performance.

Brumley, Jacob; Lienesch, Philip “Changes To the Fish Species Diversity of the Middle Fork of Drakes Creek Over 40 Years.” (Philip Lienesch)

Within the Middle Fork of Drake's Creek in south-central Kentucky, humans have been settling and manipulating the landscape for centuries. The manipulation of the lands within watersheds of rivers and streams is an enormous issue for conservation biologists, who are interested in the impact on aquatic diversity. This study is an extension of a survey done in the Middle Fork of Drakes Creek in 1972 by David Bell and Robert Hoyt. We resampled the same reach of river examined by Bell and Hoyt to determine if there has been any change to the species diversity of fishes over the past four decades. Fish samples were taken at three stations: upstream, midstream, and downstream. The sampling was conducted seasonally, which differs from the original experiment where fish were sampled every month. The fish were identified to species and the relative abundance calculated. Species of the family Cyprinidae remained the most abundant, as seen in the prior study, composing approximately 80% of the collection. Most of the species not collected in the later sampling had been rare.

Brummett, Travis “Cloud Middleware” (Michael Galloway)

Cloud Computing is a rapidly growing branch of distributed computing. a vertical implementation of a cloud architecture could be used to replace a traditional computer lab within an educational setting. However, to do this the architecture requires a middleware that can communicate across nodes. This paper discusses a middleware developed in Python that uses sockets to communicate between compute nodes and the head node within such an architecture. Specifically, the middleware uses a socket connection between a client program installed on the head node and server programs installed on each compute node to poll the compute nodes for information. It then uses that information to carry out a load balancing algorithm that checks the available resources on each compute node and starts a virtual machine (VM) on the node with the most available resources. This paper will discuss in detail how these functions are accomplished.

Bruns, Brody; Murray, Thomas “Exploring the Complexities of Developing a Smart Home System” (Jeffrey Galloway)

The mobility and versatility of modern computers has sparked a transformation in how consumers interact with common household objects. We are now able to use mobile devices to control and receive information from appliances that were previously very simple to operate. This project will explore the complexities involved in the development of a System of Smart Devices. In order to gain insight into the implementation of a Smart Home Hub, our group previously designed and created a simulated Smart Home System with a Raspberry Pi acting as the central hub. To simulate the input and output of common smart appliances, we utilized a module called the Sense HAT (Hardware on Top) which consists of a LED matrix and several sensors. Using this system, we were able to simulate the functionality and control of multiple smart devices. For the next phase of this project, we have begun connecting real smart devices to our Raspberry Pi Hub. By the conclusion of this project, we will have a working Smart Home Hub that users can connect common smart devices to and control them using a mobile interface of our design.

Bubnis, Michelle; Crandall, K. Jason; Schafer, Mark; Grieve, Fredrick “Body Image Comparisons Between High Intensity Functional Training and Traditional Strength Training Participants” (Jason Crandall)

Muscle Dysmorphia (MD) is characterized by preoccupation with muscularity. Training environment may influence the clinical features of MD. The purpose of this study was to compare MD symptomology in traditional strength-trained (TRAD) individuals to individuals training in communal high intensity functional training environments (HIFT). Volunteers were recruited from both types of facilities. Participants (N=376) completed online (Qualtrics) demographics survey and Muscle Dysmorphia Inventory (MDI). One-way ANOVA compared the effect of training environment on MDI scores among HIFT, TRAD, both HIFT and TRAD (BOTH), home gym (HOME), and "OTHER." Training environment significantly affected MDI for the 5 environments [F (4, 345) = 3.765, p = .005, d = 0.737]. Mean score for TRAD (M = 111.73, SD = 20.39, [107.78, 115.68]) was significantly higher than HIFT (M = 102.20, SD = 19.59, [99.17, 105.23]). MDI for BOTH (M = 107.06, SD = 18.01, [100.77, 113.34]), HOME (M = 108.89, SD = 22.80, [99.86, 117.90]), and OTHER condition (M = 108.19, SD = 22.43, [97.97, 118.40]) did not significantly differ from HIFT or TRAD. Participants with greater MD symptoms prefer TRAD; potentially facilitating and perpetuating MD symptomology. Results may provide knowledge for creating optimal treatment programs for individuals with clinical MD.

Buchholz, Matthew; Dick, Carl "Host-Parasite Associations of Small Mammal Communities: Implications For the Spread of Lyme Disease" (Carl Dick)

Many zoonotic diseases are maintained in the environment by small mammal reservoirs and vectored to new hosts by ectoparasitic arthropods. While ecological relationships between small mammals and their ectoparasites are important to these dynamics, little is known about them across much of North America. The goal of this study was to examine these relationships in South Central Kentucky and gain insight into the relative paucity of Lyme disease in Kentucky. Small mammals were captured using live traps in three 50x200m trapping grids within WKU's Green River Preserve from November 2014-October 2015. Captured small mammals were identified to species and standard measurements were recorded. Ectoparasites were removed and retained for identification. Collected blood was examined for *Borrelia burgdorferi*, the causative agent of Lyme disease, by polymerase chain reaction. Parasite infestation was low but was affected by age, sex, habitat, and season in different parasite taxa. Infestation by *Ixodes scapularis*, the primary vector for *B. burgdorferi*, was uncommon and prevalence of *B. burgdorferi* in blood was low compared to the Lyme disease hotspots of New York and Wisconsin. These findings provide the ecological insights into the relative lack of Lyme disease in Kentucky.

Burbage, Jauan; Sharma, Nilesh; Tiwari, Manish "Physiological and Molecular Evaluation of Titanium Dioxide Nanoparticles Toxicity In Tomato (*Solanum esculentum*)" (Shivendra Sahi)

The commercial use of engineered nanomaterials has increased dramatically in recent years. Engineered nanoscale materials such as titanium dioxide nanoparticles (TiO₂) are used in a wide range of consumer products, paints, sunscreens and cosmetics. The main concern with increased applications is the subsequent release of TiO₂ in natural water channels and water bodies. In this study, a detailed physiological and molecular examination of the effect of TiO₂ on *Solanum lycopersicum* was carried out. The variable response of TiO₂ on growth was observed as low concentration enhanced the biomass whereas high concentration inhibited plant growth which was supported by photosynthetic parameters. The redox related enzymes such as catalase and peroxidase activities were elevated in concentration dependent manner. The induced expression of glutathione synthase and glutathione S-transferase indicates a promising role of thiols in cellular detoxification of TiO₂ in tomato. The elemental analyses suggest that TiO₂ largely affected the distribution of essential elements in different plant parts. Our results clearly demonstrated the negative effect of high concentration of TiO₂ on overall growth performance of tomato. We also show a differential accumulation of Ti in different plant parts that may enter in edible fruit, and could be a route of Ti exposure to consumers via biological magnification.

Burns, Rachel; Haynes, Callie; Ambush, Ahuva "Signing With Children With Down Syndrome" (Janice Smith)

The purpose of this study was to identify evidence based practices for signing with children from birth to five years with Down syndrome (DS), and to compare findings with strategies used by Speech Language Pathologists (SLPs) working with this population. The methods of this study were to complete a literature review examining effective techniques of signing and development and distribution of a survey to 27 SLPs regarding their approach to signing with these clients. The results of this investigation showed that SLPs surveyed utilized three techniques proven to be successful: modeling (Wright et al. 2013), physical prompting, and reinforcement (Thompson 2007, Normand 2011). Most significantly, displaced signing (signing in the child's signing space), was used by only 42% of respondents but may be the most effective strategy based on published evidence (Clibbens et al. 2002). Finally, 67% reported drawing the client's attention to the sign, which would not be advised considering attention deficits of children with DS and the importance of maintaining joint attention for language development (Harris et al. 1997). Findings indicate further research is warranted to determine the efficacy of displaced signing, as well as the need to establish best practices for signing with children with DS.

Byerly, Heather; Houle, Jean-Luc; Makarewicz, Cheryl "Ritual and Mobility: ⁸⁷Sr/⁸⁶Sr, $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ Analyses Comparing Modern and Bronze Age Khirigsuur Horses From Khanuy Valley, Mongolia" (Jean-Luc Houle)

Khirigsuurs are large stone burial and ritual monuments that served as stages for group activities and social negotiation during the Late Bronze Age (c. 1300-700 BC) in Mongolia. Animal remains were routinely interred in satellite mounds

associated with primary burial features, in particular the heads and extremities of horses, and often in great numbers. The question remains, however, whether horses selected for interment in khirigsuur satellites were from local or distant herds. Here, we examine the strontium, oxygen, and carbon isotopes of incrementally sampled mandibular molars from horse heads ritually deposited in khirigsuur complexes located in Khanuy Valley. We then compare these isotopes with those from modern horse molars collected in the same valley. Such isotopic data provide first insights into the complexity of social and political networks involved with khirigsuur construction and maintenance.

Campbell, Jennifer; Oakes, Bethany; Adam, Hanady; Wilkerson, Chad; Emani, Chandrakanth “Plant Extracts As Alternative and Integrative Treatment Options For Cancer” (Chandrakanth Emani)

Ocimum sanctum (basil), *Zingiber officinale* (ginger), *Azadirachta indica* (Neem) and *Nicotiana tabacum* (tobacco) are storehouses of plant-based pharmaceutical chemicals that are potential alternatives to traditional cancer treatments due to their chemopreventative and anti-carcinogenic properties. The overall goal of this project is to characterize the effects of the plant extracts both individually and in synergistic combination on cancer cell viability, progression and metastasis. Initial screening was done of a variety of cancer cell lines including: colon cancer (HT29), cervical cancer (HeLa), and lung cancer (A549) cell lines. Changes in proliferation of these cell lines was assayed using an established tetrazolium compound [3-(4,5-dimethyl thiazol-2-yl) -5-(3- carboxy methoxy phenyl) -2- (4-sulfophenyl) - 2H-tetrazolium, inner salt (MTS) technique with basil leaves. Preliminary results suggest that all plant extracts reduce cell proliferation in all cancer cell lines tested. We observe clear differences in the proliferation response that varies depending both on specific plant extract as well as the type of cancer cell line assayed. Ginger has a global cytotoxic effect on all cell lines tested. All four plant extracts show cytotoxic effects on leukemic and breast cancer cells.

Canada, Jessica “Tipping the Scales: Is Right-To-Work Legislation Your Right To Prosperity?” (Brian Strow)

With West Virginia on the verge of passing right-to-work legislation, and on the verge of becoming the twenty-sixth state to do so, the U.S. labor relations movement is at a tipping point. Other policy makers are closely analyzing relevant studies to determine whether passing similar legislation could improve economic projections for their states. Many supporters of right-to-work legislation claim that right-to-work states experience greater economic growth and higher employment rates than non-right-to-work states. Those who oppose right-to-work legislation claim that it leads to greater income inequality by weakening union bargaining power, ultimately resulting in lower wages for the middle class. My thesis will examine these claims using panel data taken for both right-to-work states and non-right-to-work states for a period extending before and after each state’s policy decision. I expect further analysis of the data to show that right-to-work legislation has a positive impact on a state’s economic growth rate and employment rate when compared to the state’s rates prior to the policy change. I will use econometric modeling to analyze the overall impact of right-to-work policies on states’ economic output, per capita income levels, union density rate, employment levels, and degree of income inequality.

Cannady, Leah; Hoover, Don; Stinnett, Brad “An Assessment of Scholastic Basketball Training Facilities: Size, Equipment, and Management” (Don Hoover)

The purpose of this study is to provide a statistical snapshot of basketball training facilities in Kentucky and contiguous states in terms of size, equipment, and management. Additionally, this study aims to collect measures of perceptions regarding strengths, weaknesses, opportunities, and threats associated with these types of facilities at the interscholastic level. Descriptive research techniques will be employed to ascertain statistics to summarize, organize, and simplify data. An electronic survey instrument has been developed and several specific procedures are in place for the data collection phase. In this study, data will be collected from the entire population of Boys and Girls Head Basketball Coaches in Illinois, Indiana, Kentucky, and Tennessee—approximately 3,800 potential participants. Recruitment procedures consist of an invitation to participate and follow-up correspondence. An incentive of a one-year “dues bonus” toward annual state high school athletic association membership will be offered in an effort to increase participation. This foundational study will contribute to the field of interscholastic athletic administration and coaching by creating benchmark data. Findings obtained from this study will provide an assessment of basketball training facilities relative to size, equipment, and management and could potentially aid administrators in comparing their respective facilities against their industry peers.

Capps, Nicole “Escape Reality” (Shahnaz Aly)

I would like to provide a space for families and friends to come together and enjoy their time away from their busy lives and escape reality for a while. Family fun centers have the ability to bring together all ages and put a smile on faces. The research undertaken was to analyze how important family fun centers are to a community and its members. The family fun center will be designed with both modern and sustainable aspects that new technology has provided us with, and will hopefully inspire other elements of a community to become more sustainable and modern. This family fun center will provide the opportunity to bring together members of its community, interaction, and create a greater bond for families. For this family fun center I wanted to stray away from what a traditional family fun center would look like and make the structure more eye-catching and whimsical. The family fun center will not only be aesthetically pleasing, but sustainable and a place for all age groups.

Carrizosa, Sara “Hybrids of Cobalt Oxide Polymorphs On Graphene-Related Materials: High-Performance Supercapacitors and Enzymeless Glucose Detection” (Sanju Gupta)

In this work, strategies for the fabrication of cobalt oxide/graphene hybrid nanostructures are developed to create tailored interfaces for enhanced electrochemical and electroanalytical properties. Nanostructure engineering and electrochemical deposition is demonstrated as an effective approach to improve the electrochemical performance as hybrid supercapacitive electrodes. Employing a simple hydrothermal procedure and electrodeposition techniques followed by thermal treatment, cobalt nanoparticles (CoNP) and cobalt oxide polymorphs such as CoO and Co₃O₄ nanostructures were in-situ synthesized on two- and three-dimensional graphene nanosheets. The structure and morphology of the resulting covalent graphene/cobalt hybrid composites were characterized by electron microscopy, X-ray diffraction and Raman spectroscopy. The graphene/cobalt hybrid composites were investigated as asymmetric supercapacitor cathodes and as electroanalytical platforms for enzymeless detection of glucose.

Carroll, Amber; Brickeen, Xavier; King, Rodney “Isolation and Characterization of Novel Mycobacteriophages Baehexic and Ruin” (Rodney King)

The Genome and Discovery Exploration Program seeks to gain insight into the diversity of the mycobacteriophage population. Using *Mycobacterium smegmatis* as a host, bacteriophages Baehexic and Ruin were isolated from soil samples collected from Auburn, Kentucky and Bowling Green, Kentucky, respectively. Electron microscopy of the purified phage particles revealed that they share a similar morphology. To determine their genetic relatedness, the genomic DNA of the phages was isolated, purified, and subjected to enzymatic digestion and gel electrophoresis. The comparison of the restriction patterns to the Mycobacteriophage database suggests that Baehexic belongs to the A2 subcluster of mycobacteriophages, while Ruin belongs to subcluster A4. Our data suggests that these phages are genetically related; both are members of the A cluster. Our results are also consistent with geographic mapping data showing that cluster A phages are the most abundant cluster within the south-central Kentucky area. DNA sequence analysis will be necessary to determine the degree of relatedness between these newly identified phages.

Casey, Claire “Opposing Treatments of Ethnic Representation In the Television Series *Parks and Recreation*” (Ann Ferrell)

The television series *Parks and Recreation* includes multiple supporting characters of diverse ethnic backgrounds. Though these characters are written in a way that may tangentially illustrate ethnic stereotypes, such stereotypes are largely avoided so that each character can become a realistically complex individual instead of a flattened generalization of a group. The series often instead uses ethnic humor to point out white privilege or ignorance of racial issues, especially through multiethnic interactions. Representation of Native Americans in the show, however, does rely heavily on common stereotypes and is featured more frequently throughout the series. This study will use literary understandings of ethnic humor, audience reception of the series, and the actors' own perceptions of their characters to analyze the differences of representation throughout *Parks and Recreation*. An exploration of why these differences might occur and how they affect the statement being made by the series about ethnic identity and relationships will shed light on how pop-culture can reflect, perpetuate, and influence American social perceptions of race and ethnicity.

Castleman, Samantha “Subversion In Search of Tradition: The Fairy Tale Heart of Dreamworks’ *Shrek*” (Ann Ferrell)

With the advent of the Disney film empire built on such fairy tale inspired works as Cinderella and Snow White, a precedent for the media popularity of traditional marchen has become apparent. DreamWorks' *Shrek* follows closely in this tradition. Obvious uses of preexisting fairy tale characters and motifs abound, yet the film's use of such plays cunningly with the expected traditional presentation of these characteristics. By applying readings of Jan Brunvand's *The Study of American Folklore* as well as Stith Thompson's *The Motif-Index of Folk Literature* this paper attempts to show how the subversion of classic fairy tale stereotypes actually strengthens the film's claim to the ranks of contemporary marchen. Moralistic values such as withholding judgment of others and self-acceptance are presented within the film and are continually strengthened by the comedic subversions of what have become known as traditional fairy tale characteristics. Now, princesses know karate and ogres become heroes, but in the end both come to accept each other and themselves for who they truly are. The popularity of the *Shrek* film and its growth into a four-part animated saga in turn prove the effectiveness within popular culture of such deviations from the norm.

Castlen, Joshua “Cancer Research Engagement For Students” (Chandrakanth Emani)

Objective: This study acts as a foundation for a program targeting high school students using Howard Hughes Medical Institute's Student Education Alliance program as a model. High school research teams will engage in data collection, gene modeling, data processing, and genetic engineering. DAXX protein's role in oncogenesis is a good starting point for novice researchers to have first-hand interactions with cancer research. Method: The evolution, structure, function, and oncogenic contributions of DAXX were researched using PubMed, BLAST, FASTA, InterPro Scan, ProtScale, MEME Motif, ProtParam, Peptide Cutter, T-Coffee, COBALT, Entrez Gene, BioSystems, TMHMM, and MEME. The research involved

sequence and domain-specificity. Results: The DAXX gene is 4,459 nucleotides long, contains 8 exons, and produces 740 amino acids. The gene is highly conserved and active in MAPK, JNK, and FAS pathways. Conclusions: Emphasis on DAXX is ideal for novice researchers because it is highly conserved and present in affordable and convenient model organisms, such as the house mouse and fruit fly. The next step for this project is to isolate the protein in numerous model organisms and report on the methods for doing so. This project will benefit students by offering research experience, scholarships, and publications in peer-reviewed journals.

Cavanaugh, Jacquelyn “Facebook Faking: Examining Ratings of Modified Profiles” (Amber Schroeder)

Personality inventories are a common selection tool utilized by organizations. Research has found that faking behavior is typical of participants of these assessments (Rosse, Stecher, Miller, & Levin, 1998). Faking often occurs in the employee selection process as a means to present oneself in a socially favorable light (Ellingson, Smith, & Sackett, 2001). Using data from a larger study that examined faking ability on Facebook through profile modification, the current study looks specifically at the ratings made based on the modified profiles. In the original study, participants were instructed to modify a researcher-created Facebook page in order to “fake good” (i.e., make a Facebook profile appear more desirable) or “fake bad” (i.e., make a Facebook profile appear less desirable). Three graduate students subsequently rated the 170 modified profiles on specific Facebook profile components (i.e., events, likes, photos, wall posts), as well as overall impressions of the profile in regard to each applicant’s attractiveness to an organization, interview likelihood, and offer likelihood. The current study will look at inter-rater reliability, correlations between ratings, and the predictive weights of profile components on overall impression ratings.

Chen, Yu-Hsuan “The Role of Hypertension In the Prevention of Cardiovascular Disease” (Colin Farrell)

The purpose of this research is to conclude hypertension as pre-CVD, thus improve the prevention and the management of CVD. CVD refers to any disease affecting heart and vascular system, such as heart attack and stroke. Among the common risk factors of CVD (hypertension, smoking, high blood cholesterol, diabetes, physical inactivity, overweight/obese/, genetic, race, age, and gender), hypertension attribute the greatest percentage of CVD. Further, risk factors other than hypertension of CVD often co-exist with hypertension when an individual developing CVD. Therefore, if hypertension can be concluded as pre-CVD, the prevalence of CVD in the public will be more predictable and manageable.

Clark, Chandler; Carpenter, Caleb; Deel, Jonathon; Howell, Ryan; Latham, Jacob “Optimizing and Organizational Program For Halton Company” (Robert Choate)

A team of WKU Mechanical Engineering students is collaborating with Halton Company to create and organizational system for their plant. Each job performed at Halton is custom, leading to several different processes needing to be accounted for at once. The team is designing a program in Visual Studio that will be used to control the progression of the plant as well as store data to optimize future processes involved. Visual Studio will be implemented by April in order to give the team and company time to troubleshoot the program and insert optimizing options into the code of the program. In order to optimize the Visual Studio program, I will be implementing a barcode system. This will allow collection of time studies that can be evaluated using real time analysis. It will also show issues throughout the plant, which can be evaluated using root cause analysis. Other methods, including verification and validation, Analytical Hierarchy System, Taguchi Methods, etc. will be considered to further evaluate the data in an attempt to implement both corrective and preventive actions throughout the plant. These methods, in combination, will result in total optimization of the plant, making it more efficient and capable of further expanding.

Clark, Kristen “Avenging Cinderella: Melding Traditions and Metanarrative In ‘If the Shoe Fits’” (Tim Evans)

The episode “If the Shoe Fits” (S10E06) of television series *Criminal Minds* melds versions of the tale type 510A better known as the “Cinderella” story and tale type 510B “The Father Who Wanted to Marry his Daughter.” These narratives, while related, show significant enough difference to receive distinct listings in the Aarne-Thompson Tale Type Index, an alpha-numeric reference work used to organize, classify, and analyze folktales. The two narratives become conflated in the mind of the traumatized serial killer leading to her unique modus operandi and victim preference. The episode also presents a metanarrative conversation about both the bowdlerization of fairytales (and the truth in general) and the effect such censorship has on those who hear this version of the tales: The serial killer Claire Dunbar and the child of FBI agent Jennifer Jareau. This essay analyzes both the melding of the two tale types—intentional or unintentional—and the conclusions drawn by the censorship issues formed during the narrative with heavy nods to the psychoanalytic method of analysis done by the main characters in the FBI Behavioral Analysis Unit.

Clayton, BethAnne; Wessel, Paige; Grimes, Brooke; Shaker, Nuha; Zagdsuren, Battogtokh; Maples, Jill “Influence of Gender On Attitudes Toward and Perceived and Self-Selected Intensity During High-Intensity Body-Weight Exercise” (Jill Maples)

Introduction: The purpose of this study is to assess the impact of gender on 1) selected and perceived exercise intensity during high-intensity Body Weight Exercise (BWE), and 2) to evaluate attitudes toward high-intensity BWE. Methods: 14

men and 18 women completed baseline testing and a 15min BWE bout wearing a metabolic analyzer. Rated Perceived Exertion (RPE) was assessed during and post-exercise. The Physical Activity (PA) Enjoyment Survey and Exercise Self-efficacy Questionnaire were administered at baseline and post-exercise. Results: Women exercised at a higher self-selected intensity overall.

Cockrel, Brad “Transmission Noise Modification” (Chris Byrne)

The WKU Engineering Department Senior Student Team, the Synchronizers, has been contracted by a regional manufacturer to assess the sound characteristics of riding mower transmissions. This project entails developing an acoustic data acquisition apparatus and method, and developing a dynamometer stand which will load the transmission to replicate actual use. In addition, the team will create ways to alter the transmission acoustic signature. The Sound Data Acquisition method entails using a specialized microphone calibrated to operate on IOS devices to measure Sound Intensity. The sound intensity will be found over a collective area, in order to evaluate to the sound power generated. The dynamometer test stand will consist of a system designed to drive the transmission, introduce friction and thereby torque, and a system that will measure the rpm of the axle, and the torque experienced by each axle. Potential modes of modifying sound characteristics include modifying current gear design, introducing shims, and introducing sound dampening materials. This presentation will describe the system design and future work.

Conrad, Ben “Sustainable Lifestyle” (Shahnaz Aly)

The goal of the project is to create a sustainable apartment complex for Bowling Green. The city of Bowling Green is growing. Apartment complexes do not use much land and can house as many people as a subdivision. The apartment complex will have five apartment buildings and a clubhouse with the possibility for future expansion. The methodology of the project was to conduct initial research into the feasibility of the project, similar projects in other cities and sustainable elements that could be incorporated. The sustainable features of the apartment complex are rainwater collection, solar panels, environmentally preferred building materials, reduced energy consumption, modern heating and cooling, and reduced sound transmission. Solar panels absorb and store energy from the sun to be used for electricity. These sustainable features will help decrease the environmental impact of the apartment complex. The result of the project is a garden style complex suitable for families. That is also environmentally friendly and fulfills the ever increasing demand for housing in Bowling Green.

Cooper, Laken “Effect of Sleep Disruption Upon Cytokine Gene Expression of Zebra Finch (*Taeniopygia guttata*)” (Noah Ashley)

Sleep is a natural physiological process that is essential for survival, and prevention of sleep leads to cognitive dysfunction as well as a marked inflammatory response in mammals. However, a number of vertebrate taxa, including birds, exhibit resilience to sleep loss over the annual cycle (e.g., breeding, migration). We have developed a non-invasive method of disrupting sleep in caged birds that involves an automated, sweeping horizontal bar that arouses sleeping birds. Adult zebra finches on a 12-h light:12-h dark rotation were exposed to fragmented sleep cycles (bar moves every 2 min) for a 12-h period (either dark or light cycle) or no disruption (control group), and then pro-inflammatory cytokine gene expression (IL-1, IL-6) was assessed in liver, spleen, fat, heart and brain using RTPCR. We predicted that sleep disruption would lead to a pro-inflammatory response. Results from this study will provide insight into how birds cope with sleep loss from an immunological perspective.

Couch, Bennett “Heteronormativity Is a Drag: Drag Performance As Dissent In an Aggressively Gendered World” (Sandra Hughes)

I argue that drag performances are forms of dissent against heterosexist and gendered world views, challenging the gender binary that only acknowledges men and women and their limited gender roles. Furthermore, drag performance, in rejecting dominant and privileged world views, creates safe spaces within queer communities for others who face discrimination and oppression due to aspects of their identity such as race and class. This paper focuses on drag as dissent specifically in America; it looks at the presence of drag performers in several communities starting in the early twentieth century, the role that drag performers played in queer activism, and the culture and conventions of modern day drag performances. Specific focus is also placed on the difference between drag kings and drag queens, as the variation in their approaches makes more general statements about drag inadequate. By refusing to be quiet about who they are and how they are considered different, the mere presence of drag performers is not only validating, but also an essential part of creating spaces for queer visibility, community, and discussion.

Craig, Dani “Is Juno a ‘Can-Do’ Girl or an ‘At-Risk’ Girl?: Being a Feminist Is Not a One-Way Street” (Jerod Hollyfield)

In the review “JUNO: Feminist or Not?” from the news journal “Off Our Backs” Jennie Ruby finds Juno’s character disappointing as a feminist when she decides to give birth to her child instead of going through with an abortion. Ruby feels that Juno’s decision “coincides perfectly with a Christian-fundamentalist right-wing agenda” since Juno made her decision after the “your baby has fingernails!” comment from a pro-life protester catches her attention. By also examining the book by

Anita Harris, “Future Girl” and covering the chapter “The “Can-Do” Girl Versus the “At-Risk” Girl” which claims that there are virtually only two ways a woman can exist in society, I will argue that feminism is hugely situational. Using the film “JUNO” (Jason Reitman, 2007) as my primary example, I will analyze how Juno displays her feminism, various types of feminism portrayed in film, and the kind of influence it may have on audiences of either sex.

Daugherty, Zechariah “The Benefits of a Right-To-Work State” (Brian Strow)

Workers across the nation are chained down by current labor laws. The existence of a Closed Shop State forces a worker to join a labor union regardless of their desires. In this report, a literary analysis of preexisting documents over Right-To-Work laws were examined. The sources evaluated included a business ethics case explaining the relationship between the employee and the employer, the publications of university researchers, news articles over the leaders of Right-To-Work laws, and studies from state researchers were the laws were being proposed. The literary analysis supported the concept that Right-To-Work laws were beneficiary to the worker along with the state’s economy. In the early years of these laws wages were largely unaffected, but new research demonstrates a greater increase in median household income after Right-To-Work laws were legislated. State’s that implement the laws also see an increase in employment rate. The report concludes that states would benefit both economically and socially from the implementation of Right-To-Work laws.

Davis, Andrew; Kessler, Bruce “Matrices For Discrete Logistic Population Modeling With Distribution Control” (Bruce Kessler)

This poster will demonstrate the advances we have made in our research toward establishing a matrix version of the logistic population model based on Leslie matrices. Our previous work, presented at last year’s conference, simply reigned in the total population to a given capacity, with the population distribution being a dominant eigenvector of the initial Leslie matrix. We are now able to choose the final distribution vector, within certain reasonable constraints that come with Leslie matrices, as well as the final total population size. We will state the conditions needed to construct this model, and the theorems that establish the method. We will also provide several graphical examples of the method in use.

Davis, John “Rustic Timbers” (Shahnaz Aly)

The goal of my project is to design a condominium located on the shore of Kentucky Lake, titled Rustic Timbers. This condominium is designed to create very functional and beautiful living spaces for its residents. The structure houses 15 units that give the residents a sense of privacy with marvelous views of the lake, and circulation spaces that bring the beauty of the landscape indoors. All codes were followed and features were acquired to create a safe, functional, space. My method for creating a rustic look similar to its landscape is driven by the use of heavy timbers as the framing material. The site really makes this project so I created outdoor spaces for the residents to interact more with this beautiful place. Green building systems were researched and incorporated into the design to create a more sustainable structure and environment. The end product of this project is a well-researched and designed condominium that incorporates sustainable features, functional circulation, rustic interior design, and a beautiful surrounding landscape to create a desirable residence.

Dillard, Colton “Design of a Web-Accessible Experiment To Improve Student Understanding” (Walter Collett)

Students in the electrical engineering program benefit from performing hardware experiments related to the material they learn. However, web accessible software experiments also have value to students because they are capable of simulations that would not be practical for hardware experiments due to cost or lab space. Therefore, our team’s goal is to design a software package that will allow students to perform a simulated experiment over the internet. Our software will demonstrate this capability by simulating the behavior of electromagnetic plane waves at the interface of two media. Students will access the website to perform guided experiments from an online lab manual. After a student is finished discussing their results, they will be able to send their completed lab report from the software directly to the professor for a grade. This tool will allow engineering students to visualize difficult concepts and further development of the software would allow students to benefit from a larger variety of experiments. Although the technology developed for this project is targeted at an electromagnetics course, it could easily be applied to other engineering courses.

Dixon, Brittany “Bioinformatics Study of EZH2” (Chandra Emani)

The present study deciphers the molecular biology evolution of the EZH2 protein. Genomic instability of EZH2 may affect chromatin binding, core-promoter binding, sequence specific binding, histone methyltransferase activity and other DNA processing. EZH2 is deregulated in many cancers, especially breast, colon, larynx, and testis. The protein’s primary function is the methylation of lysine on histone 3 (H3K27). Through post-translational modification EZH2 controls gene expression. In this study twelve EZH2 FASTA sequences were investigated using computational tools. Analysis was performed using bioinformatics software databases NCBI and EXPASY. Conserved domains and evolutionary ancestors were identified through PSI-BLAST and neighbor-joining phylogenetic trees. Further investigation of the proteins were used by MEME. BLAST has identified a hypothetical evolutionary ancestor, *Acyrtosiphon pisum*, the pea aphid genome possesses homologues to all DNA methyltransferases found in vertebrates and can be used to study a functional methylation system.

Doctrow, Jamie “Cross-Cultural Attitudes About HIV/AIDS Stigmatization” (Tony Paquin)

The Human Immunodeficiency Virus (HIV) is the cause of a public health epidemic that has impacted millions of individuals worldwide. Though medical advances have decreased the number of AIDS related deaths by 42% since the peak year of 2004 (UNAIDS, 2015), many individuals with HIV/AIDS are unaware of their status and are not currently receiving antiretroviral treatment. Many experts have suggested that a significant barrier to HIV/AIDS prevention and treatment is the social stigma that has become attached to the disease. No single cause of this stigmatization has been identified, but a variety of influences may play a role including lack of education, religious ideas, and cultural norms. To gain a better understanding on the role of culture in this situation, this study measures cross-cultural attitudes about HIV/AIDS using a questionnaire distributed to both international and American students at Western Kentucky University. The results will be analyzed to determine whether attitudes about HIV/AIDS differ between these two groups. It is hypothesized that international students will have more stigmatizing attitudes than American students. Based on these results, recommendations will be made for methods of reducing stigmatizing attitudes globally.

Dowell, Catherine; Hoyng, Stevie “Haptic-Visual Solid Shape Matching With Variable Numbers of Fingers” (J. Farley Norman)

Thirty-six younger and older adults participated in a cross-modal shape-matching task. On any given trial, a participant haptically explored, but could not see, a plastic copy of a bell pepper (*Capsicum annuum*) for seven seconds; the participant then chose which of 12 simultaneously visible bell peppers possessed the same 3-D shape. Some participants explored the object shapes using only one finger (the index finger), while others used either three or five fingers. Interestingly, there was no effect of the number of fingers upon the participants' shape-matching performance. There was, however, a strong effect of age: The younger adults' performance was 48.6 percent higher than that of the older adults ($F(1, 30) = 15.7, p < .001$, partial eta-squared = .34). These results (i.e., no effect of the number of fingers) differ from those of Jansson and Monaci (2004, 2006) who found a large difference in performance between the use of one and three fingers.

Dubell, Robert “Goal! Goal! Goal! Social Reflection and Soccer In the United States” (Jerod Hollyfield)

Soccer could possibly be the biggest sport in the world. The Federation International de Football Association, or FIFA, claims that the 2014 FIFA World Cup reached 3.2 billion viewers. The United States of America have slowly adapted to the world game and show signs of expanding the game even further in the future. Gamel Abdel-Shedid and Nathan Kalman-Lamb quote, “On a broader scale- in the context of an increasingly cosmopolitan, globalized world, multicultural societies are valued for their diversity.” Films such as Danny Cannon’s film Goal! (2005) and Gurider Chada’s Bend it Like Beckham (2002) symbolizes the transparent relationship between the United States and soccer as well as complex issues including immigration, multiculturalism, gender roles, race, and identity. In this paper I argue that these two films use the world’s sport to symbolically show the growth and spread of soccer in the United States and critique specific social issues. Christian Kwauk argues that, “The film addresses some of the significant issues that sociologists of sports recognize as characterizing modern sport narratives...”

Duke, Brooke; Williams, Blairanne “Toxicity Effects of Platinum Compound Leaving Ligands On Cancer Cells” (Kevin Williams)

Currently there are three platinum anticancer drugs on the market: cisplatin, oxaliplatin, and carboplatin. These compounds have variable leaving ligands, which are locations on compounds that will be replaced by biological targets (DNA and protein). Our research focuses on testing platinum compounds that have a nonleaving ethylenediamine ligand, similar to the nonleaving ligands found in cisplatin, and variable leaving ligands. Testing the compounds on cancer cell lines allows us to determine the effects leaving ligands have on the ability of platinum compounds to kill cancer. The testing involves performing MTT assays on colorectal and testicular cancer cell lines treated with platinum compounds. In MTT assays, the living cells can reduce a tetrazolium salt to a purple formazan that is quantified to determine cell survival. The testicular and colorectal cancer cell lines were chosen because of the success of cisplatin and oxaliplatin in killing those cancer cells. The main purpose is observing how leaving ligands affect cellular uptake, cell line specificity, and cancer cell death. The MTT assays on the colorectal and testicular cell lines suggest that leaving ligands have a significant influence on toxicity. Research into effective leaving ligands is important because it could lead to successful anticancer treatments.

Durlin, Michael “IMVU: The Introductory Study of an Technology-Based Culture” (Ann Ferrell)

IMVU is a software program that allows its users to create a virtual 3D representation of themselves and allows them to communicate with others users from around the world, in doing so the users become a member of a unique microculture. During my fieldwork, I determined that this was in fact, a microculture based on features that were wildly common throughout the community; following are just a few things I identified; an experience among all users of a journey from the first time they log in, to stages of avatar development, first contact and eventually establishment into the general community. Also within the IMVU community; certain rules of conduct, common usages of unique words and phrases, system of reciprocity, common standard of the idea avatar and a basic social hierarchy. I decided to choose this community as my area to get my first feel for fieldwork with conducting interviews, taking field note, and analyzing because of its massive cohesive

community with worldwide reach, users from countries like Tunisia, Lithuania, and Brazil.

Edmonds, Isaac “The Sense Center” (Shahnaz Aly)

The Sense Center the city of Asheville, North Carolina is a city that is full of growth. Even though this city is growing, the artistic scene is dying out. According to people living in the city, they feel the need to have an actual performing arts center, art gallery, and museum. The intent of my project is to create the Sense Center. This building will not only benefit the growth of the city but it would revitalize the artistic scene that is beginning to fade away. The research for this building included ways in which the performing, flat, and culinary arts enhance all five senses while coexisting in one building. In the Sense Center visitors will enjoy a performing arts auditorium, restaurant, as well as an art gallery/museum. Because the Sense center offers different culinary, flat, and performing arts classes, visitors will have the opportunity to create and display their own work. The overall goal was to bring personal creation, plays, concerts, art exhibits, and food, to a growing city that does not have a place that is pleasing to the people who live and visit there.

Ernst, Jasmine; Gregory, Jordan; Lemerise, Elizabeth “An Analysis of the Types of Feedback Provided By Head Start Teachers To Children” (Elizabeth Lemerise)

Nationwide, Head Start is evaluated with the Classroom Assessment Scoring System (CLASS, LaParo, Pianta, & Stuhlman, 2004). Preschool classrooms serving low-income children score low in the concept development and quality of feedback scales on the CLASS (Early et al., 2005). We assessed the Head Start teachers' (N=6) feedback to students during taped book reading sessions before and after receiving quality of feedback training. Training emphasized use of labeled praise (“You did a good job picking up the blocks.”) and “do” commands (“Use your walking feet.”). Teachers' feedback was coded for statement type and affective tone. Statements were coded as “do” commands, “don't” commands, negative comments, general praise, or labeled praise. Tone was coded using a bipolar, 7-point affective rating scale, ranging from very negative to very positive (Harper, Lemerise, & Caverly, 2010). Inter-rater reliability was high ($\kappa = .82 - .85$). Multivariate analyses revealed effects of wave and statement type; from pretest to posttest the number of statements increased and the most frequently used statement was “do” commands, which are developmentally more appropriate for preschool age children (Webster-Stratton, 2003) than “don't” commands. Analyses of affective tone revealed negative comments and commands had a more negative tone than positive comments.

Ernstes, Brandon “Hydrocarbon Potential of Salem-Warsaw In Warren County, Kentucky” (Michael May)

Hydrocarbons have been developed in Warren County, Kentucky since the 1920s in multiple fields. Many of the shallow Mississippian oil pools in Warren County occur at a depth of less than 2000 feet making them economic targets despite today's current low oil prices. The goal of this project is to assess the potential of hydrocarbon exploration and production in the Salem-Warsaw Formation near the Richardsville Field in Carter Coordinate H-36. Driller's logs and well-log data from the Kentucky Geological Survey (KGS) including gamma ray, density, and neutron porosity, will be assessed. This information will result in a series of constructed maps including structure, gross isopach, porosity cut off, and net pay. The Salem-Warsaw consists of coarse-grained limestone and siltstone that are thick to massively bedded and locally cross bedded. Outcrops along the Barren River valley supplement geophysical analysis and aid in geologic interpretation. The resulting subsurface to outcrop model will aid in identifying trends in production and help predict potential targets.

Evans, John “The Lagging State of Renewable Energy In Kentucky” (Leslie North)

While many areas of the United States are taking strides toward harness sources of renewable energy, the energy landscape of Kentucky continues to be dominated by coal and, to a lesser extent, natural gas. This phenomenon is in large part due to the cultural history of coal in Kentucky. As a result, many Kentucky citizens see no room for renewable energy sources such as wind, geothermal, and solar energies in the fossil fuel dominated economy. This research assessed the economic, cultural, and geographic factors among a host of other issues affecting the lack of renewable energy sources in the bluegrass state in an attempt to answer the question, Why is Kentucky behind most other states when it comes to this pressing issue and what steps can be taken to change this?

Falls, Dustin; Crandall, Jason; Shake, Matthew “Mobile Application For Improving Functional Performance and Health Education In Older Adults” (Jason Crandall)

A mobile application (app) incorporating exercise and health education into a fun and familiar game may improve older adults' health and well-being. Objective: Test the efficacy of a mobile app to improve functional performance and health knowledge. Methods: Senior center volunteers were randomly assigned to (a) an experimental group that used the app (bingo, exercise, and health education) on tablets (Samsung Galaxy) twice a week for 10 weeks or (b) a control group that played only modified bingo using the app. Pre/post functional performance and health knowledge were compared using Mixed ANOVA ($p < .05$). Results: Health knowledge ($\lambda = 6.06$, $F(1, 10) = 6.50$, $p = .029$, partial eta-squared=.394), Short Physical Performance Battery scores ($\lambda = .584$, $F(1, 10) = 6.41$, $p = .032$, partial eta-squared=.416), and gait velocity ($\lambda = 6.10$, $F(1, 10) = 6.40$, $p = .030$, partial eta-squared=.390) were significantly improved in experimental ($n = 7$; 72.28 ± 7.41 yrs.) compared to controls ($n = 4$; 74.80 ± 6.22 yrs.). Adherence was not statistically different (89% experimental and 96%

controls, respectively). Conclusions: The mobile app can be a fun and effective way to increase health knowledge, while improving measures of functional performance.

Fan, Joy; Srivastava, Ajay “An Immunohistochemical Screen For Genes Expressing In Air Sac Primordium In *Drosophila*” (Ajay Srivastava)

The metamorphosis process in *Drosophila melanogaster* relies heavily on imaginal discs, the precursory buds of adult appendages found within larvae that undergo drastic transformations in the pupal stage of the *Drosophila* life cycle. This study examined the expression of five genes in the air sac primordium (ASP) within the wing imaginal discs of *Drosophila* third instar larvae. As the precursors to the adult dorsal air sacs, the ASPs are an integral part of the metamorphosis process, controlling the transformation of the tracheal system in the developing fly. To gain a better understanding of the tracheal transformation, this study utilized antibody staining to target expression of the roundabout, titin, GASP, pebble, and Sema-II genes. *Drosophila* larvae were dissected and stained with specific antibodies, and the results were studied using fluorescent microscopy. It was found that pebble was the only gene that was expressed in the ASP, while GASP was expressed in the trachea. This is significant because in a separate study, the pebble gene was found to be a regulator of cytokinesis (Lehner, 1992). Since cytokinesis is the separation of two cells during cellular division, it is a required part of carcinogenesis, the development of cancer.

Fleming, Maelee “Women Domination: The Presence and Role of Women Warriors In Herodotus’ *Histories*” (Eric Kondratieff)

This paper attempts to explain the attention Herodotus gives in his *Histories* to women warriors, females possessing masculine traits, despite having an audience firmly embedded in ancient Greece’s patriarchal society. This paper will argue that Herodotus included women warriors to emphasize the “femininity” of the Persians and to caution Greek males against allowing women to possess too much authority. Herodotus’ women warriors include Artemisia, Queen Nitocris, and Queen Tomyris, who exemplified masculine traits exhibited by Homeric heroes such as Hector, Achilles, and Odysseus, archetypes for masculinity in ancient Greek society. Herodotus’ presentation of the Persians as somewhat feminine is revealed in a comparison of the actions and achievements of the above-named women warriors to the shortcomings of Persian Kings Cyrus, Darius, and Xerxes. Finally, a brief examination of the Amazons’ interactions with Scythian males will showcase the effects of women exiting the feminine sphere and entering the masculine sphere: Amazons become the males of their society while the Scythians become females in terms of traditional gender roles. In analyzing the women warriors, this paper both contributes to the study of women in ancient Greece and highlights the importance of masculinity in ancient Greek society.

Flynn, Frederick “How the U.S. Came To Recognize Israel” (Beth Plummer)

The topic is one in which most Americans, while aware of U. S. recognition of Israel, do not know of the extremely controversial background that went into the decision. It is alleged in the paper that U.S. President Harry Truman was receiving one-sided advice from his coterie of advisers, with U. S. Secretary of State George C. Marshall at the forefront. Much of the substance of the paper is related to showing the back and forth between Truman and the State Department. While the general suspicion Truman held for many of the permanent under-echelons of the State Department certainly played a role in Truman's instinctive maneuvering, perhaps most central to the story the project is concerned with is Truman's reluctance to realize that it really was General Marshall who had instigated a major misrepresentation by omission to Truman. This put the U. S. in the position of declaring to the World before the United Nations a policy which was not true. It is this story, with the addition of other advisers who advocated for Israel, on which the project focuses.

Fraser, Ellis “Float Like a Repressive White Society, Sting Like a Black Liberation Movement: The Use of Cinema To Tell Narratives of Black Liberation” (Jerod Hollyfield)

In 2010 Louis CK proclaimed in an interview with Jay Leno, “Every year white people add a hundred years to how long ago slavery was.” Rather than dealing with the harsh realities of America’s darkest era; contemporary society has sought to push these narratives away, ignoring the difficult conversations associated with them. As a result, modern blacks are left looking for narratives that seem to recreate their struggles. Critic Armond White agrees; in his review of Ryan Coogler’s *Creed* he discusses how the film uses *Apollo Creed* as a tool by which to recreate the lives of modern black people. He explains, the undertone of the film is to link the narratives of *Rocky* the hard working middle class American, with that of black youth. Specifically, *Apollo Creed*, the relatively privileged black male looking to prove himself in contemporary society. My paper will argue that films (like *Creed*) are used to create necessary tales of black liberation. Stories that show blacks as the underdogs who can ultimately triumph. Because in a world where schools in Texas are seeking to replace the word *slaves* with *workers*, it is of the utmost importance that these narratives are brought into the light.

Frits, Andrew “Community Revitalization Through Architecture” (Shahnaz Aly)

Can architecture revitalize cities and communities that are suffering from the common social ills of crime, unemployment and lack of infrastructure? Good architectural design can be a major factor, if not the sole answer, to a city’s social, political, and environmental problems. My goal is to demonstrate how vital architectural design can be in solving a community’s problems.

My research is focused on improving and revitalizing a downtown area of Rockford, Illinois, a struggling mid-size city that is annually ranked as having some of the highest unemployment, crime, and obesity rates in the country. Through my research into sustainable design, community revitalization efforts, and similar case studies, I have come to a solution through architectural design. I have adaptively reused a historic freight depot for a mixed-use civic building that includes a multi-modal transportation center with office, event, and restaurant space. I strongly believe that this newly renovated area of Rockford can become a welcoming gateway to the region that will stimulate and foster sustainable commerce and economic activity for the community.

Froedge, Lori “Assessments: Where Has the Accountability Gone?” (Jennifer Cribbs)

This study sought to answer two questions. What are teachers’, parents’, and administrators’ perceptions on school assessments and their effectiveness as an evaluative measure of students’ academic progress? and how does student performance data on the Algebra II EOC correlate with school ACT scores and the graduation rate corresponding with that class? Interviews were conducted with four Algebra II teachers, two counselors, and two principals. Surveys were sent electronically to the parents of students enrolled in Algebra II as well. Finally, ACT data, EOC scores, and graduation rates from the same group of students were analyzed to determine the correlation. Major themes from the interviews revealed that teachers believe the EOC to be a huge factor in making curricular decisions and instructional practices. There was also a consensus that those practices would be modified and varied and more risks would be taken if it were not for the EOC. Additionally, large discrepancies were found between the number of students proficient/distinguished on the EOC and the graduation rate. The implications for this project show further need to evaluate the current accountability system. Are we measuring what we intend, and are we doing more harm than good with state-mandated assessments?

Frye, Kayla; Baker, Tyler “Sustainable Concrete Canoe” (Matthew Dettman)

Each senior in the civil engineering program at WKU must choose a design project to participate in, concrete canoe or steel bridge, throughout the entirety of senior year. Having chosen to be a part of the concrete canoe team, one of the goals we undertook was to build a more sustainable concrete canoe in order to cause less of a negative impact on the environment. After researching for cement replacement products, it was decided upon to use a product called Ekkomaxx to create a “green” concrete canoe. The typically used Portland cement concrete has a very large carbon footprint. Since the Ekkomaxx concrete is carbon neutral, the carbon footprint of the concrete canoe was reduced substantially. This product also had other extremely beneficial characteristics for this purpose including resistance to cracking and improved durability. The implications of this are substantial. In a world that places many tons of concrete, but emphasizes being environmentally friendly, this product and products similar to this could provide a way to have both.

Fussman, Kelly “Outcomes of a Speech and Language Pilot Program For International Students” (Mary Lloyd Moore)

Universities in the United States host a substantial number of international students every academic year. Western Kentucky University alone hosts over 1,400 international students every year. These students often face a number of challenges upon arrival in the United States, especially when it comes to language and cultural differences. A considerable body of research strongly indicates that international students’ educational performance and outcomes are significantly impacted by the learners’ cultural identities, psychological and sociocultural experiences, and attitudes in relation to English-speaking societies. Many international students attribute academic and social difficulties to a lack of proficiency in the English language and unfamiliarity with the local culture. To address these concerns, a five-day English language skills seminar was conducted for a group of international students, focusing on pronunciation, grammar, vocabulary, social language, and acculturation. According to pre- and post-assessment and survey results, the seminar was very effective in improving both the students’ speech and language skills, as well as increasing learners’ confidence when using their skills. These results highlight the need for quality language and cultural education programs for international students in order for them to be more successful while studying abroad.

Galbraith, Samuel “Developing a Measure For Assessing Virtual Organizational Citizenship Behaviors” (Amber Schroeder)

In a time where technology is an integral part of life, virtual workplaces are becoming more of a staple in organizations and will continue to do so as technology increases (Cascio, 2000). Due to the rise in virtual workplaces, employees are interacting less and organizations are requiring more from them. Employees must perform behaviors that are outside of their formal job description. These behaviors are considered to be organizational citizenship behaviors (OCBs), which are employee behaviors that promote organizational effectiveness that are not part of an employee’s formal job description and are therefore formally not recognized by the organization’s reward system (Organ 1988, 1997). No research to date has yet looked at if employees can engage in OCBs through a virtual medium. Thus, the goal of this paper is to develop a tool for assessing OCB engagement in the virtual workplace.

Garratt, John “The MPAA and the NC-17 Stigma” (Jerod Hollyfield)

From 1930 to 1968, American films had to adhere to the Motion Picture Production Code or “Hays Code.” Its draconian rules and regulations were eventually replaced with the MPAA’s voluntary rating system. While the MPAA is a private organization which has no real governing authority, the rating that a film receives still has a huge impact on its profitability. If a film receives an NC-17 rating its advertising is extremely limited, major movie theater chains and streaming services won’t show it, and most retailers won’t stock the DVD. The NC-17 was created to replace the X rating which had become synonymous with pornography. In an article published by Cinema Journal, Kevin S. Sandler argues that it was the commercial and critical failure of *Showgirls* that ultimately reassured the economic liability of the MPAA’s adults only rating. Kirby Dick’s documentary *This Film is Not Yet Rated* also found an extreme bias towards independent and LGBT films. In this paper I will argue that the NC-17 rating should either be abolished or lose the stigma attached to it and how R-rated films such as *Deadpool* have shattered expectations showing that studios can take risks and still be profitable.

Gibbs, Jennifer “Test For Measuring Cutting Effectiveness” (Christopher Byrne)

This project established a test method for evaluating the effect of coatings on cutting edges performances. Two methods were developed and tested in this effort. One entailed the use of a slicing motion; the second used a plunging motion. In each case, forces were measured during cutting to quantify the ease with which the blade cuts. The test methods underwent iterations in developing a process that yielded reproducible results. The slicing test involved dragging a razor blade at an angle across a surface which isolated the evaluation of the cutting edge to a small region. The second method involved wrapping a softer cutting material around a rod and plunging the blade into the material with the blade parallel to the surface. This allowed for the evaluation of a larger portion of the edge. For each method, tests were performed to identify inherent blade and cutting material variations. Once reproducibility was established, comparisons were made between uncoated and coated blades. Current results show that some coatings do not result in measureable improvements in cutting effectiveness. Other results of testing using these methods include the capability to distinguish between new and worn cutting edges.

Gilbert, Michael “Impacts of Habitat Fragmentation On the Trophic Morphology of a Threatened Desert Fish (*Cyprinodon pecosensis*)” (Michael Collyer)

Drastic alterations to the North American Southwest’s hydrology have highly influenced resident fish communities. In New Mexico and Texas, the Pecos River has been severely altered as a result of water manipulation, isolating backwaters and various habitats that were once connected to the main river. *Cyprinodon pecosensis* (the Pecos pupfish) has been highly impacted due to the effects of anthropogenic water manipulation, as well as species introductions. *C. pecosensis* populations have become isolated and scattered, residing in sinkholes, remnant lakes, and static backwaters, thus creating numerous micropopulations. The purpose of this study was to assess the morphological variation in feeding morphology that occurs in response to varied habitats, especially in terms of environmental factors and species co-occurrence. Landmark-based geometric morphometrics was used to assess shape variation across numerous populations comprising four general habitat types, each with varied community structures and salinities. Results from this study suggest that morphologies vary: (1) among sex, (2) seasonally, and (3) in response to interspecific interactions. As *C. pecosensis* is a threatened species, this research has important implications for its future conservation and management. Additionally, these results could further aid in the understanding of preserving species in fragmented landscapes.

Gilpin, Cynthia “The Disappearance of a Middle Ground In Filmmaking” (Jerod Hollyfield)

According to boxofficemojo.com, Hollywood studios have produced 122 remakes from the years 2003 to 2012 that were released theatrically. Some of these remakes were huge box office successes that generated franchises. This is still happening now with more studios announcing film line-ups spanning over several upcoming years. On the other hand, Independent films are also getting much attention for contrasting what Hollywood seems to be doing by creating more original movies with filmmakers that have an alternative look to storytelling. The middle ground between these two outlooks of filmmaking seems to be disappearing. That middle ground is theatrically released films with lesser studio budgets starring known actors and directors that have an original concept and become top grossing films. Through researching box office records, I’ll compare how popular studio produced films are to independently financed films uncovering why audiences prefer studio produced films or independently financed films. This data will uncover the history and success of the big- budget, studio produced, remake and franchise films that are continuing to be created today. This paper will also explain independent films history and its attempts to be opposite of Hollywood studio cinema, concluding why our middle ground of filmmaking is disappearing.

Glascock, Allison; Crandall, Jason; French, Megan “A Novel Game For Improving Engagement In Older Adults With Dementia” (Jean Neils-Strunjas)

Dementia is a progressive, irreversible, and ultimately, incurable cognitive decline that is rapidly affecting millions of adults worldwide. It is imperative that researchers and health care systems find resolutions to common social concerns associated with dementia. One such concern is lack of engagement with others and activities in nursing home settings. This project aims to answer the following research question: Does constructive engagement increase during and following Bingocize (a combination bingo, functional movement, and social engagement program) compared to observation prior to Bingocize? the

proposed hypothesis theorizes that constructive engagement will increase in patients with dementia during and following participation in Bingocize. Methods included administering the MoCA (Montreal Cognitive Assessment) to assess five participants' level of cognitive function. After a baseline was established, participants were observed weekly, in 10-minute intervals, before, during, and after sessions of Bingocize using the Menorah Park Engagement Scale. The preliminary results suggest that Bingocize increases engagement, which is maintained for at least 20 minutes following the activity. Both Bingocize and the observation method are promising tools for clinical intervention and assessment of persons with dementia residing in nursing home settings.

Gossett, Hannah “Self-Esteem, Sense of Belonging, and Body Satisfaction of College-Aged Women” (Jennifer Cribbs)

In this survey, college-aged women were asked questions about their demographics, self-esteem, sense of belonging, and body satisfaction. There were 91 women who completed the survey. These women are all a member of a sorority on Western Kentucky University's campus. The survey was given in an auditorium in a university building. Two-tailed correlation statistics were conducted on the results to find out if there was a correlation between self-esteem and sense of belonging, self-esteem and body image, and sense of belonging and body image. The results showed that there was a strong, positive correlation between self-esteem and sense of belonging: $r(89) = 0.701$, $p = 0.000$. There was a weak, positive correlation between self-esteem and body image: $r(89) = 0.360$, $p = 0.000457$. and there was a weak, positive correlation between sense of belonging and body image: $r(89) = 0.179$, $p = 0.0896$.

Greenwell, Barrett “Do Ask, Do Tell: The Exclusion of Gay Men From Universal Male Conscription In the Republic of Turkey” (Patricia Minter)

What are the implications of the Republic of Turkey's paradoxical policies of universal male conscription and exclusion of gay men from military service? To answer this question, this project draws upon four months of research in Turkey where interviews were conducted with prominent lawyers and activists as well as with gay men who personally experienced the inhumane exemption process of the Turkish military. This project begins by analyzing the historical reasons for the military's pervasive influence in Turkish society. Next, it explores the issues inherent in a policy of universal conscription without conscientious objection. The project then focuses on the methods utilized from 1986 to the present to “prove” the sexuality of men in Turkey. These methods are based in Victorian pseudoscience, including invasive anal examinations, video or photographic evidence of sexual acts and cross-dressing, the Minnesota Multiphasic Personality Inventory, and the House-Tree-Person Test.

Greenwell, Dantin “Depictions of Mental Illness In American Cinema: How Film Has Influenced Mass Media Interpretations of Mental Illness” (Jerod Hollyfield)

In an article published in the Journal of Community Psychology titled “Mass Media Images of Mental Illness: A Review of the Literature,” Psychologist Otto F. Wahl makes the claim “Numerous studies of frequency and content of media depictions support clinical observations that mental illness is frequently depicted in the mass media, particularly the entertainment media, and that these depictions tend to be inaccurate and unfavorable” (Wahl 343). While over time many films have been released that do in fact depict mental illness in relatively accurate ways, such as *Clean, Shaven* (Lodge Kerrigan, 1993) and *Silver Linings Playbook* (David O. Russell, 2012), iconic films with a higher cultural outreach such as Alfred Hitchcock's *Psycho* (1960) have paved the way for inaccurate depictions of mental illness in American cinema. In this essay I will argue that Hitchcock's *Psycho* has played a major role in mainstreaming the psychotic character arc and influencing modern news and media depictions of mental illness in an inaccurate and unfavorable way, thus stigmatizing and influencing social interpretations of mental illness.

Gregory, Jordan; Ernst, Jasmine; Lemerise, Elizabeth “Follow Up Analysis of the Negative Comments/commands Provided By Head Start Teachers” (Elizabeth Lemerise)

The Classroom Assessment Scoring System (CLASS, LaParo, Pianta, & Stuhlman, 2004) which is used to evaluate Head Start classrooms, revealed that teachers score low on the concept development and quality of feedback scales (e.g., Early et al., 2005). We assessed the long-term effects of quality of feedback training during 4 book reading sessions, which included a pretest, followed by quality of feedback training, an immediate posttest 1, posttest 2, refresher training, and posttest 3. The focus of the training was to increase the use of labeled praise (Good job washing your hands) and “do” commands (Put the blocks in the bin) and decrease the use of negative comments and “don't” commands. Teachers' feedback was assessed for statement type. Statements were coded as “do” commands, “don't” commands, negative comments, general praise, or labeled praise. a multivariate analysis yielded significant effects of statement type. Both general praise and labeled praise increased from posttest 2 to posttest 3; negative comments and “do” and “don't” commands decreased from posttest 2 to posttest 3. “Do” commands were more frequent than “don't” commands and negative comments. Training was thus effective.

Gregory, Thomas “An Approach To Identify Mycobacteriophage Diversity Prior To Dna Sequencing.” (Claire Rinehart)

Over 6869 Mycobacteriophages have been isolated and purified. of these, 1087 have had their genomes sequenced and more are added each year. Sequenced Mycobacteriophages have been grouped into clusters based on a 50% or greater nucleotide

identity. Each year, as new phages are discovered the question arises, “Which isolates should we sequence?” In order to sequence phages and achieve the greatest possible diversity, we need a rapid way to identify phage cluster membership or singleton status. One approach to this issue is to identify sequences that are common across a cluster and unique to only that cluster. Unique sequences could then be used as primers or probes in order to assign membership to a cluster or potential singleton group. a computer program was written in Python to identify all the oligonucleotides that are common to all members of a cluster but unique between clusters. So far we have analyzed all 15 bp sequences that are unique to each cluster. As we develop these sequences into primer/probe sets, this will provide a tool for identifying cluster membership and help us to select a broader diversity of phages for sequencing.

Haberman, Rachel “In the Shadow of the Cave: The Persistence of Tradition In Edmonson County” (Ann Ferrell)
Drawing upon my fieldwork and ethnographic investigation with members of the Edmonson County Historical Society, this paper will describe the historical and cultural resources in the area surrounding Brownsville, Kentucky, specifically highlighting the connection between traditional groups and the landscape. My fieldwork process included referencing existing archival records, surveying historical buildings, documenting their condition, and conducting interviews with local residents to understand the tangible significance of these structures as well as any associated folklore that contributes to the intangible significance. This research is particularly relevant to the National Park Service as part of their mandate to manage the cultural and natural resources of the Mammoth Cave National Park area and will be added to a report that will be submitted to the National Park Service this year.

Hall, Reba “Police Reform and Diversification: Can Police Brutality Be Impacted By a Diversified Police Department” (Andrew Rosa)
Due to recent concerns over police brutality towards African Americans, community leaders, policy makers, and elected officials have suggested that greater diversity among police personnel, or the implementation of affirmative action policies in the hiring process, might aid in reducing violent police-minority interactions. Currently, no evidence exists to support a positive correlation between the hiring of African American officers and the arrest rates and civil rights violations experienced by African Americans. While minority communities disproportionately experience police brutality, this paper is focused on police interactions with African Americans and the efforts of organizations and communities that have pushed for the hiring of a more diverse pool of police personnel with the view that such initiatives would affect healthier police-minority interactions. Based on an analysis of relevant studies and existent literature, aggressive affirmative action initiatives have had no systemic effect on rates of police brutality experienced by African Americans, suggesting an absence of a causal relationship between the hiring police officers of color on community trust and rates of brutality/misconduct. Alternative approaches to addressing the problem of police brutality, misconduct, and interactions with African American communities are proposed as areas for future investigation.

Hamilton, Courtney “Contribution of a Putative Up Element DNA Sequence To the Activity of a Newly Identified Phage Promoter” (Rodney King)
Transcription is a universal step in gene expression in which information from a DNA sequence is copied into messenger RNA. This information is then translated into proteins that carry out the biochemical activities of the cell. a key component in gene expression is the promoter sequence, a region of DNA that initiates transcription of downstream genes. Some promoters also contain an Upstream Promoter (UP) element, which have been shown to boost promoter activity. We recently identified a new promoter in a mutant bacteriophage that grows on a restrictive bacterial host. Close inspection of the promoter sequence suggested it had a putative UP element. The goal of this project was to determine if the UP element contributes to promoter activity and, if so, to what degree. To test the effect of the putative UP element, reporter gene constructs were created in which the UP element-like sequence was deleted. By observing the phenotype of the resulting bacterial colonies on indicator plates, we concluded that the promoter without the putative UP element is still functional. Quantitative β -galactosidase assays demonstrated a two-fold decrease in promoter activity after removal of the sequence, suggesting that the sequence is an UP element that contributes to promoter activity.

Hamilton, William; Payne, Jason; Dakshinamurthy, Rajalingam “Carbapenem Functionalized Gold Nanoparticle Synthesis, Characterization, and Antibacterial Susceptibility Testing” (Stuart Burris)
With soaring increases in the cases of multi-drug resistant bacteria all over the world, we are on the verge of entering post-antibiotic era if no immediate action is taken against this global crisis. In an attempt to address this issue, and as an alternative to designing new antibiotics, we attempted to modify current commercial antibiotics. We designed an array of effective antibacterial agents involving gold nanoparticles (AuNPs) conjugated to an antibiotic. Carbapenems, a sub-class of β -lactams, are considered one of the drugs of last resort to treat bacterial infections. Due to the recent emergence of infections with advanced patterns of antimicrobial resistance bactericidal agents such as these are being viewed as candidates for further development and augmentation. a unique green process was used for AuNP synthesis wherein the antibiotic reduces and stabilizes the AuNPs resulting in antibiotic conjugated gold nanoparticles (Car-AuNPs) which were morphologically characterized using transmission electron microscope, UV-Vis spectroscopy, scanning electron microscopy/energy-dispersive

X-ray spectroscopy, and dynamic light scattering. Antibacterial efficiency was evaluated on Gram-positive and Gram-negative bacterial strains using turbidmetric and spread-plate assay. The minimum inhibitory concentrations (MIC) of Car-AuNPs was significantly less than pure antibiotic drugs which proves the synergistic activity of Car-AuNPs.

Hampton, Tori “A Meteorological Perspective of the Hazardous Outcomes During Two Consecutive February-march 2015 Winters Storms Across Kentucky” (Josh Durkee)

During February and March 2015, two historic winter storms produced an array of hazardous outcomes across Kentucky and the surrounding areas within a two week period. In Kentucky, both events combined resulted in ten wind-chill related fatalities, one injury, and produced an estimated \$174,000 in property damages. Many areas experienced nearly 48-hour snow durations that totaled between 40-50 cm. Record low temperatures below -20°C were observed in parts of the state. Interstate closures and thousands of power outages stranded residents in sub-freezing and sometimes record cold temperatures across the state. Businesses and schools in rural cities were shut down for up to a week due to impassible snow-covered roads. The purpose of this study is to provide meteorological context for an improved understanding of the hazardous 2014-2015 winter conditions across Kentucky, particularly as they pertained to these two events. The data used in this study include first-order observation stations, hazard data from the National Climatic Data Center Storm Events Database, as well as Midwestern Regional Climate Center Cli-MATE temperature and snowfall observations. Initial findings show that while the winter of 2014-2015 ranked above average in snowfall, the state experienced relatively little snow and average temperatures prior to February 2015.

Hancock, Shane Hancock; Iverson, Leisel; Pulliam, Daniel “Examination of Attentional Focus Strategies and Exercise Intensity On Rpe, Affect, and Cognitive Processing” (Steven Winger)

The purpose of this study was to examine the impact of four attentional focus conditions and three intensities on RPE, affect, and cognitive processing. Participants consisted of 103 undergraduates. Participants were assigned to one of four conditions: 1) Control, bike, 2) Math, bike while completing math problems, 3) Music, bike while actively listening to music, and 4) Math and Music, bike while completing math problems and actively listening to music. Participants exercised for 5 minutes at a low, moderate, and high intensity. In between each bout participants were allowed 5 minutes of resting time. The first research questions assessed which dissociation activity had the most impact on RPE and affect and whether intensity moderated the effect. There were no significant interactions. The second research question addressed how exercise intensity impacted math performance and whether there was a difference between the math vs. math and music conditions. As exercise intensity increased math performance decreased significantly in a negative linear fashion. At the low intensity persons in the math only condition performed better than those in the math and music condition. This difference dissipated as the intensity increased.

Hannah, Emily. “Get In the Zone: A Survey of Dental Professionals’ Knowledge of Ozone Therapy” (Lynn Austin)

Ozone therapy has been used in medicine for centuries to treat a variety of ailments. Ozone is an unstable triatomic molecule made up of three oxygen atoms. This molecule has the ability to kill bacteria, fungi, parasites, and viruses. The researcher first was curious if there has been research done on uses of Ozone in the dental setting. After reviewing the literature there is indeed a use for Ozone to treat a host of dental problems including periodontal disease, ulcers, and carious lesions (also known as cavities). However, there are conflicting conclusions in the literature as to whether or not Ozone is the most effective treatment against oral pathogens. The current research done on the subject in dentistry is limited. The researcher sent out a brief survey to inquire if dentists in the state of Kentucky are aware of Ozone therapy and its uses in dentistry. The researcher also inquired about the dentists’ location, the year of graduation from dental school, and if they specialize in a certain area of dentistry. The survey will give insight into whether or not dentists are aware of this treatment alternative.

Harris, Heather “Fusion: A Shared Space” (Sheila Flener)

A shared space with a focus on revitalizing downtown businesses for success will flourish when incorporating the community to work towards this goal. This type of vertical studio will have the practices of service learning that accommodates high school students, undergraduate students, graduate students, educators, and design professionals. This shared space will integrate distinctive work zones that fuse together with unique architectural and sustainable features. Specified areas are made accessible throughout the space to provide an experience for every individual that might encounter this shared space. These work zones include a studio space for group project collaboration, community areas that incorporate various activities, and faculty/staff support spaces to manage the studio. Sustainable features also showcase themselves in this space to create a healthy environment for users. These sustainable features include, but are not limited to nature views surrounding the building.

Haug, Garrett “Developing the Body of Philadelphia” (Shahaz Aly)

My hypothesis is that surround structures influence the community. What if we redirected the lifestyle of a neighborhood into a health conscience focus. Will the surrounding environment encourage a healthier neighborhood? My senior research project is to study the effects of the surrounding establishments and how to positively influence the people to become more active in

their healthy lifestyle. The overall goal is to focus on the interaction of how people react within the urban level and how this can influence a healthy living. With this goal in mind, I will be developing a multi-purpose building. The main purpose of the building will be to host multiple sporting events (outdoors and indoors). Other functions that will be attached to this facility is a gymnasium and a AMTrak stop. The influence on the design and materials follow along with the traditional styles of Philadelphia. While this new structure is based off Georgian and Federal Style; it has a contemporary approach with the glass facade. This structure helps relate how the human body is a reflection of art as it directly references the Art Museum of Philadelphia.

Hayslip, Frederick “Does Simón Bolívar Still Influence Latin America?” (Sonia Lenk)

Studying Latin American civilization is important because the progression of how Latin America arrived at its current state and structure is very complex, and understanding how this progression took place is vital to understanding how Latin American civilization is currently constructed on a cultural, political, and ideological level. Specifically, I am looking at two Latin American countries, Venezuela and Ecuador, and looking at their development over time in relation to probably the most important person involved in making their respective independences come to fruition: Simón Bolívar. Bolívar was a military hero who had very strong beliefs on how a country should be operated, along with firm moral and cultural values that he believed should serve as the foundation for a country’s identity. The question I will attempt to answer is, in effect, “How closely do the governments and cultures of modern-day Venezuela and Ecuador reflect the ideas and beliefs of Simón Bolívar?” I will conduct research on the cultural and governmental roots of Venezuela and Ecuador and compare that to the political and/or cultural ideology of Bolívar expressed in various primary sources, eventually answering to what degree the influences of Simón Bolívar are still visible today.

Henderson, Andrew; Collier, Sydney; Tipton, Jacob; Peck, Emily; Jackson, Carley; Murray, Chelsea “Gender and Communication” (Blair Thompson)

Our study investigates the relationship between gender and persuasion, and specifically how the gender of listeners and speakers can impact the receptiveness of a message. Persuasion is a communication method that is used on a daily basis, and developing a better understanding of how persuasion is perceived and conveyed will allow us to become more effective communicators. Men and women are known to differ in many ways, and this is evident in the various persuasion tactics used by both genders. This study also takes into account how the persuasion tactics used can be changed depending on the gender of the audience. After interviewing 4 adult men and 3 adult women (all of whom were college-aged individuals), our results suggested many varying themes that could impact the effectiveness of the speaker, but the gender of the speaker was the dominant factor. Each participant listened to two audio advertisements for the same product and following the same script, one presented by a male voice and one presented by a female voice. After the participant listened to these audio recordings, they were interviewed and asked which speaker was more persuasive and why, as well as their past experiences relating to persuasion.

Henderson, Nicholas “Architecture Providing a Sustainable Community” (Shahnaz Aly)

Architecture is more than creating a unique design or an attractive building. Architecture is about creating spaces that will endure time. With the building industry being one of the largest energy resource users on this planet, architects have the responsibility to reduce its reliance on these precious resources. A renowned architect, Richard Rogers, once said, “I believe we - architects - can affect the quality of life of the people.” Missionaries in Costa Rica approached us to design a community that is a safe haven for local orphans and refugees. The architecture we created focused on making a space for people to heal, and emotionally rehabilitate. The significance of our architecture was to produce a space where interaction, opportunity and healing encourage a community to grow and function as one. It became essential to design a community that was sustainable and self-sufficient. Bringing together sustainable design and our ideas of a community go together harmoniously. Sustainability philosophy focuses on creating prosperity and hope in our communities. It is through careful investigation and research we achieved a design that had a positive environmental impact, and one that also is socially and emotionally responsive to the community.

Hendrick, MaryEllen “More Than Just Torture Porn: Eli Roth and Dismantling American Exceptionalism” (Jerod Hollyfield)

Foreign countries often view Americans as a privileged society. Americans typically live an extravagant lifestyle compared to others, and foreign societies judge them for this. Being an American also seems to come with some sense of entitlement, and the need to fix other societies, whether the society asks for it or not. Many films explore this idea, but no directors rival Eli Roth and his controversial material. While David Edelstein refers to Roth’s films as “freak-show sensationalism[s] with relish, [while] enjoying...the prospect of titillating and shocking” and refers to it as “torture porn,” Roth actually offers up social commentary on American society. In this paper I argue that Roth uses the films *Hostel II* and *the Green Inferno* to mock ideas of American exceptionalism through the journey of the female protagonists, challenging of corporate power, and extreme gore. *Hostel II* features wealthy female college students traveling throughout Europe who are captured and tortured by a corporation of buyers. In *the Green Inferno*, Roth mocks college students and the idea of political correctness through

the slaughter of a college group by the very indigenous people they wish to save. While sounding far-fetched, both films clearly commentate on real American society.

Henley, Michael “Two Designs of a Simple Electrical Difference Engine” (Walter Collett)

Charles Babbage (1791-1871) designed the mechanical difference engine with the ability to automate the process of computing up to seventh degree polynomials. Until a version of the difference engine was realized, manual calculations by human “computers” were the only method of tabulating polynomial output. Babbage’s difference engine accomplished this goal mechanically. Our project goal was to design a small-scale electrical difference engine capable of calculating integer coefficient second or third degree polynomials. We approached the design as two separate teams. The two teams were not allowed to discuss the project with one another until after the project deadline. Each team designed their respective electrical difference engine in a circuit simulation software, and ultimately took two contrasting paths to accomplish the project goal. This poster details the processes involved in the design of these circuits, as well as circuit simulations of the final designs.

Hickey, Daniel “Green Overlook Hotel and Restaurant” (Shahnaz Aly)

The goal of my project is to provide a hotel for guests of Bowling Green Kentucky. I felt it is necessary to provide a convenient place for visitors to stay when events are hosted at Sky Pac and the Hot Rods baseball stadium. Bowling Green has a revitalization program called the TIF district, if their efforts are going to be successful I feel like there needs to be a location within walking distance of these popular locations. My main area of research was devoted to the TIF district due to strenuous restrictions dealing with aesthetics and also the goal of the district. Another major research area was successful hotels located in other cities. The main focus of this research was directed but not limited to the Peabody hotel in Memphis TN. The areas of other hotels research efforts were dedicated to street appeal, room layout, and aspects that make them successful in the area they are located. Sustainability was also a research area, specifically sustainable materials. In conclusion my project is a way for the TIF district to invite new people into the area and allow them to stay comfortably and conveniently in the beautiful city of Bowling Green.

Hickey, Hayden “Is Workplace Justice Blind? Social Media Use In Employee Selection” (Amber Schroeder)

This study combines aspects of social media’s role in employee selection and how it relates to potential employee attitudes toward a company. By measuring participants’ attitudes when told that their Facebook profiles would be taken into consideration in determining their job ability, applicant feelings of procedural justice (i.e., fairness of a process; PJ) were assessed and compared to a control group. To measure interactional justice (i.e., fairness regarding interpersonal treatment; IJ), participants were divided into two conditions: participants in the high justice condition were given an explanation of the rationale behind using social media as an evaluation tool and shown empathy, whereas participants in the low justice condition were provided with no information and shown no empathy. The current study also compared participants’ self-reported stress levels with both PJ and IJ. Our objectives included measuring applicants’ perceptions of workplace injustice.

Hicks, Stacy “Characterization and Threat Assessment of Potentially Hazardous Near Earth Asteroids” (Mike Carini)

Our planet is under constant threat from both man-made and natural disasters. With all that is happening on our world, it is easy to overlook external threats, such as asteroid impacts. While rare, these are major threats, historically resulting in mass extinction events. I have undertaken a study of eight potentially hazardous asteroid candidates identified in conjunction with NASA’s OSIRIS REX Mission and observed via the Target Asteroid Project (TAP). This study will include a characterization of these asteroid’s orbits and physical characteristics as well as a threat assessment. Using images obtained by TAP, I am determining the brightness of the asteroid as a function of time, known as a light curve. Analysis of the light curve provides information on the rotation period of the asteroid and its size. Spectroscopic observations will be obtained with WKU’s 0.6m Bell observatory and combined with multi-color photometry from TAP to determine composition of the asteroid. Knowledge of the size and composition of the asteroid are the two critical parameters in assessing the severity of the threat. Using the determined characteristics for each target asteroid, impact scenario modeling will be done to determine the effects of an impact event specific to each target.

Hillard, Taylor “Spanning Generations: An Oral Family History Project” (Blair Thompson)

Family is an integral aspect of humanity that exists in a variety of forms. Our families shape who we are, despite their makeup or relational quality. Based on his or her experiences, each person has an individualized view of family, and these views can even differ among family members of separate generations. In order to better understand these differences, members of the same family from three different generations were interviewed regarding their perspectives and opinions of family. The interview questions addressed four focus areas of family communication: family communication patterns, the definition of family, family stories and legacies, and the division of labor within families. Through comparison of the interview responses, this project shows the influence of family resulting in common beliefs but also demonstrates each individual’s freedom to reject familial norms and form their own opinions.

Hollen, Clayton “Alucore Failure Testing” (Mortenza Nurcheshmeh)

Students: Clayton Hollen, Saxon Steele, Muhamed Suljic, Abdulaziz Suqair Advisor: Dr. Morteza Nurcheshmeh Logan Aluminum, came to Western Kentucky University's Engineering Department with the request to create a machine center for the purpose of testing its Alu-core material. The goal of the project was to design a machine that could quickly and accurately measure the structural integrity of a corrugated aluminum core. This core is what Logan stores and ships its final product on. The testing of these Alu-cores had previously been done utilizing a two point load frame. It was quickly determined that using the existing load frame machine and equipment would not be sufficient for a final design according to the guidelines and instruction given to our team. As the entire acceptance criteria and design specifications were taken into consideration our design changed throughout the process to create the best possible product. Initial concepts focused on incorporating hoop stress. It was believed, and later tested, that adding a hoop stress would lead to the capability of resisting a greater load than testing. Some of the initial designs were vastly too complicated, or simply were not properly simulated.

Holt, Delaney ““the Creature Creation: Popular Culture’s Altered Depiction of Mary Shelley’s Frankenstein”” (Ted Hovet) Within popular culture, numerous facets of the humanities have been altered to intrigue the public. Unfortunately, these alterations have led to innumerable misconceptions in regard to an artist’s original intentions, including overall thematic frameworks and visual depictions. My essay addresses the diminished ambiguity of philosophical dilemmas in original literary works and asks today’s society to reevaluate the standards within popular culture. Specifically, I argue that nineteenth-century Gothic literature’s numerous elements have been altered to enhance personal gain within society. Within this essay, I incorporate Mary Shelley’s novel Frankenstein; Or, the Modern Prometheus to highlight the sheer amount of misconstrued material that contributes to present day culture. First and foremost, I present the introduction of a so-called “Frankenstein” into Halloween festivities, while addressing the original descriptions of the Creature. Next, I detail the slow transformation of Shelley’s character throughout decades of media. Ultimately, Shelley illuminates the truth of the human experience and the importance of ethical standards within scientific study through the image of her Creature, yet popular culture’s depictions of the character overshadow the overall importance of Gothic literary themes within today’s world.

Hoskinson, Lillie; Hulan, Nancy F.; Knotts, J. Dusteen “Tutor In a Bag: Reaching Struggling Readers” (Nancy Hulan) Tutor in a Bag project introduces an on-going evidence-based tutoring program for at-risk Kindergarten readers. Kindergarten students were identified as high risk for reading problems in a diverse public school. a student considered high risk exhibited below average skills in letter and word recognition, letter sounds, phonological segmenting skills, low scores on kindergarten screening, and teacher recommendation. In phase one of this project, four children were selected to receive tutoring. Four volunteers completed a two-hour training session to learn about the structure and components of the 30-minute tutoring sessions. Volunteers completed district training in confidentiality and obtained background clearance. Tutoring sessions occurred once a week for 30-minute sessions after school and included four types of activities: phonemic awareness games, letter and sound activities, sight word practice, and reading a book. Resources and materials were provided to tutors in a backpack. During each session tutors selected activities to address each of the four components using a brief lesson plan format and student feedback system. Tutors received on-going support from the researcher. Phase one of the tutoring program ended in December and students were reevaluated. Phase two of the tutoring program has just begun and includes five sets of tutors and students.

Hughes, Nolan “Applications and Process of Photogrammetry” (Joel Lenoir) Photogrammetry is the process of using overlapping photos to generate three-dimensional models. These models represent physical volumes that can be measured and 3D printed. The purpose of this research project was to generate a work flow for using the free photogrammetry software 123D Catch and investigate the processes, techniques, and tricks that would lead to the best three-dimensional models while minimizing cost and time. The primary focus of my research was to utilize photogrammetry in the modeling and recreation of physical landmarks such as statues. The workflow developed here can be extended to applications in forensic and structural analysis. Multiple sets of photos at different distances and elevations were used to generate models of two statues. Depending on the object and the desired level of detail, 30-50 photos taken from a wide angle generated the best models. Capturing more background allows the software to have a better orientation since it uses landmarks in the photos to align the images in 3D space. The best model generated without excessive warping or artificial deformation of the true object was converted into a usable solid file. The workflow developed also includes other free software packages to produce good models for 3D printing.

Hupman, Ann ““Can You Imagine?": The Presence of the Dystopian Society in Film “ (Jerod Hollyfield) From Stanley Kubrick’s nightmarish film adaptation of a Clockwork Orange (1972) to the recent box office blowout the Hunger Games trilogy, dystopian societies have had a constant and secure place in the film industry. These ideas have even found their way into children’s animated films. Wall-E (2008) is a Disney Pixar film that follows a robot left on a post-apocalyptic Earth covered in waste due to mass consumerism. The film’s creators strategically folded together very real social issues with stunning visuals and a charming love story, fooling any child into enjoying a film that deals with heavy issues like environmentalism. Robert MacFarlane stated that these apocalyptic ideas have the ability “to command attention and shock people,” but does the same go for the audience Wall-E was meant to attract? In this paper, I will discuss our

society's fascination with these dystopian cultures, ask why the idea of an unstable society is intriguing and find the place where Wall-E belongs in all of this.

Jackson, Hope "The Fruitlands Failure, Or How Not To Create an Intentional Community" (Timothy Evans)
Fruitlands was a Utopian community established in 1843 by Bronson Alcott, a prominent Transcendentalist philosopher. The organization of Fruitlands and its subsequent failure provides insight into the roles of faith, ideals, and social processes in intentional communities which are relevant to communes in the 21st Century. This research is both historically and sociologically significant, and gives clues to how intentional communities can establish a cohesive structure for functionality. The lack of cohesion, complete agreement, and understanding of the values they espoused appear to have hastened the demise of a promising society. I viewed Bronson Alcott's personal papers and secondary sources at Harvard College's Houghton Library. Alcott's daughter, Louisa May Alcott, wrote about her thoughts and memories in *Transcendental Wild Oats*. Besides the Alcott family, other names associated with Fruitlands include Charles Lane, and Isaac Hecker. The Transcendentalists eliminated stimulants, animal products, and certain foods from their diets. Cotton was eliminated because it was produced by slave labor. Some of these beliefs were shaped by the devout nature of the founders. Many ideas would be considered absurd by society. The community came together with high ideals and intentions, but lacked a solid foundation of intentionality.

Jacobson, Sean "Western's New Deal: The Shaping of College Heights During the Great Depression" (Patricia Minter)
This thesis addresses the Great Depression's impact on public higher education by analyzing developments at Western Kentucky State Teachers College. It also seeks to understand factors leading to the enshrinement of Henry Hardin Cherry as a larger-than-life figure upon his death in 1937. Archival research was conducted primarily through materials in the Library of Special Collections in the Kentucky Building. In addition to books and documents, visual media and oral histories provided research content. The study found that the New Deal projects on campus provided a boost for Cherry's leadership and charisma in his community. The concurrence of his death with the construction of a classroom building funded by the Public Works Administration determined his memorialization for posterity. The building, Cherry Hall, emerged as an institutional symbol and attached the college's identity to the character of its founder. The results provide insight and discussion to the New Deal's implementation.

Jeddi, Haleh; Luo, Weilong; Zhang, Rui "Kinetic Studies of Oxygen Atom Transfer Reactions By an Oxo-manganese(v) Corrole" (Rui Zhang)
There is significant interest in the catalytic activity of metalloporphyrins owing to their structural similarities to metalloporphyrins. In this study, 5,10,15-tripentafluorophenyl corrole (H3TPFC) and its manganese(III) complex [MnIII(TPFC)] were successfully synthesized according to literature-reported methods. The manganese(III) precursor was oxidized by two different oxygen sources to a manganese(V)-oxo complex [MnV(TPFC)O]. The kinetics of its oxygen atom transfer reactions were investigated under pseudo-first-order conditions. Competition reactions were studied with a catalytic amount of MnIII(TPFC) and a terminal oxidant. Our studies indicate that MnV(TPFC)O reacts via a disproportionation pathway to generate a putative manganese(VI)-oxo species, acting as the true oxidant.

Jernigan, Aaron "Importance of Environment In Architectural Education" (Shahnaz Aly)
Importance of Environment in Architectural Education Abstract the goal of this proposal is to improve the facilities of architectural education at WKU. This revolves around three main tenets: The instruction and studio areas should be didactic, comfortable, and beautiful. Recommendations are made for a new architecture building that addresses these through contemporary design and "trueness" of materials; sun shading to reduce glare on computer screens; and adding natural light, exterior views, and green space. In creating this type of environment, certain other benefits exist like the insulating qualities of a green roof, the reduction in solar gains from brise-soleil (sun-shading devices), and the reduction in bird casualties from indiscernibly transparent or reflective glazing.

Johnson, Jarred "Disaquer: An Investigation of Queerness In German Cinema" (Laura McGee)
While American queer film history began in 1970 with *Boys in the Band* (Friedkin), German queer film history began much earlier in 1919 with *Anders als die Andern*, or *Different than the Others* (Oswald). Because of its longer history and European cultural context, German film has tended to represent queerness more openly and normatively than American film. Critically, however, queer German films of the last fifteen years have adopted American tendencies—for instance, telling more coming-out stories. This paper seeks to understand the uniquely German concept of queerness that originated in Weimar Era cinema, its progression and eventual decline in favor of an American, and, hence, global standard of queer film. Finally, the paper situates the increased popularity of queer German immigrant stories as the inevitable result of Germany's attempt to create films using an American conception of queerness.

Johnson, Jessica; Johnson, Jarrett "Growth and Survival of Salamanders Exposed To Different Formulations of Glyphosate-based Herbicide." (Jarrett Johnson)

Amphibian populations have been experiencing declines worldwide in the past few decades. There are many proposed causations, including the use of agricultural chemicals such as herbicides. This study looks at the effects of different brands of glyphosate based herbicides on the survival and growth of salamanders. In a series of experiments, we reared axolotls (*Ambystoma mexicanum*) from hatching until approximately 75 days post-hatching in laboratory water containing concentrations of herbicide ranging from 3mg/L to 12mg/L. Out of the four brands of glyphosate herbicide (Aquaneat, Aquaneat, Helosate Plus, and Roundup Pro), the survival rates of Roundup Pro were the lowest; at a 6mg/L concentration, all larvae died. Survival was unaffected by exposure to the other herbicide formulations at all higher concentrations tested (up to 12mg/L). Growth appeared to be greatest for those larvae treated with Aquaneat brand herbicide, but there were no significant differences in other morphological features measured. Our results indicate that Roundup Pro is lethal at concentrations of 6 mg/L, and supports previous work that suggests that the active ingredient, glyphosate is not responsible. Rather the particular adjuvants and surfactants (non-active ingredients) present in the different formulations are likely responsible for the observed differences in growth and survival.

Johnson, Joseph “The Perfect Storm: Delving Into Italian Neo Realism’s Influence On the Tv Series Trailer Park Boys and How the Effects of These Influences Employ a Sense of Reality” (Jerod Holyfield)

The Canadian reality TV show Trailer Park Boys, premiered on the cable network Showcase in 2001, quickly becoming the networks’ highest rated show. The show has grown in popularity airing it’s eighth and ninth season on Netflix with a 10th season airing in March of 2016. The subject of the mockumentary/reality TV series revolves around a band of socio-economic misfits that live in a fictional trailer park in Nova Scotia. The characters aim to strike it rich through an array of schemes and petty crimes, however they’re hilariously warped understanding of the world creates an insurmountable success barrier. In the Canadian Journal of Communication, Jean Bruce provides an interesting insight on Hughes-Fuller’s argument about Trailer Park Boys’ relation to reality TV, “Hughes-Fuller argues that, “The show’s resulting excessive and misplaced spectacles produce a new disruptive and potentially progressive carnivalesque subject, one that defies reality television’s imagined citizen as a particular kind of self-serving consumer”. TPB subverts this imagined citizen, provoking reality. In this paper I will make the connection of Italian neo-realism’s influence on the popularity and employed realism within the reality/mockumentary TV series Trailer Park Boys, specifically exploring the use of unprofessional talent, thematic representation and aesthetic technique.

Johnson, Nicholas “Tracking Cancer Through the Genes” (Chandra Emani)

Paired box protein, Pax-5 has been identified as a cancer gene. The purpose of the present study is to identify the gene in many different species by phylogenetic analysis utilizing bioinformatics software that would be used to compile a list of the genes across life forms. Using the human gene as a reference, the ancestral species and the gene will be identified. The oldest known occurrence of the gene and its code will be compared to the rest of the species in the compiled list. This will enable us to track the variants in the genetic code and compare those changes within the list of the genes to the modern day human gene. By doing this we can try to identify the domains within the gene that might have mutated to a cancer promoting gene. If we identify such domains within the gene that have changed, we can look for existing drugs or treatments that can target those parts of the gene. Such targeted treatment for cancer patients that complements or integrates with existing standard treatment may specifically target the cancer and help lessen the negative side effects of standard treatments.

Johnson, William; , Jennifer “Designing and Building an Automatic Chamfer Grinding System” (Chris Byrne)

Modern day manufacturing is a demanding environment with a constant need for process improvement. As automation becomes more advanced, there are fewer jobs that must be completed by a human. In the case of Stupp Bridge Company, a local manufacturer of steel bridge girders, their workforce is highly skilled, so replacing mundane tasks with automation allow the skilled workers to focus on the difficult jobs. One such task is grinding a chamfer onto every leading edge of each girder flange, eight edges in total, ranging from 20 to 200 feet long. The purpose of this project was to design an automatic chamfer grinding system. To ensure maximum design potential, an entire semester was spent planning and designing the system. This has carried over into the current semester, and a number of techniques are being used, the largest of which is 3D computer aided design using Solidworks. Once a design is finalized, and company approval obtained, the building process will begin. Concurrent with assembly will be component testing, to confirm that the chosen components will perform as required. By the completion of this semester, a finished device will be given to Stupp Bridge Company to be put into their everyday operations.

Jones, Andrew “Investigating Water Quality Impacts From Visitor Impact In the Red River Gorge Area of Kentucky” (Jason Polk)

Investigating Water Quality Impacts from Visitor Impact in the Red River Gorge Area of Kentucky Eastern Kentucky has much to offer the adventurous person: hundreds of miles of hiking trails, tranquil forests, and world class rock climbing. The Red River Gorge Climbers’ Coalition (RRGCC) is at the forefront of securing access to this excellent climbing. They own two parcels of land in Lee County totaling approximately 1059 acres that are open to the public as “human-powered recreation areas.” While the RRGCC does its best to maintain these properties utilizing Leave No Trace principles, there are

no quantifiable data to measure how effective these policies are with regard to water quality impacts. Water quality sampling will be conducted throughout the course of a calendar year to capture the seasonality in both human impact and weather patterns. Sampling will measure: E.coli count, turbidity, temperature, stream flow, specific conductivity, pH, and ion concentrations. These data will provide researchers and landowners information to aid in shaping current and future land management practices.

Jones, Kolton; Cao, Yan “Dynamic Modular Instrumentation Platform” (Yan Cao)

Dynamic Modular Instrumentation Platform Kolton Jones and Dr. Yan Cao the developing an instrumentation platform that is able to be adapted to a large variety of applications. The platform will combine an expanding list of techniques including and not limited to FTIR, Raman, AFM, Surface Plasmon Resonance, electro chemical, microfluidics. The platform is currently adapting an interferometer to the platform to provide more accurate positioning into its FTIR, Raman, AFM, Surface Plasmon Resonance, electro chemical, and microfluidic measurements. The interferometer will allow for computer controlled system adjusting different parameters of each set up. The increased accuracy and computer controlled will allow for a dynamic system that is able to adjust to each sample as need with little to no input from the operator.

Jones, Konnor; Nee, Matthew “Temperature and Electric Field Dependency of Asymmetric Stretching of Nitrate Ion” (Matthew Nee)

Decomposition of ubiquitous nitrate ion by exposure to sunlight (photolysis) produces nitrogen monoxide, nitrogen dioxide, and ozone, which are harmful to humans and the atmosphere, releasing these gases into the air. To model the production of these gases, bond-breaking in nitrate ion must be better understood. Different nitrate geometries induced in water may form varying amounts of products during photolysis. To better understand the steps of nitrate photolysis, a better comprehension of nitrate geometry distortion is needed. Distinct molecular motions of nitrate ions were observed at a series of constant temperatures with discrete concentrations of charged particles (ions) in solution. The various spatial orientations of ions in a nitrate solution distort the nitrate ion shape, possibly favoring a specific initial chemical path (such as more ozone, or nitrogen monoxide) during photolysis. Two distinguishable distortions of molecular motions are observable in a graph of the energies of different motions of nitrate ions in water. These energies are used to estimate the relative amounts of nitrate associated with each induced molecular shape. This aids in our understanding the effect salts have on the decomposition of nitrate ion by understanding the changes that solution composition can have on molecular shapes.

Kalra, Ajay ““whispering Pines: Spatial Codes of Recorded Late- and Post-countercultural Pastoral Music.”” (Ann Ferrell) Space is central to music—in not only music's physical existence and mediation, but its purpose. The spaces where music is physically recorded, performed, and received are but small aspects of the totality of music's relationship to space. Musical performance does occupy physical and socio-cultural space. Yet, overdue emphasis on that here and now distracts musical cultural studies from music's historical project of conjuring the there and/or then, of invoking non-proximate spaces. In 1960s and 1970s America, against the backdrop of escalating socio-political disappointment, countercultural ideologies and fantasies of a musical youth dovetailed with improving recording technologies to generate expanding sonic languages for limning utopian pastoral spaces to which listeners could escape, virtually. Counterculturalists painted their claims to expansive spaces, both terrestrial and cosmic, through a kaleidoscope of cultural forms, but most significantly by etching a trace of the desired spaces on record, making recordings a major avenue through which these spaces were almost materialized sonically. Examining diverse genres, I will present a taxonomy of spatial codes of varying provenance brought together in pastoral recordings of that era, many of which continue to inform contemporary music. Music analysis, phenomenology, acoustics, psychoacoustics, ethnographic interviews, and film studies inform my cross-disciplinary approach.

Kapadia, Mayank; Srivastava, Ajay “Identification of Collagen Iv Associated Proteins From Third Larval Instar Using Drosophila Genetics and Mass Spectrometry” (Ajay Srivastava)

Metastatic cancer cells invade and spread to other locations by disrupting the basement membrane (BM). The membrane plays a major role during the normal development of an organism. In order to understand the invasion mechanism it is important to know the various interactions occurring with the proteins of the BM during the normal development. This study concentrates on understanding the major factors associated with collagen IV, a major component of BM during the third instar larval development of Drosophila. Western blot and mass spectrometry analysis revealed that collagen IV is associated with various growth factors, signaling molecules, and proteins that work together during the development of the Drosophila. Pull-down assay helped to understand how these components are associated with each other. This analysis will bring new insights on the mechanism used by the cancer cells to invade and spread so efficiently.

Kazaferovic, Sejla “Restriction Enzymes That Generate Cluster-specific Patterns in Mycobacteriophages” (Claire Rinehart)

The purpose of this research was to discover restriction enzymes that could cleave all Mycobacteriophage in unique cluster-specific patterns. Each Fall, in the Genome Discovery and Exploration course, students isolate and purify Mycobacteriophages. They isolate DNA and before sequencing they analyze the restriction digest patterns for five restriction enzymes. From the results they try to predict the cluster to which their phage may belong. Subsequent selection for

sequencing prefers to favor under-represented clusters in order to identify maximum diversity. The current restriction enzymes are not very predictive of cluster and so this project looked at additional restriction enzymes that may give patterns more diagnostic of cluster. The DNA sequences for the Mycobacteriophage were obtained from the phagesdb.org site. Initially twenty five 8 base pair restriction enzymes were used to screen 114 representatives from the a cluster. Out of all twenty five enzymes only 2 were able to cleave all 14 sub-cluster within the a cluster. Subsequently, a program was written in Mathematica® to identify and screen the cleavage patterns for restriction enzymes in all of the Mycobacteriophage clusters. In conclusion the enzymes that were identified showed fairly consistent numbers of cuts within all clusters and fragment sizes were compared for cluster-specific patterns.

Keith, Hannah “The Relationship Between Secondary Mathematics Teachers' College Experiences and Their Personal Classroom Practices” (Jennifer Cribbs)

Research has shown that a teacher’s instructional practices in the secondary mathematics classroom often come from the beliefs they hold about mathematics and that, in turn, these beliefs arise from personal experiences. One experience which all secondary mathematics teachers share is the pursuit of a college degree. This raises an important question: Could the college mathematics courses in which secondary teachers are enrolled have an impact on the aspects of mathematics which they deem important in their own classrooms? Using a correlations test, data collected from over 13,000 teachers by the National Center for Education Statistics was closely examined. This examination yielded interesting correlations between a teacher’s enrollment in four different college-level courses (applied mathematics, calculus, discrete mathematics, and statistics) and the emphasis which a teacher places on different facets of the study of mathematics (student interest, mathematical concepts, and algorithms).

Keith, Johnathon; Massengale, Jackson; Hanna, Brandon; Nguyen, Duc “Heat Curving Steel Girder Highway Bridges” (Morteza Nurcheshmeh)

Students: Jackson Massengale, Brandon Hanna, Duc Nguyen, and Johnathon Keith (Senior students in WKU Mechanical Engineering Major) Advisor: Dr. Morteza Nurcheshmeh Title: Heat Curving Steel Girder Highway Bridges Abstract For more than 150 years, Stupp Bridge Company's steel fabrication experience combined with an energetic workforce and state-of-the-art facility has resulted in delivery of bridges on schedule and within budget. Strategically located, the Bowling Green, Kentucky bridge fabrication facility produces plate girder bridges with an emphasis on quality, low-cost and dependable delivery. Engineers at Stupp are continually seeking ways to improve the heat curving process of girders to create higher quality product while maintaining affordability and improving safety. Our team is researching to provide documents on the development of improved design specifications for horizontally curved steel girder highway bridges. The study commenced with a literature review of available references. Some of these references are pertinent standards, the current practice at Stupp Bridge. The next stage will be assessing the gathered information. Finally, a detailed guideline of heat curving of girders will be prepared. Although this work is focused primarily on available information and technology, portions of the research is devoted to improving on the current state-of-the-art technology where possible.

Keller, Luci “Tourism Impacts On Chilean Patagonia: What Is Happening and How Can We Fix It?” (David Keeling)

The region of Chile from the Reloncavi Estuary in the North to the Straits of Magellan in the South is known as Chilean Patagonia. This wild landscape is considered one of the last untouched places on Earth, and for this reason, there has been a steady increase in the number of tourists to the area since 2009. The environment of Chilean Patagonia is widely uninhabited except for the National Parks, so this area does not have the resources to implement ecologically healthy tourism infrastructure. We analyze the impact and causes of this poor tourism infrastructure with a focus on Torres Del Paine National Park. Impacts include threatened habitats, endangered species, deforestation, and waste management. We show how current environmental and tourism policies are leading to these problems, and we propose methods to ameliorate future ecological damage through alternative energy sources, sustainable practices, and park management plans.

KIM, Juhwa “Multiplexed Detection of Pathogenic Dna Using Zinc Finger Proteins Without Dna Amplification” (Moon-Soo Kim)

The development of a new technology for the detection of double-stranded (ds) DNA enables multiple biomedical applications including identifying multiple pathogens simultaneously. We previously employed colorimetric Sequence-Enabled Reassembly with TEM-1 β -lactamase (SEER-Lac) to detect specific bacterial DNA sequence. SEER-Lac consists of the two inactive β -lactamase fragments which of each attached to a zinc finger protein (ZFP) would reassemble into an active full-length enzyme upon ZFPs binding to its target DNA. Here, we engineered two pairs of ZFPs which of each recognizes shiga toxin in *E. coli* O157 and staphylococcal enterotoxin B in *Staphylococcus Aureus*, respectively. Alkaline phosphatase or biotin are conjugated to the detection probe ZFP and the capture ZFP probe is immobilized on nitrocellulose membrane. The ZFP binding to their target DNA was transduced into chemiluminescent signal. Our assay generates DNA-dependent signal and allows for a detection limit of 0.5 nM without DNA denaturation and subsequently hybridization. Our system can be developed into a simple multiplexed detection diagnostic for dsDNA without DNA amplification.

King, Aaron “Architecture: Being Prospective For Society” (Shahnaz Aly)

Architecture creates the world we live in and experience. When creating a green sustainable building the quality of what we experience should not be diminished. Designing a structure to house multiple aspects will create a more efficient and enjoyable space. a theoretical design of a USDA research facility for Western Kentucky University uses this idea. This theoretical structure will house a research facility, classrooms, and parking structure. The vision statement of this design is “Being Prospective for Society”, since the structure is not only for the benefit for WKU but the advancement of society. By forming a camaraderie not only between researchers but also with the surrounding campus, this facility will help push both science and the community forward in development. Locally WKU’s science complex will become a more successful place, at the same time assisting campus and surrounding community to function more efficiently through good sustainability research and design.

King, Steven; Mock, Tyler; , Ogoma Egembah; , Tania Tando “Implementing Tele-stroke In Rural Hospitals” (Bob Hatfield)

Partnered with the Commonwealth Health Corporation (CHC), my team of graduate students explored the possibility of implementing tele-medicine in the Medical Centers of Scottsville and Franklin to improve stroke outcomes. Given the high costs of physician recruiting, administrators were inclined to find a non-traditional method of improving stroke care. Tele-stroke, a category of tele-medicine, allows a remote neurologist to advise hospital staff during stroke care via video streaming. We analyzed the stroke incidence rates and outcomes in these rural areas to outline the demand for improved stroke care. We determined the costs and benefits tele-stroke would bring the hospitals and the community. We concluded that the hospitals were seeing fewer stroke patients than the area is likely having and the introduction of a new stroke center would increase the patients they receive. Through interviews with experts and tele-medicine companies we determined Neurocall, an on-demand stroke service, was the optimal choice. We also determined the most efficient technology to accompany this service that was intuitive to use and reliable. By improving the quality of stroke care in these areas CHC can lower the costs of having a stroke for rural residents and also increase revenue.

Kini, Anu “Detection of Methylated Dna Using Engineered Zinc Finger Proteins” (Moon-Soo Kim)

Ras- Associated Domain Family subtype 1A (RASSF1A) is a tumor suppressor gene which is involved in deregulation and apoptosis of cells in cancer. Aberrant DNA methylation is a well-known epigenetic change associated with carcinogenesis. It has been shown that high frequency of methylation of RASSF1A has been observed in urine of bladder cancer patients. The availability of a simple molecular method to directly determine CpG methylation in a sequence specific manner would provide a powerful method for the detection of a specific cancer. a methyl-CpG binding domain (MBD) is employed to detect methylated CpG sites. Here, we engineered zinc finger proteins (ZFPs) to recognize specific sequences of the RASSF1A promoter region. Combined with the MBD, engineered ZFPs are utilized to detect promoter hypermethylation of tumor suppressor gene RASSF1A. Detection of aberrant methylation of tumor suppressor genes with our system can provide a non-invasive method for bladder cancer detection by obviating the need for a procedure to obtain biopsy material. It can also serve as an early diagnosis and prognosis for bladder cancer.

Kinnard, Jonathan; Moss, Kyle; Wilson, Stacy “Security Analysis of the Mqtt Protocol For the Internet of Things” (Stacy Wilson)

Introduced in 1999, the Message Query Telemetry Transport (MQTT) protocol has been widely adopted for use with Internet of Things devices. As with any communication protocol, secure delivery of data is of the utmost importance. In order to examine secure implementation of the protocol, a MQTT broker was deployed using a single board computer and multiple WiFi System on Chips (SOC) were tested with the security functionality supported by each device. Using network capture tools, the network was monitored to detect known and unknown vulnerabilities in the protocol. The results show that low cost devices often do not have the processing and memory capabilities to handle encryption and authentication required for a truly secure connection. The most popular SOC currently being used for building smart home sensors and devices, the ESP8266, had one of the poorest security results for those tested.

Kipper, Chelsey; Kambesis, Pat “Hydrograph Analysis of a Karst Conduit In Winneshiek County, Iowa” (Pat Kambesis)

A hydrograph is a graphical representation of stream water level over time. Hydrograph data is used for evaluating the hydrologic response of surface watersheds and groundwater basins to climatic influences. In 1980, the Iowa Department of Natural Resources installed a stream level recorder in the main stream passage of Coldwater Cave in Winnisheik County, Iowa. Coldwater Cave contains the main conduit of the Coldwater Cave groundwater basin, a significant sub-basin of the Upper Iowa River in northeastern Iowa. Stream level data were continuously measured from 1980 to 1990 and the data were recorded on graph paper. The data have never been processed or analyzed. The objective of this study was to digitize the hydrograph data in order to analyze the character and function of the Coldwater Cave groundwater basin. a digitizing program was used to trace the graphs and convert them to x-y graph coordinates. The data were converted to discharge data using existing stream passage cross sections and flow velocities. Climate data from a local climate station were included in the dataset. The discharge graphs generated from the stream gauge data, along with the climate data, provided a detailed look

at the seasonal response of the cave stream.

Kirtland, Aaron “Geometry Methods For Reducing the Number of Hypothesis Boxes In the Context of Pedestrian Detection” (Qi Li)

Pedestrian detection has a wide range of applications, including video surveillance, autodriving assistance, etc. Based on the body proportion, hypothesis bounding boxes can be estimated according to the length and the location of a vertical line segment that is extracted by a certain line segment detection algorithm. A vertical line segment could represent either a lower or entire leg of a pedestrian, and it could be one of further four categories: The left-outer edge, left-inner edge, right-inner edge, or right-outer edge of a leg. Thus, eight hypothesis boxes should be generated for each vertical line segment. Most of hypothesis boxes are false positives, i.e., irrelevant to a pedestrian region. Although symmetric appearance based verification can be applied to reduce the number of hypothesis boxes, the false positive rate is still high. In this work, we propose a geometry framework to reduce the number of bounding boxes generated by vertical lines with the assumption that certain line segments may be partially overlapped to each other. The basic idea of the proposed framework is to investigate the proportion of line segments that are partially overlapped in order to eliminate impossible hypothesis boxes.

Knebel, Elizabeth “The Mixed American Dream: An Analysis Into the Fascination and Hatred of America Through Hollywood Success” (Jerod Hollyfield)

Hollywood films rely greatly on their increasing popularity globally, whereas films created internationally, outside the U.S., often find little revenue from an American audience. According to recent figures from the Motion Picture Association of America (MPAA) almost 70 per cent of the studios’ annual revenue from box office now comes from international markets. With this statistic comes a great contradiction, considering certain stereotypes other countries associate with America. According to the Wall Street Journal, “Among European respondents, 32% said U.S. cultural influence was negative” (Cohen). The same people who feel negatively about large aspects of America also have a fascination with the pop culture. In this paper, I will explore the rising popularity of American films overseas in contrast to the adverse feelings about American culture.

Knibbe, Chase; Ashley, Noah; Anyanwu, Ejike “Effect of Sleep Fragmentation Upon Microglial Activation In the Murine Brain” (Noah Ashley)

Microglial cells are specialized macrophage cells of the brain that have the capacity to produce an inflammatory response through release of pro-inflammatory cytokines. When presented with a noxious stimulus, a microglial cell can engulf the toxin and present it on the outside of its plasma membrane. This results in activation and a morphological change in the microglial cell, and is thus “inflamed.” Sleep fragmentation (SF) can be considered a form of stressor that induces an increase of pro-inflammatory cytokines in the circulation. In this study, mice were subjected to 24 hours of SF using a specialized chamber that involves an automated bar that moves across the cage to periodically awaken subjects every minute. Then subjects were euthanized, brain tissue perfused and sectioned, and immunocytochemistry performed using Iba-1 antibody which stains specifically for microglial in brain tissue. Microglial morphology will be assessed using a Zeiss microscope and digital camera for recording and comparisons. We predict that SF mice will exhibit more microglial activation in two brain regions sensitive to SF: hippocampus and hypothalamus. These findings will improve our understanding how the brain responds and copes with acute sleep loss through changes in cellular morphology and activation of the immune system.

Knowles, Bryan “Decision Making Under Visible Uncertainty” (Mustafa Atici)

We have studied a problem which asks, “What is the safest way I can cross campus if I (i) must follow sidewalks, (ii) each length of sidewalk has a known chance of 'failure,' (iii) I cannot backtrack, (iv) and I can reroute my trajectory whenever I see a failure ahead.” In general, we believe this problem is intractable, meaning that it has no solution that can be computed by a machine fast enough to matter. However, we have proposed and implemented various approximations to this problem, revealing some of the nature of decision making itself in a world where predictions about the future are possible, though limited.

Koostra, Caleb; Polk, Jason “Using Raman Spectroscopy To Analyze Oxygen Isotope Ratios In Calcite Speleothems” (Jason Polk)

Paleoclimate reconstruction is a valuable resource for determining the past climate conditions. The use of Raman spectroscopy on calcite speleothems can be used to determine the oxygen isotope ratios, which can be used as a climate proxy for paleoclimate reconstruction. Oxygen isotope ratios can be used to accurately project past climate conditions including seasonal precipitation amount, temperature influences, and many others. Tropical speleothems grow quickly due to abundant rainfall and ideal conditions for calcite precipitation in a cave environment. Use of Raman spectroscopy for isotope ratio analysis is a relatively new method that has only been used on lab grown calcite and not on calcite speleothems. A speleothem collected from Barbados will be micromilled at selected high-resolution intervals for analysis using mass spectrometry to test for oxygen isotope ratios and trace elements, which also serve as proxies for precipitation and Uranium-

series dating will be conducted for multiple layers. The speleothem will then be tested using the Raman method for oxygen isotope ratios to determine if it can produce comparable results. Preliminary results indicate that it may be possible to generate oxygen isotope ratio data using Raman spectroscopy and thus provide a nondestructive method for testing the ratios in speleothems.

Kramer, Madeline “Rosencrantz and Guildenstern Are Dead: A Web of Meta-absurdism” (Ted Hovet)

Since its early 20th century roots, absurdism as a philosophical movement has abandoned common approaches of theoretical exploration. Unlike existentialism and nihilism, it addresses difficult philosophical questions through jest. As a literary genre, absurdism does much more. Down to its intentionally illogical writing styles, absurdism is metaphorical by nature and reflects reality in ways other literature cannot. Its ambiguity reveals life truths, yet it is often overlooked as a vehicle for exploring the human condition. Tom Stoppard’s play, *Rosencrantz and Guildenstern Are Dead*, embodies this chaotic nature and is reflective of the unpredictable world in which we live. I will examine the elements of absurdism as well as life’s many facets and argue that the literary form utilized deliberately mirrors absurdist philosophy. I will conclude that absurdist literature is chaotic and unorganized because the life it aims to reflect is messy. It is therefore a necessary tool in understanding existence. To capture the true essence of reality, absurdism takes on its disordered characteristics, and in order to show the true essence of absurdism, my argument does the same. What remains is a web of meta-absurdism reflecting not only the characteristics of absurdist literature, but also those of life itself.

Kroger, Samantha “Making Men: Toxic Masculinity In Stanly Kubrick’s Full Metal Jacket” (Jerod Hollyfield)

The tradition male role in cinema has been regulated to the macho and hyper-masculine heroes. We see this in action roles like westerns and war films where the man embodies the traits of masculinity that includes violence and domination. The trend with war dramas becomes a genre where we must analyze the techniques and conditioning it takes to create these army men who kill. In recent years, David Buchbinder argues that the modern male figure is “typically hapless . . . and as hopeless” (230). This differs in Stanly Kubrick’s *Full Metal Jacket* (1987), because it explores hyper masculinity within the structure of the army to deconstruct masculinity instead of the trend now of seeing these “hapless” men who oppose the label of masculinity. Kubrick exaggerates army men who are taught to be indifferent towards violence and distance themselves from femininity, but when in the line of fire they fall apart. I argue that with Kubrick satire the men he depicts actually expose the lie of masculinity and reveals how fragile these men actually are. He shows the creation of masculinity as something that is not innate but taught through extreme violence with sometimes disastrous effects.

Kwong, Kawai “Synthetic and Mechanistic Studies of Bis-porphyrin-manganese(III) μ -oxo Dimer” (Rui Zhang)

In this work, a series of bis-porphyrin—manganese(III) μ -oxo dimer complexes were synthesized. Manganese(III) porphyrin monomer were dissolved in benzene and added into 30% NaOH aqueous solution to form bis-porphyrin-manganese(III) μ -oxo dimer, the complexes were characterized by NMR and UV-vis. The spectrum studies focused on photolysis of bis-porphyrin-manganese(III) μ -oxo dimer. It is shown that photolysis of bis-porphyrin—manganese(III)- μ -oxo dimer gave a porphyrin-manganese(II) species in the presence of pyridine or triphenyl phosphate. Manganese(IV) porphyrin were detected without the presence of reductant, which suggest a photo-disproportionation reaction. Manganese(IV) porphyrin species were confirmed by manganese(III) porphyrin monomer react with iodobenzene diacetate.

LaDue, Chase “Chemosignaling In Asian Elephants (*elephas Maximus*): Concentration Effects With Applications For Management and Conservation” (Bruce Schulte)

Asian elephants face a number of threats in their natural range, including human-elephant conflict. While some strategies have been implemented to mitigate this conflict, they have been met with limited success. However, a push-pull strategy—whereby pests are pushed from habitats occupied by humans via repellent odors and pulled toward other areas by attractants—has not been implemented because of insufficient knowledge of vertebrate chemical communication. Biologically relevant compounds (e.g. pheromones) may be especially effective in push-pull strategies because of their known importance in elephant communication and reproduction. However, it is unknown how response varies with signal concentration, which is vital information for any application. The study of captive elephants provides an opportunity to better understand the chemosignaling abilities among elephants so that more effective pheromone-based mitigation strategies can be developed. Additionally, ‘pheromonotherapy’ has the potential to enrich the lives of captive elephants and enhance current ex-situ breeding efforts if carefully applied. In this regard, chemical concentration may have profound effects on how signals are received. This project examines concentration effects of chemosignals in Asian elephants with further analysis of whether factors such as age, sex, and reproductive status are related to the level of detection and extent of response.

Larkin, Grant; Rodgers, William; Silva, Philip; Nee, Matthew “Identifying and Characterizing Initial Trends Within Agriculturally Produced Chemicals That Result In Atmospheric Aerosols” (Rezaul Mahmood)

The main goal of this research is to characterize the chemical mechanisms that form atmospheric aerosols resulting from agricultural practices. Through the analysis of various chemicals, including Ammonia (NH₃), Carbon Dioxide (CO₂), Nitrous Oxide (N₂O), Methane (CH₄), and Water Vapor Content (H₂O), we have begun to piece together some initial

findings from our data. Additionally, we analyzed atmospheric variables (temperature, dewpoints, etc.) of the nearest Kentucky Mesonet stations to gain a sense of the atmospheric impacts on these chemical concentrations. While the gathering of results is only in the initial stages, we have begun to see various relationships and trends among some of the chemicals. For example, in our datasets, Nitrous Oxide (N₂O) tends to stay consistently positive, despite fluctuations among the other variables. In contrast, while Carbon Dioxide (CO₂) and Ammonia (NH₃) aren't on the same scale in terms of parts per meter (ppm), their general trends and patterns followed each other. The overall significance of this is yet to be known; however, with further research and time, we will likely gain a greater understanding of the significance of these trends.

Lasher, Jessica “IDH1 Gene” (Chandra Emani)

IDH1 gene (Isocitrate Dehydrogenase 1) catalyzes the oxidative decarboxylation of isocitrate to 2-oxoglutarate. IDH1 mutations are implicated in cancers and leukemia. IDH1 mutations are heterozygous, typically involving an amino acid substitution in the active site of the enzyme in codon 132. The mutation results in a loss of normal enzymatic function and the abnormal production of 2-hydroxyglutarate. The IDH1 gene mutation has been discovered in Maffucci syndrome. This is a disorder that primarily affects the skin and bones. It is characterized by multiple enchondromas, which are non-cancerous growths of cartilage that develop on the bones. The present study traces the ancestral origins for the gene. The principal goal of my study is to be able to find out how IDH1 gene mutations contribute to the development of endochondromas in Maffucci syndrome.

Latham, Ashley; Warf, Tara “A mobile application to reduce perceived stress in female undergraduate students” (Jason Crandall)

Objective: To examine the effects of a mobile application (Bingocize®) on perceived stress and stress management knowledge in female undergraduate students. Using a tablet PC, Bingocize® incorporates the game of bingo with exercise and health education. Participants: Female, full-time student status, at least 18 years of age, and able to participate in physical activity were recruited from the campus of Western Kentucky University (WKU) in the Fall semester of 2015. Methods: A randomized experimental pre/post-test design was used. Control and experimental groups attended four separate weekly one-hour sessions over the course of five weeks. Results: There was no significant group by time interaction for perceived stress or stress management knowledge. Both groups significantly decreased perceived stress and increased stress management knowledge. Conclusions: Both the traditional stress management program and the Bingocize® mobile application can be effective approaches for reducing perceived stress.

Lecoffre, Victor “Perception of Space In Architecture” (Shahnaz Aly)

We have taken steps to explore the different ways in which architecture stirs human emotions. On this journey, we conducted research on human feelings and emotions experienced through the five senses of sight, sound, touch, smell and taste. Our final goal was to develop a deeper understanding of how architecture can provide the stimuli that produce a reaction in the human nervous system and, consequently, evoke emotion. We believe that pinpointing the cause of such emotional responses would ultimately enhance the overall experience of space. Upon reviewing available literature, we established examples of architectural stimuli to include: overall form, walls, openings, ceiling, structure, color, circulation, and more. With this in mind, we investigated the questions of how, when, what, and where. How do people react when they view a structure? When they go through the entrance and discover the space, does the initial reaction change or become enhanced? What emotions do visitors experience? Where are these emotions experienced the most, be it on the exterior or interior of a building? We analyzed the data gathered through this research endeavor and applied it to the design of a public library within an urban setting.

Lee, Ngo Fung; Malone, Jonathan; Kwong, Ka Wai “Synthesis and Spectra Studies of Manganese(III) and Manganese(V)-oxo Corroles” (Rui Zhang)

Metalloporphyrins have attracted considerable interest in terms of their catalytic properties. Corrole with tetrapyrrole 19-membered macrocycle compound has the capacity to access higher metal-oxo species, which are more stable than the corresponding porphyrin-metal-oxo species. In this work, manganese(III) corrole and manganese(IV) corrole were prepared according to the reported procedures and their characterization data were consistent with reported values. The spectral studies focused on chemical oxidation of manganese(III) corrole to form an manganese(V)-oxo corrole in the presence of iodobenzene diacetate which is a mild oxygen source. In addition, photochemical generation of the same manganese(V)-oxo corrole was also attempted through a reported method.

LeMaster, Maya “Bethlehem Chapel of Prague: How a Place Can Be Interpreted Differently by Government” (Roger Murphy)

An important source of legitimacy for all types of government is building up of a sense of nationhood for the citizens of the state, especially by drawing from historical tradition and precedence. This can be achieved in many ways, including through the use of physical nationalist symbols. In my paper, I address this topic by exploring how the Communist government of Czechoslovakia reinterpreted and changed the traditional meaning of the historical Bethlehem Chapel in Prague in order to fit

their own ideology. I found that the Communist government emphasized the communal aspects of the Hussite movement and ignored the religious aspects. My research is primarily historical, with a focus on the role and importance of the Chapel in Czech history and how this significance influenced its rebuilding by the anti religious Communist government in the early 1950's. This research is significant because it demonstrates how a government encourages nationalism by emphasizing certain aspects of an existing symbol in order to change its meaning.

Lewis, Larissa “Shared Spaces” (Sheila Flener)

Out of the 2.04 million people residing in the King County/Seattle area, there are between 5,000 to 10,000 homeless youth, ranging between the ages of 13-25. At least 1,500 of those kids are without a stable place to sleep every night (youthcare.org). Up to 60% of these children have experienced some form of sexual or physical abuse prior to becoming homeless. 40% of those kids belong to the LGBTQ community, and suffer from mental health problems due to the lack of structure provided in their home lives (standupforthekids.org). Shared spaces was designed to help students who are interested in a future with Interior Design to be able to achieve that goal. ID students can not only use the space for working on design projects, but also to mentor youth and teach them basic and advanced principles of design in a unique workplace. Classes to teach design to students, as well as one-on-one mentoring sessions will be offered to accompany the needs of the students. Shared spaces will encourage outside community groups to utilize the space for independent events and programming. Shared spaces wants to inform the community about the profession of Interior Design while celebrating creativity and ingenuity.

Liang, Gongbo; Li, Qi “Pedestrian Detection Using Line Segments” (Qi Li)

Pedestrian detection is an important topic in computer vision. It is also a critical task for intelligent video surveillance system. It has an obvious application to an auto-driving system due to the potential for improving safety systems. A robust pedestrian detection algorithm should be able to handle pedestrians in various appearances and different poses. In this work, we propose a pedestrian detection framework based on basic line segments. Specifically, the framework contains three parts: i) extraction of line segments, ii) generation of candidate bounding boxes, and iii) reduction of candidate bounding boxes. Experiment results will be presented to show the effectiveness of the proposed framework.

Liu, Leo “Elevation Studio” (Sheila Flener)

“Seven out of ten Americans are one paycheck away from homelessness.” This design was inspired by the need facing Denver for homes for the homeless in their community. This space will showcase all that we can do to help these people live their lives in a safe environment. Space saving techniques will be utilized throughout the design to show how much you can do with what little you have. Neutral colors with pops of color are used to express that in every dark moment there is a ray of light that will shine through. Different aspects in the design incorporates the needs of the users including, not only a resource room for the designers, but a resource room for the citizens in need. The design community along with the university, Habitat for Humanity of Metro Denver and Denver's Road Home will combine their efforts to help families in need as well as educating the community on how to combat homelessness. The design community will have full use of the first floor classroom.

Loomis, Wendy; McKenna, Kelly; Ferguson, John; Rathnayake, Hemali “Preparation of Core-shell Nanoparticles Using a Hydrophilic-hydrophobic Approach.” (Hemali Rathnayake)

Core-shell nanoparticles are of interest due to multiple applications to organic electronics and biomedical applications. When core-shell nanoparticles are formed, a shell of a hydrophilic substance will form around a core of a hydrophobic substance. The core shells are formed by the hydrophobic hydrophilic interaction between the two substances. Core shells can be prepared by having a hydrophobic and hydrophilic solution start in a solution where they are both soluble, and slowly introducing this solution to an aqueous solution. This method is known as a solvent aggregation method. The hydrophilic solution formed a shell around the hydrophobic core. Cross-linking the solution allows for the products to remain intact even when drying. Here we describe a synthetic method to make electronically active core-shell nanoparticles using the hydrophilic-hydrophobic approach.

Luo, Wei Long; Zhang, Rui “Synthetic and Catalytic Oxidation Studies By Metalloporphyrin and Metalloporphyrin” (Rui Zhang)

A series of manganese porphyrin and corrole complexes have been synthesized and utilized as catalysts for oxidation of sulfide using iodobenzene diacetate [PhI(OAc)₂] as a mild oxygen source. Both complexes have been resulted in a highly selective and reactive fashion in sulfoxidation catalysis. Better results were obtained with manganese corrole complex since the tri-anionic ligand structure has a better ability to support the transition metal to a higher oxidation state than di-anionic porphyrin ligand. Meanwhile, the porphyrin-ruthenium(V)-oxo species was generated through photo-disproportionation of a bis-porphyrin-diruthenium(IV)-μ-oxo dimer via laser flash photolysis. The same ruthenium(V)-oxo intermediate was also obtained by using photo-induced ligand cleavage reaction of porphyrin-ruthenium(III) N-oxide adduct according to its kinetic behavior and spectra studies. An efficient reactivity of ruthenium(V)-oxo intermediate was observed in catalytic aerobic oxidation of hydrocarbons using visible light and molecular oxygen as oxygen source.

Luttrell, Meagan; Mutter, Sharon; Woosley, Catherine; Osbourn, Madison; Cundiff, Meredith “Effects of Reward Motivation On Verbal and Non-verbal Recognition Memory” (Sharon Mutter)

We presented high or low value reward cues prior to study lists of word pairs (Exp. 1) or picture pairs (Exp. 2) and examined how this affected single-item (i.e., context, no context) and dual-item recognition (i.e., associative, pair). In Experiment 1, recognition performance for words was worse for associative than pair recognition and high reward cues improved performance. Preserved context produced better single-item recognition and performance was worse for words associated with high reward cues. High rewards may have motivated participants to form higher order associative units for word pairs, which improved dual-item recognition. These unitized associative representations did not aid and may have even impaired single-item recognition. In Experiment 2, recognition performance for pictures was worse for associative than pair recognition and for high reward than low reward pairs. Neither preserved context nor reward had an effect on single-item recognition performance for pictures. High rewards may have motivated participants to form highly detailed memory traces for each individual picture, which improved single-item recognition. These types of representations did not aid associative recognition but did facilitate pair recognition. Differences between experiments are likely attributable to the differences between encoding strategies employed at study for words and pictures.

Ma, Aimee (Yuan) “The Rainbow Kindergarten” (Shahnaz Aly)

The Rainbow Kindergarten is located in Erdos, Inner Mongolia, China. Project areas include outdoor activity rooms beside every class, sleeping rooms, indoor activity rooms, kitchen and teacher’s offices among others. At the beginning of design, inspiration come from Sugamo Shinkin Bank and FUJI kindergarten in Japan. Those two examples bring very good ideas, like colorful eaves and courtyard. Colorful eaves not only make the building exterior interesting, but also keep out wind and rain by the function. The courtyard support a safe and an outdoor activity room for the children. The materials and systems use CMU wall, steel bar joist, and Cast-in-Place Strip Footing. For the sustainable features, to design all the children life parts to the south orientation is in order to more natural light instead of artificial light to save energy. Then use Ceramic Frit Glass for the colorful roofs. The goals are to create a humorous space for the kids, to make all of the building interesting and encourage exploration, and to develop the creativity for the children. Also the design would provide sustainability. The sustainable design is good for the kids in the building. A good and humorous environment makes children healthier.

Malla, Gargya; Farrell, Colin “Obesity: Psychological Health vs. Cardiac Health” (Colin Farrell)

One of the most discussed and controversial health issues over last few decades is the increasing prevalence of obesity, the antecedent factors and health consequences, as well as the social implications. While more focus is being laid on the physical health consequences of obesity, less is being spoken about psychological health consequences. With almost 600,000 deaths due to cardiovascular diseases and more than 61 million suffering from mental illness, the present study aimed to examine the relation of obesity or overweight with cardiac risk factors and also with psychological stress conditions within the United States using the 2013 Behavioral Risk Factor Surveillance System data. The results indicated that obesity and overweight were strong predictors of being depressed or having a cardiovascular disease, even while controlling for the known associated factors. The current analysis supports existing findings, which suggest that obesity has a deleterious effect on one’s psychological as well as cardiovascular health. Interventions targeting weight reduction should address the risk of physiological and psychological disturbances secondary to increased BMI. This is supported by the high preventable percentage of both the disorders. The preventive programs should be holistic to decrease morbidity and mortality due to overweight and obesity.

Malone, Jonathan; Chen, Tse-Hong; Kwang, Ka Wai “Visible Light Generation of High-valent Iron-oxo Intermediates” (Rui Zhang)

High-valent iron–oxo intermediates play central roles as active oxidants in enzymatic and synthetic catalytic oxidations. In this presentation, a new photochemical method to generate high-valent iron–oxo model will be presented. As controlled by the electronic nature of porphyrin ligands, iron(IV)–oxo porphyrin radical cations (compound I model) and iron(IV)–oxo porphyrin derivatives (compound II model) were produced, respectively, by visible light irradiation of the corresponding iron(III) bromate complexes. These observations indicate that the photochemical reactions involve a heterolytic cleavage of O–Br in precursors to give a putative iron(V)–oxo intermediate, which might relax to compound I through electron transfer from electron rich porphyrin to the iron or undergo rapid comproportionation reaction with residual iron(III) to afford the compound II derivative.

Marcum, Trenton “Come and Let Us Justify the Ways of God To Men: An Evaluation of the Intertextuality of Milton’s *Paradise Lost*” (Jerod Hollyfield)

Intertextuality is simply the interconnectedness and relationships between texts. Milton’s epic poem *Paradise Lost* is one of the foremost intertextual pieces in the literary canon; he rewrites the conventional biblical narrative to shed light on underlying dormant themes. The poem reaches the heart of humanity through its meditations on spirituality, sexuality, and morality. Heinrich F. Platt argues that intertextuality’s manifestations “represent not only abstract sedes argumentorum but

also concrete formulae taken from pre-texts, literary and non-literary ones, that offer themselves for reemployment in texts of a derivative kind...or, metaphorically speaking, in secondhand literature.” In this paper I will argue that Xavier Dolan’s *I Killed My Mother* and Shunji Iwai’s *All About Lily Chou-Chou* are not only intertextually connected to *Paradise Lost* but that they are intrinsically related through their tragically flawed characters. The former is a French-Canadian film that centers on the tumultuous relationship of a mother and her son while the latter tells a story about the psychological trauma of middle school bullying in Japan. The characters in these films directly mirror the fall of Lucifer and humanity from Milton’s poem; however, their respective falls from paradise starkly contrast one another, yet their unity with *Paradise Lost* remains.

Martin, Emily “Examining the Effect of Expatriate Narcissism Levels On Cultural Adjustment and Global Leadership Effectiveness” (Amber Schroeder)

With the increase in globalization around the world, many organizations are sending employees to work abroad as global leaders on organizational projects, these employees are called expatriates. Expatriate effectiveness is dependent on the employee’s cultural adjustment to their new culture. The proposed study plans to investigate the relationship between expatriates’ levels of narcissism, their cultural adjustment, and their overall leadership effectiveness. It is hypothesized that high levels of narcissism in expatriates will lead to poor levels of cultural adjustment and that cultural adjustment will moderate the relationship between narcissism and leadership such that as cultural adjustment levels decrease, the positive relationship between narcissism and leadership effectiveness will weaken. The sample in this study will consist of participants who have relocated to Thailand to work as teachers in an English immersion school system.

Martinez, India “Prevalence of Depression In Children Diagnosed With Autism Spectrum Disorder” (Colin Farrell)

Autism Spectrum Disorder (ASD) is well known to be comorbid with other conditions such as aggression, anxiety, and Turret’s syndrome. This study focuses on determining the relationship and comorbidity between ASD and depression. Data was taken from a survey done by the National Health Interview Survey in 2014 and analyzed with IBM SPSS. Using independent sample t-tests and regression, it was shown that children with ASD are more likely to be depressed than children without ASD and that the relationship between ASD and depression is significant despite the presence of other cofactors.

McCrary, Elizabeth; Lopez, Jessica; L. Wichman, Ph.D., Aaron “Reconsidering the Role of Affect In Terror Management Research: Experiencing Fear Under Mortality Salience” (Aaron Wichman)

Lambert et al. (2014) found that manipulating mortality salience (MS) elicits changes in affect. However, this recent research conflicts with previous terror management literature (e.g., Jonas et al., 2008) that emphasizes the inability of MS to reliably produce affect change. To investigate this divergence, the current study was designed to replicate the findings of Lambert et al. (2014). Participants were randomly assigned to one of three conditions: MS induction (anxiety and fear), an aversive control (anxiety but not fear), or a neutral control (neither). In all conditions, participants answered a free-response prompt assessing feelings about a particular scenario: death, dental pain, or watching television, respectively. Post-hoc analyses following a one-way ANOVA revealed significant differences between all conditions in self-reported levels of fear. These results uniquely contribute to contemporary understanding of terror management by replicating the pattern produced by Lambert et al. (2014), suggesting that affect indeed plays a role in how people respond to MS. Future research should consider the specific conditions under which MS produces affect change, as compared to conventional explanations of self-esteem buffering such as worldview defense, in an effort to enhance the field’s understanding of how people respond to the implications of their own humanity.

McDaniel, Benjamin “The Contemporary Farmhouse” (Shahnaz Aly)

The objective of this design project was to provide the Western Kentucky University chapter of FarmHouse Fraternity with a new fraternity house. Despite being referred to as a “house” this structure must not only address the residential needs of a proposed 14 residents, but also meet the needs of a chapter the size of roughly 50 members and growing. In addition to the challenge of the private versus public life, the members of the fraternity asked that aesthetically the house be portrayed in a contemporary style, in opposition to the more classical housing style seen on WKU’s campus. During the early design stages extensive research was done on how to incorporate green building materials and methods into the design of the house. Not only does this enrich the surrounding environment, but it also contributes to the idea of being both innovative and concurrent with the times. However, it is equally important to maintain an inviting and cozy atmosphere. The resulting design culminates as a structure that carefully balances both contemporary and traditional styles to give a strong sense of purpose, comfort, and pride for an organization moving forward.

McDonald, Benjamin “Nanodiamond Modified Boron-Doped Diamond Surface Redox Chemistry: Influence of Physicochemical Properties On Electrocatalytic and Biocatalytic Processes” (Sanju Gupta)

Diamond possesses outstanding bulk physical properties. In nanoworld, the surfaces of nanodiamond (ND) particles are engineered targeting specific applications. In this work, modification of conductive boron doped diamond; BDD is conducted with an immobilized layer of ND that significantly enhances the recorded currents for reversible oxidation of ferrocene methanol (FcMeOH). Electrochemical current enhancement is related to nanodiamond size.

McDowell, Patrick “The Poet, the Pope, and the Pauper” (Alison Langdon)

This oral paper will explore the parallels that Dante Alighieri, Pope Francis, and Saint Francis have in common. While the pope and the poet unequivocally share a spiritual emphasis on the mercy of God, they also exhibit a similar tendency to criticize the clericalism of the church of their times, opting for a church of spiritual depth that prefers the poor and marginalized over a more aristocratic bureaucracy mired in political affairs. These touchstones of commonality significantly inform the dynamic between the pope and poet, yet they bear even greater meaning when linked to the duo’s shared role model: Saint Francis of Assisi. The founder of the historic mendicant order of friars serves as the current pope’s namesake, and Dante nods to the saint’s legacy numerous times in the Comedy, culminating with the saint’s prominent placement in the celestial rose of Mary. Therefore, upon careful examination of the legacies of these three noteworthy Christian figures, one can discern how St. Francis’ commitment to poverty and humility serves as a precursor to the spiritual ideals vaunted by both the pope and poet, embodied most fully in their promotion and awareness of divine mercy, poverty, and church reform.

**McElroy, Kate; Brown, Brianna; Kenney, Lauren; Beasley, Kalli; Gouvas, Emily; Applegate, Darlene
“Bioarchaeological Analysis of Human Skeletal Remains From Graves 1, 2, and 4 at Site 15Wa916, a Prehistoric Burial Ground in Warren County, Kentucky” (Darlene Applegate)**

Site 15Wa916 in northern Bowling Green is located immediately south of the pumping station on Barren River along Highway 957 opposite Beech Bend Park. Dr. Jack Schock of Western Kentucky University excavated several prehistoric grave features at the site in May 1973. Radiocarbon dates of 910-1110 BC indicate the site was occupied during the early part of the Early Woodland period. Schock’s excavation yielded, among other artifacts, hundreds of human bones and bone fragments. Analysis of the commingled human remains from Graves 1, 2, and 4 indicates the presence of at least five individuals, including two adult males, one adult female, and two infants of unknown sex. One adult male was affected by severe osteoarthritis and exhibited large muscle attachments and bone robusticity indicating engagement in strenuous physical activity. Both infants exhibited strong periosteal reactions, suggesting that an infectious disease may have been the cause of death.

Miles, Kimberly “The Female Perception of Safety On a College Campus” (Gayle Mallinger)

Previous research has shown the prevalence of females on college campuses across the nation experiencing a generalized fear of being victimized or violently assaulted while on campus. This fear is generated by the knowledge of violent crimes towards women on campus, as well as the perception alone that there are assaults happening on campus. Studies have noted that this fear held by female students can significantly affect their academic progress and overall wellbeing while at school. This study chose to examine the female students of Western Kentucky University and their personal perception of safety on college campuses comparing students who live on campus versus students living off campus. The hypothesis was that female students living on campus would experience feeling safer than females living off campus due to access to emergency resources and informational safety programs provided by the residence halls. Data was collected using random surveys distributed to females at WKU.

Miles, Luke “Four Different Measures of Graph Integrity (Planar Graphs Especially)” (Dominic Lanphier)

In graph theory, the integrity of a graph describes how easy it is to shatter the graph into small pieces by removing vertices. The mean integrity is a similar measure of the vulnerability of a graph. The mean integrity of a graph is less than the integrity of the graph, and it is more powerful, but less workable than integrity. We invent two new functions of graphs (the simple mean integrity and the flavor integrity) that bound the mean integrity from below. Using these new measures, we study the mean integrity of planar graphs and prove several other facts in the process.

Mills, Tori “Unveiled: The Embodiment of an Idyllic and Enlightened Poland In Pawlikowski’s *Ida*” (Jerod Hollyfield)

In 2013, Pawel Pawlikowski released *Ida*, a film depicting the transformational journey of Anna, a novitiate nun, and Wanda, a Communist judge. In his interviews with various film journals, Pawlikowski has described his brief time in his native country Poland to be the inspiration for *Ida*. He believed that Poland during his childhood had a particular idyllic appeal. Matilda Mroz, James Harvey-Davitt, and Richard Rushton have argued that *Ida*’s defining visual elements result in “the shape of grief,” a figurative absence, and an intense emotional response amongst the viewers, respectively. While their explanations are thoroughly insightful, they choose to focus on the film’s aspects within the screen and how they relate to thematic issues. However, it is important to consider Pawlikowski’s motivation for making the film. In my formalist analysis, I argue that Pawel Pawlikowski utilizes the narrative and cinematic elements of *Ida* to reflect the progressive, anti-conformist ideals he believes of both the period depicted within the film and the time in which it was released.

Mitchell, Logan; McClanahan, Kegan “Long-term Monitoring of Storm Responses Within a Complex Karst Aquifer” (Jason Polk)

The purpose of this research was to examine storm event induced flooding and hydrometeorological responses in the Lost

Rive Cave Aquifer System. In order to achieve this, precipitation totals from ASOS, COOP, KYMN, and CoCoRAHS weather stations within the same drainage basin were compared to discharge totals from Lost River Rise (LRR) and Blue Hole Four (BHF). Data were measured and collected for 32 continuous months, with evapotranspiration being accounted for at the monthly resolution. Statistical analysis was conducted for storm events to determine predictive flood modeling between the primary output (LRR) and the upstream conduit (BHF). So far, a large difference between the drainage basin area calculated for LRR and BH4 exists. The discharge rating curves of previous studies at LRR are being examined in depth so that the current one can be updated, as this may also be contributing to this difference. After determining the reason for the drainage basin area difference between the sites, the research will focus on creating a flood risk vulnerability index, which can be very useful in determining the amount and duration of precipitation during storm events necessary to cause groundwater-induced flash floods.

Moolani, Harsh; Payne, Jason; Daksinamurthy, Rajalingam “Direct Aminoglycoside Coated Gold Nanoparticle Synthesis, Characterization and Antibacterial Susceptibility Testing” (Stuart Burris)

With soaring increase in the cases of multi-drug resistant bacteria across the world, we are on the verge of entering post-antibiotic era if no immediate action is taken against this global crisis. As an alternative route to modify current commercial antibiotics, we designed an effective antibacterial agent involving gold nanoparticles (AuNPs) capped with an antibiotic, like those of the aminoglycoside drug family. Due to recent emergence of infections due to Gram-negative bacterial strains with advanced patterns of antimicrobial resistance bactericidal agents such as these are being view as a candidate for further development and augmentation. a unique self-patented, green process was used for AuNPs synthesis wherein the aminoglycoside reduces and stabilizes the AuNPs resulting in aminoglycoside conjugated gold nanoparticles (Amg-AuNPs) which were morphologically characterized using transmission electron microscope, UV-Vis spectroscopy, scanning electron microscopy/energy-dispersive X-ray spectroscopy , and dynamic light scattering. Antibacterial efficiency was evaluated on Gram-positive and Gram-negative bacterial strains turbidmetric and spread-plate assay. Sections of bacteria treated with Amg-AuNPs observed under TEM showed bactericidal activity by causing perforations and disturbing the cellular environment leading to apoptosis. The minimum inhibitory concentrations of Amg-AuNPs was significantly less when compared to pure aminoglycosidic drugs which proves the synergistic activity of Amg-AuNPs.

Moore, Brittny; Kambesis, Patricia “Distribution of Bedrock Collapse Sinkholes In Warren County, Kentucky” (Patricia Kambesis)

Warren County, Kentucky is located atop bedrock consisting of Mississippian-age limestones eroded by dissolution which formed sinking streams, springs, caverns and sinkholes. Though sinkholes are common throughout the state, south-central Kentucky has the highest density. The most common types of sinkhole in Kentucky are dissolutional, where slightly acidic meteoric water dissolves cavities in the soil-covered, intensely-fractured bedrock. The sediment moves down into the expanding cavity forming a circular depression. The second type of sinkhole is called a collapse with two subtypes: sediment collapse and bedrock collapse. The former, where sediment collapses into the underlying void is considered the most common. Bedrock collapses occur when the ceiling of a cave collapses exposing the cave passage. This type of collapse is considered rare. The purpose of this study is to determine occurrence and distribution of bedrock collapse sinkholes, relationships to known cave passages, and comparison to the distribution of other types of sinkholes. Methods include use of remote-sensing, GIS, cave data and maps to interpret bedrock collapse frequency and cave passage relationships. There are over 200 cave entrances in Warren County and more than 20 km of cave passages. Preliminary results indicate bedrock collapse sinkholes are more common than originally thought.

Mudd, Brandon; Rowland, Naomi; Maples, Jill “Exercise To the Rescue: An Analysis of Altered Metabolic Gene Regulation Post-Exercise In Lean and Obese Individuals” (Jill Maples)

Introduction: The skeletal muscle of obese individuals exhibits a depressed ability to metabolize fats. This dampened ability to metabolize fats is thought to be rescued with exercise training; mediated by a coordinated increase in the expression of a network of genes that regulate metabolism and fuel utilization. The purpose of this study is to determine the exercise-induced regulation of metabolically important genes in lean and obese individuals. Methods: Muscle biopsies (one pre-exercise/baseline and one immediately post-exercise) were obtained from 4 lean (BF% 24.4 ±5.5; 23.5 yrs ±1.9) and 13 obese (BF% 39.7 ± 2.4; 26.1 yrs ±2.3), age-matched, relatively young subjects, free from overt disease, non-smokers, and not taking medications known to alter metabolism. RNA was isolated, quantified, and reverse transcribed into cDNA. RT-PCR was used to evaluate the expression of several metabolic genes. Results: The pre-exercise RNA content of Pyruvate Dehydrogenase Kinase 4 (PDK4) was significantly higher in the obese compared to the lean (P=0.04) and the RNA content of Peroxisome proliferator-activated receptor alpha (PPARA) was significantly lower (P=0.03). There were no differences in the mRNA content post-exercise. Discussion: Exercise tends to improve the expression of important metabolic genes in the skeletal muscle of the obese.

Munday, Scout; Wulff, Andrew “Color Variation In Sphalerites From Northern Tennessee” (Andrew Wulff)

Mississippi Valley-Type (MVT) ore deposits are found throughout the world but the most extensive deposits are found in

North America. These ores are commonly stratabound, epigenetic, and some cases are locally stratiform, typically occurring in platform carbonate sequences along foreland thrust belts or sedimentary basins. MVT mineralization is commonly controlled by faults, fractures, lithological transitions, and collapse breccias. The MVT deposits studied in this project are hosted in Ordovician Knox Dolostone and located along the tectonic crest of the brecciated Cincinnati Arch dividing the Illinois Basin to the northwest and the Appalachian Basin to the east. Samples were collected from the Elmwood and Gordonsville mines in Smith County, Tennessee. Doubly-polished thick sections were made of samples containing coarsely crystalline sphalerite of different colors. Characterization of color variations and zoning were obtained using reflected light microscopy, SEM-EDS, Raman Microscopy, powder XRD and ICP-MS. Color in black, brown, and yellow sphalerites is largely dependent on the total iron content, while more exotic colors (reds, oranges, etc.) are associated with Cu and Ag. Fluid inclusions in the polished thin sections were mapped and identified as primary, secondary, and pseudo-secondary. Matrix compositions of the sphalerites will be used to correlate with the other data.

Mwizerwa, Tim “Hollywood vs. Time and Progression” (Jerod Hollyfield)

Whether it was the Vietnam War, the Cold War or the Civil Rights Movement 1967 was an extremely tumultuous year for the majority of Americans who chose to fight to maintain their idea of traditional American values. Although, American mainstream society had resisted humanizing African American characters in television shows as well as films for decades, Hollywood sensed the cultural tides which lead to them producing three successful, influential and pivotal films starring Sydney Poitier that directly confronted race relations in that time period. *To Sir, with Love* directed by James Clavell; *In the Heat of the Night* directed by Norman Jewison; and *Guess Who's Coming to Dinner* directed by Stanley Kramer are films that brought attention to the issues facing the average African American trying to survive in a traditional America. In this paper I argue that Hollywood is not to blame when it comes to the pace of social progression within the general public. Each film worked hard to instill empathy for a class of people that the general audience considered inferior while at the same time exposing America's anxieties in the face of social progression.

Na-Yemeh, Dolly; Mahmood, Rezaul; Goodrich, Gregory “Synoptic Conditions and Equivalent Temperature Variations In Kentucky” (Rezaul Mahmood)

Research has demonstrated that equivalent temperature (TE), incorporates both the surface air temperature (T) and moist heat content associated with atmospheric moisture, is a better indicator of overall heat content. In this research, we have applied TE to determine impacts of land use and land cover and air masses on atmospheric heat content during growing season (April-September) and used Kentucky Mesonet and air mass data. It is found that the moist weather types dominated the growing season and, as expected, differences between T and TE were smaller under dry atmospheric conditions and larger under moist conditions. For instance, the lowest TE-T difference was 10.04 °C on the 18th of April (T = 8.91 °C and TE = 18.95 °C) and this was a Dry moderate weather type. On the other hand, the highest estimated difference for the period was 46.54 °C (T = 26.54 °C and TE = 73.08 °C) and it was under the Moist tropical weather type on the 11th of August 2010. Further analysis of data and results of this research will help to fill a gap in the scientific literature.

Neeper, Hannah “Gender Perceptions In Taiwan” (Timothy Rich)

Taiwan ranks first in female participation in government as compared to other countries in East Asia. As the outlier in this part of the world, it is extremely surprising that Taiwan has such a high number of female participation in government since the original ideology is based on Confucius ideals. To understand this, the question I will be researching is how culture influences gender, and more importantly, gender equality in Taiwan. Since Taiwan is ranked so high for female participation, the research should lead me to find that women are treated equally in this society, despite all of the Confucian influence that would suggest otherwise. To do this, I have read and analyzed what has been written already about gender perceptions in East Asia, especially focusing on how Confucius ideals have impacted these views. Next, I sent a survey to Taiwan to subtly test how women are perceived in the general public. The interesting twist on these questions was the two different types of surveys sent; one survey indicated that the official was female and the other it was indicated as male. Finally, I analyzed the test results and the implications of the answers that were received.

Oldham, Alexandra “Causal Attributions As a Mediator For the Relationship Between Self-Efficacy and Performance – Do Performance Goals Also Impact This Relationship?” (Steven Wininger)

The focus of the study was on self-efficacy (SE), attributions, and goal-types. Research questions included: Do past performances impact SE more than SE impacts future performances? Do attributions about past performances mediate the past performances and SE relationship? How do goal types impact the SE and performance relationship? This study measured students' perceptions of their SE on four tasks—math flash cards, basketball shooting, Equate (math Scrabble), and a hand grip endurance task. Participants were assigned to a one of three performance goal types. “Win” goal was to score higher than the top performer from our previous study, “Sub-Win” goal was to score in the top 75th percentile, and “Personal” goal was to perform better than their first trial. The goal assignment was followed by a SE rating of their confidence to achieve their goal and a second performance of the task. There was a stronger relationship between past performance and SE estimates than between SE estimates and future performance. Attributions did not mediate the

performance and SE relationship. The “Sub-Win” goal category was the most effective for performance improvement. Future research should focus on creating a better measure of attributions and further explore the utility of “Sub-Win” goals.

Owens, Cory; Khouryieh, Hanna; Williams, Kevin “Influence of pH and Xanthan-Locust Bean Mixtures On the Creaming and Flocculation of Whey Protein-Stabilized Oil-In-Water Emulsions” (Hanna Khouryieh)

The effect of pH and xanthan (XG)-locust bean gum (LBG) mixtures on the physical stability of 2 wt% whey protein isolate (WPI) stabilized oil-in-water (O/W) emulsions containing 10% v/v menhaden oil was investigated by measuring particle size, cream stability, viscosity, and microstructure. Comparisons were made between emulsions containing .1% XG-LBG, .1% XG, .1% LBG, and no gums. Each emulsion type had pH of 3, 5, and 7. Results show that creaming is dependent on pH and biopolymer. XG and XG-LBG emulsions at pH 3 and 5 creamed rapidly because of the formation of XG-WPI complexes and resulting flocculation. At pH 5, all emulsions had similar phase separation and no turbidity in the serum phase. The lack of turbidity is likely because at pH 5, the WPI is near its isoelectric point (IP) and can be adsorbed more efficiently. Being near the IP also caused increased flocculation and similar creaming at pH 5. The XG-LBG emulsions at pH 7 were the most stable emulsions. This is likely because XG and LBG have a synergistic interaction that increases viscosity. Emulsions with a pH of 7 containing XG-LBG mixtures can help in development of novel structures and textures to create healthier foods.

Pace, Abigail; Cook-Newell, Margaret; Payne-Emerson, Heather “Benefits of a Flexitarian Diet: Educating College Students of Lifestyle Approaches To Reduce the Risk of Developing Breast and Prostate Cancer” (Margaret Cook-Newell)

Practicing the Flexitarian diet, a plant-based diet, in conjunction with physical activity can promote a lifestyle consistent with the American Cancer Society’s recommendations for reducing risks of breast and prostate cancer. College students were assessed on knowledge of the relationship between diet and cancer risk prior to and after accessing information on the American Institute of Cancer Research site or the WKU Flexitarian Pinterest Page. Participants completed a three-phase survey to identify current lifestyle and willingness to modify lifestyle behaviors related to nutrition and cancer. Participants were recruited from the National Panhellenic and Interfraternity Council memberships and the International students at Western Kentucky University. We hypothesized a preponderance of participants that access the WKU Flexitarian Pinterest page will report the intent to make a least one lifestyle modification related to diet and cancer risk.

Paicely, Adam; Wallmann, Harvey “The Acute Effects of Whole Body Vibration On Vertical Jump, Power, Balance, and Agility In Untrained Adults” (Harvey Wallmann)

Purpose/Hypothesis: Although whole body vibration (WBV) has been shown to have effects on several physical performance measures, there is limited data on its effects on untrained adults. The purpose of this study was to investigate the effects of WBV on balance, agility, power, and vertical jump. Subjects: Thirty-six subjects (20 males, 16 females) with no orthopaedic injuries within the last 6 months participated. Materials/Methods: WBV was applied using a Power Plate Pro5. The Myotest was used to measure vertical jump height and power output. a modified T-test was used to measure agility. Balance was measured using the NeuroCom Limits of Stability (LOS) test. Results: Significant differences were observed in the following measurements: agility time pre (7.30 sec, SD = 1.42) and post (7.18 sec, SD = 1.44), $t_{35} = 2.39$, $p = 0.022$; right movement velocity from 5.29 deg/sec (SD = 1.84) to 6.03 deg/sec (SD = 2.34), $t_{35} = -2.07$, $p = 0.046$; and left end point excursion from 77.72% (SD = 12.22) to 80.97% (SD = 12.21), $t_{35} = -2.57$, $p = 0.015$. Conclusions: Results indicate that WBV may potentially have positive effects on agility and balance as seen with decreased agility times and improvements in some balance components.

Palavra, Sanida; Smith, Michael “Mechanoreceptors In Chameleons (*Chamaeleo senegalensis*) For Seismic Communication” (Michael Smith)

Seismic communication is a type of communication where information is transmitted by substrate-borne vibrations. a number of animals, across diverse taxonomic groups, communicate this way. One taxonomic group that has been understudied in terms of vibratory communication is reptiles. Veiled chameleons (*Chamaeleo calyptratus*) produce a low-frequency buzzing sound emanating from a gular pouch in the throat region, resulting in vibration of the branch upon which they reside. We hypothesize that chameleons, which do not hear very well, detect these low-frequency vibrations through tactile sensation. The purpose of our research is to look for specializations in the skin of the tail and plantar surfaces of the feet in the chameleon (*Chamaeleo senegalensis*). Such specializations may include increased types or numbers of mechanoreceptors, a type of sensory receptor sensitive to pressure and vibration, which would represent a mechanism for detecting substrate-borne vibrations. Skin tissue from toe and tail will be fixed in glutaraldehyde and paraformaldehyde, embedded into LR white resin, sectioned, stained with hematoxylin and eosin stain, and then examined under a light microscope. In addition, skin tissue from toe and tail will be embedded into Spurr’s resin, sectioned, and viewed.

Parrish, Deborah; Helm, Aecha; Ward, Kayla; Greiner, SarahAnn; Applegate, Darlene “ Bioarchaeological Analysis of Human Skeletal Remains From Grave 14 at Site 15Wa916, a Prehistoric Burial Ground in Warren County, Kentucky” (Darlene Applegate)

Site 15Wa916 in northern Bowling Green is located immediately south of the pumping station on Barren River along Highway 957 opposite Beech Bend Park. Dr. Jack Schock of Western Kentucky University excavated several prehistoric grave features at the site in May 1973. Radiocarbon dates of 910-1110 BC indicate the site was occupied during the early part of the Early Woodland period. Analysis of almost 170 skeletal specimens revealed that three subadults were interred in the grave. An infant of unknown sex under the age of twelve months was represented by six bone specimens. A juvenile aged 5-7 years and of unknown sex exhibited evidence of porotic hyperostosis. An adolescent male aged 10-14 years had dental caries and porotic hyperostosis. There was no evidence of cultural modifications or special mortuary preparation for the three subadults.

Parsons, Philip “Student Perceptions of Services For Veterans and Military Personnel” (Dana Sullivan)

Many veterans are returning from the War on Terror and making their way to universities. Due to the many aspects of war and military life many maybe, or are experiencing some level of mental health issue/s. As more veterans make this transition, resources may not be available for them to be successful in the classroom (Whitley, Tschudi, & Gieber, 2013). After reviewing the literature, a suitable instrument to measure these variables was not available. The research developed a survey and sampled students on one Midwestern public university. The variables included basic demographic questions and perceptions of veterans and the services on campus and in the community. These were rated on a Likert scale with a range of 1-5. The sample was split evenly between civilians (n = 41) and veterans (n = 41). They indicated a moderate awareness of veteran issues (M = 3.74, SD = 1.0) and a belief that services on campus were not adequate to meet their needs (M = 2.72, SD = .92). The results indicate that veterans do not have sufficient resources on campus to meet their needs and that students do not understand all the issues that veterans are facing.

Pate, Matthew; Hunt, Allen “Responses To Regulators – An Analysis of Letters Written By the Institute of Internal Auditors” (Allen Hunt)

Because of the many stakeholders affected by and interested in accounting and auditing regulation, a number of organizations make it their goal to oversee and improve upon the ethical values and frameworks of the profession as a whole; a job made even more important by the magnitude of responsibility that accountants carry due to the nature of the work. The project at hand is an exploratory study of one of those organizations – the Institute of Internal Auditors (IIA). The purpose of the project is to determine the factors affecting the issuance and nature of the comment letters that have been written by the IIA over the past five years. We find that the IIA is active in responding to the exposure documents of organizations regulating the accounting profession. A large majority of these comment letters advocate for refinements to the exposure documents issued by the regulating organizations across the globe. We also find that the typical subjects for advocacy has shifted in recent months from exposure documents affecting the whole accounting profession to the role of the Inspectors General, and the necessity of unrestricted access to government documents when performing audits.

Patterson, De'Sean “House of Fraternal Brotherhood” (Shahnaz Aly)

The basis of my project was to design a fraternity house, continuing Greek Row for the Western Kentucky University chapter of the Phi Gamma Delta Fraternity that would be more than just a big house on campus that is only used for meetings, and by the 17 individuals who will live in the house. For the design I wanted to create a space that promoted the growth of brotherhood in the fraternity by giving its members a place to gather during their free time so they can study, eat, do laundry, have a gathering, or just have somewhere to come hangout on campus, all while still giving the members who will live there the feeling of actually being in a home, and keeping the house privatized. After lots of research of codes, and covenants I came up with a concept that I believe will add to WKU's Greek Row, as well as giving the Phi Gamma Delta Fraternity a unique house that will not only fulfill their housing needs, but also strengthen the brotherly ties, that hold them together.

Payne, Jason; Tockstein, Sarah; Chavda, Fenil; Moolani, Harsh “Novel Self-Patented Gold Nanoparticles For Augmented Antineoplastic Activity” (Stuart Burris)

Phloridzin, a natural dihydrochalcone and the first SGLT2 inhibitor isolated, is an SGLT2 inhibition antidiabetic and antineoplastic agent. Phloretin, the aglycone of phloridzin, displays a reduced capacity of SGLT2 inhibition, while demonstrating an enhanced antineoplastic activity in comparison to phloridzin. The mechanism of these dihydrochalcones' cytotoxic activity are hypothesized to be attributed to their ability to interfere in the glucose processing pathways. Nanoparticles, especially gold nanoparticles (AuNPs) have been studied for drug delivery applications for poorly bioavailable drugs. Hence, in order to address the issues of phloridzin and study the unknown anticancer mechanism, we synthesized phloridzin and phloretin capped gold nanoparticles (Phl-AuNP and Pht-AuNP respectively) in single step, rapid, and biofriendly processes. The synthesized conjugated AuNPs were morphologically characterized via transmission electron microscopy and UV-Vis spectroscopy. The presence of phloridzin or phloretin was confirmed using scanning electron microscopy/energy-dispersive X-ray spectroscopy and thermo-gravimetric analysis. Assessment of the antineoplastic potency of the dihydrochalcone conjugated AuNPs against cancerous cell lines, specifically HeLa cells, was accomplished through anticancer assays monitored through fluorescent flow cytometry. The functionalization of these dihydrochalcones onto the gold nanoparticles' surface improved the antineoplastic activity substantially for both phloridzin and phloretin.

Pecina, Sara “Steps In Time: An Exploration of Tap Dance Education” (Amanda Clark)

Tap dance is an indigenous American art form that not only holds a valuable presence in the world of entertainment but also boasts an important historical background. From the slave quarters on plantations to Hollywood’s silver screen, the development of tap dance mirrors the story of American history. Tap dance must be preserved because of its cultural significance in American history; likewise, it is imperative for dancers to understand its development in order to appreciate the art and for today’s artists to continue the growth and presence of tap dance in America. However, many dance educators today focus solely on teaching a vocabulary of steps to students and fail to impart knowledge of the traditions and significance of tap dance. This study examines the development of the styles and education of tap dance from both historical and contemporary perspectives by using traditional research methods as well as personal experiences of taking dance classes from a variety of instructors, performers, and choreographers, conversing with other artists, and teaching practice. The collected information has been analyzed from a pedagogical standpoint in order to develop a tap dance curriculum with syllabi and lesson plans for students of varying ages and skill levels.

Pedersen, Kristen; Huskey, Steve “The Kinematics of Stingray Envenomation” (Steve Huskey)

The yellow stingray, *Urobatis jamaicensis*, is a common saltwater stingray species that can administer a fast, venomous sting usually as the result of being inadvertently stepped on. This species has been studied by a number of investigators, however, little is known about the kinematics of its strike. High speed cinematography as well as the MiDAS and ImageJ software were used to film strikes catalyzed by pinning the animal down with a foot-like apparatus. It was found that the yellow stingray is capable of two different types of strikes: horizontal and vertical. Further, it was determined that, when provoked, a stingray will flex the tip of its tail backwards in order to reveal the venomous barb, forming an angle with the tail designated as the angle of maximum flexion. Various measures were found and recorded for both types of stings in hope that this information will aid in the prevention and treatment of stingray inflicted wounds.

Peerce, Amanda “27 Floors of Support: How To Effectively Promote Campus Resources To College Students” (Alexander Olson)

College campuses provide a large variety of resources to college students to help ensure their well-being and success; however, students cannot utilize these resources if they do not know they exist. While there has been extensive research on the importance and efficacy of resources on college campuses, not as much research has been done on how to advertise these services to college students. The goal of this project is to assess the efficacy of a campaign educating and encouraging students to seek out campus resources in times of need. This project focuses primarily on promoting resources to first-year female students that live within Pearce Ford Tower at Western Kentucky University. Students were given an anonymous survey that asked about their knowledge and comfort levels with various campus resources. From this data, a campaign entitled ‘27 Floors of Support’ was created. Surveys were then redistributed, collected, and analyzed throughout various points of this campaign to assess the efficacy of different advertising methods. This research yields practical insights into how Student Affairs professionals might successfully promote an array of campus resources to students. Providing students with information about such resources is important both for retention and college students’ well being.

Penn, Aubrey; Neerudu, Niharika “Environmentally Friendly Method For Nickel Nanostructure Synthesis” (Hemali Rathnayake)

Here we propose a method for an economically feasible and environmentally friendly method for the reduction of nickel (II) chloride to pure nickel metal nanostructures. Nickel nanoparticles and nanopowders have commonly been formed using heat and the highly toxic reducing agent, hydrazine. Although this procedure has proven effective, our method utilizes the milder reducing agent, sodium borohydride (NaBH₄), and is run at room temperature in aqueous phase. This novel procedure has been used for other transition metals, like copper, iron, and zinc. Analysis by Energy-dispersive X-ray Spectroscopy (EDS) has shown atomic percentages as high as 81% nickel, with a large percentage of oxygen due to unexpected oxidation, which has since been minimized by running the reaction under argon. The nanostructures’ morphology was analyzed via Transmission and Scanning Electron Microscopes (TEM and SEM). This analysis has shown small aggregates with linked chains of particles of nickel with diameters as small as 20 nanometers. These nanostructures will be tested for their conductivity and will have future application in metal-organic hybrid semiconducting nanocomposites for use in thin film organic-based solar cells.

Perdew, McKenzie; Redifer, Jenni “To Cheat Or Not To Cheat: Impacts of Learning Disability Status and Impulsivity” (Jenni Redifer)

Impulsivity is associated with academic dishonesty (cheating) and is a strong characteristic of extensive cheaters. Impulsivity is also a characteristic of several learning disabilities (LD). Despite separate connections made between impulsivity and academic dishonesty and between LD and impulsivity, there is little information in the literature regarding whether the impulsivity feature of some LD causes higher rates of academic dishonesty in those students. It was hypothesized that individuals with LD would display higher levels of impulsivity, specifically dysfunctional impulsivity, as well as higher

levels of academic dishonesty compared to their neurotypical (NT) peers. We measured history of academic dishonesty, tolerance of academic dishonesty, and impulsivity in 83 Amazon Mechanical Turk participants. After removing five extreme outliers, an independent samples t-test revealed that participants with a LD exhibited higher levels of dysfunctional impulsivity compared to their NT peers, $t(75) = -2.58$, $p = 0.012$. Dysfunctional impulsivity was associated with increased cheating tolerance, $r(75) = 0.40$, $p < 0.001$. Individuals with a LD reported cheating on more types of assignments (e.g., papers, tests, quizzes), $t(75) = 2.16$, $p = 0.034$, confirming the original hypothesis. These results have important implications for educators of students with LD.

Phelps, Rachel “Lady Brett Ashley and the Unattainable Female Ideal” (Walker Rutledge)

In my paper, I discuss how the character of Lady Brett Ashley in Ernest Hemingway’s novel *The Sun Also Rises* exemplifies the unattainable female ideal. There are many definitions and interpretations of what makes the “ideal female,” ranging from fragile and sexually pure to unabashedly sensual and tempting. Ernest Hemingway portrays Lady Brett as an archetype of the latter. Upon first glance, she seems to be reiterating a sexist stereotype, and given that her character was written by a male in the 1920s, this is an understandable conclusion. However, upon further analysis, it is clear that Lady Brett serves as a critique of the unattainable female ideal, rather than a paragon. Lady Brett does not exemplify how glorious and wonderful it is to be thought of as the unattainable female ideal; she shows what an incredible burden it is, and how she is suffering. In Lady Brett’s own insecurities and feelings of misery, it is revealed just how impossible such a standard truly is, calling into question whether or not anyone, even Lady Brett Ashley, can live up to the unattainable female ideal.

Ponder, Abigail “The Preservation of Identity: A Narrative Examination of National Parks In Kentucky” (Judith Szerdahelyi)

National parks are symbols of national identity. They tell the history of places— personal legacies and natural phenomena. My capstone project for the Honors College at WKU features interconnected short stories that fuse fiction and non-fiction conventions to share the experiences of national parks in Kentucky. My presentation will include a brief reading from the aforementioned novella. Following the reading, I will subsequently highlight the process of obtaining research from a tourist’s perspective at Mammoth Cave National Park and Abraham Lincoln’s Birthplace, as well as how narrative tales continue the tradition of storytelling in places whose very existence is owed to the stories of prior generations. As the National Park Service celebrates its 100th Anniversary this year, these stories are timelier than ever.

Porter, Julia “‘Expelliarmus!’ How the Harry Potter Franchise Has Helped Pave the Way For Modern Day Feminism” (Jerod Hollyfield)

Ingibjörg Sigurgeirsdóttir begins her work *Gender Equality in the Wizarding World? A Feminist Analysis of the Harry Potter Novels* by stating, “Throughout all the Harry Potter novels we can see subtle feminism.” She continues by looking mostly at the female characters throughout the series. However, there is more to it than just the strong women in these novels. Feminism, defined as the belief that men and women should have equal rights and opportunities, is one of the greatest social issues in modern day society. Though Sigurgeirsdóttir only writes about J.K. Rowling’s popular novels, many can see that major themes and issues from the books carry over into the film series as well. The author of the books, for those who do not know, is a woman who has become one of the most influential people in the world, and had a great deal of influence in the making of the films. From start to finish this series embodies feminism, even if it is only subtle most of the time. In this paper I will argue how the pop cultural phenomenon of the Harry Potter franchise has spread awareness and helped bring feminism to where it stands today.

Powers, Nathan; Srivastava, Ajay “Altering Expression of JAK/STAT Pathway Components In Air Sac Primordia of *Drosophila melanogaster*” (Ajay Srivastava)

JAK/STAT signaling facilitates vital developmental processes in a diverse array of mammalian and invertebrate species. One such species, *Drosophila melanogaster*, appears to be a strong candidate for investigating and modeling mechanisms for early morphogenetic changes common to both humans and fruit flies. of particular interest are the potential roles that signaling pathways implicated in invasive growth patterns, such as JAK/STAT, serve in oncogenesis and metastasis of tumors. In *Drosophila*, progenitors of adult air sacs, which supply oxygen to flight muscles, are known as air sac primordia (ASP), and function in a manner comparable to human lungs. Because these ASP propagate into wing imaginal discs invasively, we have begun investigating possible roles that JAK/STAT signaling proteins might play in the directed morphogenesis of these structures. Our current research focuses on enhancing or suppressing expression of the remaining three components in the JAK/STAT signaling cascade of *Drosophila*: The JAK (hopscotch), ligand receptor (domeless), and STAT (Stat92e).

Prasad, Ayush “A Mathematical Model For the Interactions of Matrix Metalloproteinase and Their Inhibitors In a Wound” (Richard Schugart)

The medical treatment of diabetic foot ulcers remains a challenge for clinicians. a quantitative approach using patient data and mathematical modeling can help researchers better understand the physiology of the wounds. In this work, we analyze a

previously developed mathematical model describing the interactions among matrix metalloproteinase, their inhibitors, extracellular matrix, and fibroblasts (Krishna et al., 2015). In the previous work, the parameters were estimated using least squares from average patient data in Muller et al. (2008) for the system of four differential equations. However, the system can be reduced to three differential equations since a closed-form solution exists for the fibroblast equation. We numerically analyze and compare differences in the curve fits of the non-autonomous three-equation system to the original four-variable autonomous system.

Price, Joshua “Catchin' Zzzzz's” (Jennifer Cribbs)

Sleep is important to every aspect of life. It influences how people feel, how people act, and even how people think. This is what makes sleep such an important topic to investigate, particularly for college students. This study involved administering a survey that explores the sleeping habits of college students, as well as other potentially contributing factors such as classes and hobbies. The intention of this study was to see if there was a correlation between a student’s workload/obligations and the amount of sleep that they get per night.

Pruitt, Brandon “The Development of Latin American Militaries: Impacts of the Late Colonial Era” (David Keeling)

Military geography offers a unique perspective to understand geopolitics more clearly through a military lens. This approach explains the complexity of current political situations, and this is especially apparent in Latin America. Unlike the United States, Latin American militaries exercised a significant domestic political influence. As all of the Americas are framed historically by European colonization, what explains this significant difference in development of the Latin American militaries specifically? Existing literature fails to explain the current state of Latin American politics, and limits analysis to military impacts during the Cold War era. My research argues military impacts on society date back to the late-colonial period. Deep-rooted geographical, social, and psychological conditions of earlier eras are key components in the development of a professionalized Latin American military. By analyzing existing literature from a macro level, we gain deeper insight into factors frequently ignored. By identifying larger ramifications of military development, I will apply these outcomes to a more focused study of Argentina. With its unique geographical, social, and historical constructs, Argentina provides a meaningful example of Latin American military development over the past 100 years and how their impacts on society prove so different from how the United States evolved.

Pye, Ashton “Eco-Friendly Luxury Abode” (Shahnaz Aly)

When designin' a hotel, the main focus of design was to incorporate the natural daylight of Nashville, and keeping the style modern. Studying the site’s weather conditions, the sun shines bright year round, provided a direction for the building’s design. The sun influenced my floor to ceiling windows and balcony design. With the code heights and area limitation the building would benefit from the natural daylight. Research on how natural southern exposure can aid in a building heating system, will reduce energy cost. Case studies show how different hotel incorporate natural lighting and ventilation. Solar panel to collect energy throughout the day will provide backup power and lower energy consume at night. Water waste management is another key factor in the design for conserving water as much as possible. A method used in the design, called grey water recycling, recycles water from places like the shower, bathroom sinks, and dishwasher. The environmental friendly aspects bring the long-term energy saving.

Ranburger, Davis “Synthesis and Spectral Studies of Manganese 5,10,15-tris(pentafluorophenyl)corrole Complexes” (Rui Zhang)

Due to the structural similarities of metallocorroles and metalloporphyrins, a significant interest of the two systems has grown. Examining and characterizing the less known corroles compared to the better known porphyrins is a result of this interest. In this study, 5,10,15-tris(pentafluorophenyl)corrole (H3TPFC) was synthesized and characterized followed by a manganese metal insertion, which produced MnIII TPFC•(Et₂O)². Using different oxygen sources including meta-chloroperbenzoic acid (m-CPBA) and iodobenzene diacetate [PhI(OAc)₂], spectral studies of the formation and decay of MnV-oxo corrole, were investigated through UV-vis spectroscopic method. In addition, a photochemical approach to the same MnV-oxo corrole was also attempted.

Reed, Sarah “Democratic Satisfaction In the Czech Republic For Non-Voters and Losers” (Timothy Rich)

How do non-voters and individuals who voted and lost feel about democracy? This is a question that could be posed in many countries around the world, but in newly democratic societies, democratic satisfaction is key to the continuance of a stable and successful government. This research deals with legitimacy of democracy and its relationship to election outcomes for individuals over three election cycles in the Czech Republic. It poses the question whether and to what extent democratic satisfaction levels change for those who did not vote, or who voted and lost. The research also discusses the presence and influence of loser's consent in newly democratic societies. The data examined is Comparative Study of Electoral Systems Czech Republic election survey data from three election cycles: 2002, 2006, and 2010. Non-voters and losers were detached, and their self-reported democratic satisfaction levels analyzed. Examination of the data showed a significant negative relationship between both non-voters and losers and their levels of satisfaction with democracy.

Richey, Jay “Building a Superpower: The Asian Infrastructure Investment Bank” (Timothy Rich)

What is the Asian Infrastructure Investment Bank (AIIB) and why is it being created? To address these questions, this project will focus on recent economic development strategies sanctioned by the People’s Republic of China (PRC), namely the “One Belt, One Road” plan. My research analyzes why China deems it necessary to create its own infrastructure investment bank with a focus on economic development in Asia, how the AIIB is just one component of the “One Belt, One Road” development strategy, and why the United States and Japan are refusing to join as member states. This study will also make an educated prediction that the AIIB will not succeed in being a high-standards, transparent organization, but will, instead, serve as the catalyst for the PRC to assert itself along with the World Bank, the International Monetary Fund, and the Asian Development Bank, which have most recently comprised the world’s institutional economic architecture.

Riggle, Matthew “Spatial Analysis of Burmese Refugee Resettlement Locations” (Jun Yan)

Refugee populations face many challenges when relocating and settling into a new country. The Burmese refugee population in Bowling Green experiences unique challenges typical of a midsize city such as Bowling Green. This presentation will explore a variety of geographic and demographic characteristics of neighborhoods with high concentration of Burmese immigrants, seeking to characterize the neighborhoods by several quality of life metrics. These metrics include median household income, rental rates, educational attainment, and many others. The neighborhood characteristics are studied using recent data from the U.S. Census Bureau, specifically from the American Community Survey. Additionally, the neighborhoods will be examined for accessibility to basic services such as grocery shopping or public schools. Finally, the last portion of the presentation will examine some of the challenges and limitations of using Census data for such a case study.

Roe, Clarissa; Broder, Brittany; Kintzel, Edward; Andrew, Keith; Palmquist, Shane “Investigation of Carbon Nanomaterials Embedded In a Cementitious Matrix” (Edward Kintzel)

In the current study, we have carried out an investigation on monoliths of novel cementitious composites with embedded carbon nanomaterials (CNM). Cementitious samples were prepared using the carbon allotropes C60, Carbon Nanotubes, and Graphene Oxide. Due to their varying geometry, the steric effect on strength of the resulting monoliths was measured against the varying CNM concentrations. Results provide evidence that the CNM’s disperse within the cement in different ways depending on the geometry and amount of CNM added. Real-space imaging was obtained using the Large Chamber Scanning Electron Microscope (LC-SEM) at the WKU Nondestructive Analysis (NOVA) Center using Backscattered Electrons. The resulting strength of these cementitious nanocomposites was investigated using a uniaxial load frame. Comparing these results with the LC-SEM imaging provides a more comprehensive picture into the development of materials that are strong and durable relative to the abovementioned differences in CNM geometry and mass. Future studies will include the use of small-angle neutron scattering to provide independent data confirming measurement of the size and distribution of the CNM’s within the cementitious matrix. The fabrication of these samples aboard the International Space Station can compare the effect of gravity on the CNM dispersion and resulting cement monolithic strengths.

Ross, Zach “Lend Smarter: Using Predictive Analytics To Better Enhance Consumer Lending” (Leyla Zhuhadar)

Deciding whether or not a bank should lend consumers money comes down to multiple aspects. With using a credit data set, we want to determine who is creditworthy of a loan, and this can be deduced by a combination of certain attributes and values. To find these combinations we use SAS to run statistical analysis and mine on our data. We analyze from a cost/profit perspective. We assume that a correct decision output means that a bank will predict a customer’s credit scoring to be in good standing; and therefore would obtain the loan. The selected model (champion model) largely depends on the measurement used to make the decision. This selection will primarily be based on the average profit computed. The data mining application will select and report rank order measures at each population depth that is appropriate for the business case. Finally, we will compare the results obtained from using data mining models with the actual loss being reported using the profit matrix. An accurate model prediction can be used to protect banks from making loans to consumers who are more likely to default or not pay back the loan in its entirety; saving the bank from losses.

Rowland, Andrew “The Value of Professionalism” (Amber Schroeder)

Evaluating an individual for professionalism can often be unclear and consequently subjective. As professionalism becomes an increasingly desired trait in employees, it is important that it be assessed reliably. Previous research has identified several different elements, yet has failed to reach a uniform consensus. The literature often identifies elements specific to one profession, such as protecting patient privacy (Akhtar-Danesh, Baumann, Kolotylo, Lawlor, Tompkins, & Lee, 2013), or identifies similar elements but uses different names such as dedication (Hall, 1968) and commitment (Baumann & Kolotylo, 2009). Due to this inconsistency in previous research, this study proposes to review the professionalism literature in order to merge previous findings and identify elements of professionalism that can be applied in a general context. Elements identified by a literature review will be presented to a group of participants via a Q-sort. This Q-sort will test the proposed model by ensuring the elements are closely related to professionalism, that each element applies to a variety of occupations,

and will group elements into categories predefined by the researcher. Interrater agreement will be examined to eliminate irrelevant elements from the model and categorize the remaining elements into dimensions.

Ruggles, Hannah “The Age-Friendly Cities Project In Bowling Green: An Oral History” (Dana Bradley)

An age-friendly city is one that “encourages active ageing by optimizing opportunities for health, participation and security in order to enhance quality of life as people age. In practical terms, an age-friendly city adapts its structures and services to be accessible to and inclusive of older people with varying needs and capacities.” Bowling Green was the seventh city in the US to join the World Health Organization’s Global Network of Age-Friendly Cities and is currently in year three of a five-year project. The developments over the past two years have been guided by the principle that senior residents of Bowling Green are the experts and that changes made should target their key concerns. The changes that have been made are low or no cost and are implemented by diverse groups of community stakeholders with support from WKU Aging. This project aimed to summarize the efforts that have been made thus far in the Bowling Green Age-Friendly Cities Project. A narrative research method was used to identify, characterize, and document four key outcomes: The Gathering, the Over 50 Citizen’s Academy, the Society for Lifelong Learning, and the Senior Calendar Committee.

Russelburg, Wesley; Choate, Robert “Wind Effects On Testing Air Tightness In Buildings” (Robert Choate)

Blower door test are conducted to quantify the air leakage in buildings caused by cracks around windows, poor design and bad construction. Leakage impacts homeowners through their utility bills and forces a higher demand of energy. Residential buildings account for approximately 17% of the energy consumed in the United States. Homeowners use blower door data to invest in solutions aimed to lower the leakage so their utility bills will be reduced. One parameter that effects testing, which is not accounted for, is wind. The presence of wind creates a differential pressure causing more or less leakage and skews the results. My research project focuses on determining the effects of wind on blower door testing and how to account for these effects. In return blower door data will be more accurate and therefore purposed investment solutions will be more effective. The FUSE Grant obtained through WKU was used to build a test bed from which data was collected. The test bed consist of a scaled model of a home and a wind tunnel used to simulate the environmental effects of wind. By quantifying the effects of wind, blower door testing will become more accurate and lead to efficient energy solutions.

Saarinen, Emma; Richmond, Thomas “Primitive Pythagorean Triangles In Two and Three Dimensional Space” (Thomas Richmond)

Primitive Pythagorean Triangles (PPTs) are right triangles whose sides are integer lengths with a greatest common factor of one. Investigating the geometric relationships between these triangles, thus exposing the relationships between the integers of which they are composed, can have important implications for number theory. When these triangles are graphed in 3 dimensions, using the three side lengths as coordinates, they fall on a cone. Analyzing the distances between and placement of PPTs on this cone, we can attempt to determine if any three PPTs themselves form the vertices of a PPT. This can be aided by evaluating PPT’s relationships in two dimensional space. Consulting the properties of right triangles and trigonometric functions, it can be shown that the angles of PPTs are dense in the first quadrant, and manipulating Euclid’s formulas for generating PPTs implies that every PPT vertex lies on the intersection of four equations. Euclid’s formulas also imply that the distances between two PPTs will always be even, meaning that any Pythagorean triangle with PPT vertices on the cone is not primitive.

Sahlman, Jonathan “The Need For New Domestic Patent Legislation To Prevent the Exploitation of Traditional Knowledge Holding Communities” (Jessica Furgerson)

Drug development in the United States has grown exponentially over the past few decades. Drugs, like Aspirin, have been heralded as breakthrough for modern medicine. However, while the pressure on the biotechnological industry increases to find the next medical miracle, so does the piracy of plant and animal biological compounds from Indigenous communities. In this practice, known as biopiracy, United States corporations take traditional knowledge and resources from these communities in order to develop commercially viable products. This paper explores the political, social, and legal constructs that have facilitated the continued use of biopiracy despite its consequences on indigenous peoples. Politically, the United States and the international community lack consensus on the regulation of bioprospecting activity. Socially, Western conceptions of property are inadequate to protect traditional knowledge. Thus, it is imperative to engage in consultation. Legally, I focus on the role of U.S. patent legislation and the unsustainability of domestic and international legislation such as the TRIPS agreement. However, by adopting a new flexible domestic legislation, this practice made by Western corporations can be halted in order to prevent cultural genocide. This allows traditional knowledge-holding communities to maintain control of the resources necessary for them to survive.

Salami, Daniel “Code Cloud” (Michael Galloway)

Computing has moved from early scientists programming in one’s and zero’s (binary) to having a graphical interface. In this project the team will be building software called “Code cloud”. This is basically a cloud based programming platform that also has a web interface for interaction; this will essentially provide a programming environment for student programmers.

Code cloud is going to have a web interface, in which users write codes on a web based software. With code cloud, programmers don't need to worry about how their code is being compiled or if external hardware's are required. The software is designed to meet criteria like availability and low cost. Code cloud is also going to take an educational approach; the primary target audience for this project is students. Students can write codes and save it on a server where a professor can simply log onto the server and pull the code. a server was created and allocated a remote IP in the research computer lab; this server is running on an Ubuntu Operating system. A login web interface has also been designed to meet our primary audience. Code cloud would present coding as a simpler and more attractive way of writing codes.

Schaefer, Robert; Polk, Jason; McClanahan, Kegan “Sourcing and Dynamics of Karst Hydrologic Inputs On Harmful Algal Bloom Occurrences In Kentucky Lakes” (Jason Polk)

Recently, freshwater Cyanobacterial Harmful Algal Blooms (CyanoHABs), have been occurring in Rough River Lake and Nolin River Lake and may be caused by nutrient loading introduced through karst hydrologic inputs. Currently, there exists little data regarding the cause of these CyanoHAB's with only recent efforts underway to investigate these inputs. The main goal of the project was to discover the level of influence the karst inputs have on the eutrophication of the reservoirs from water quality impacts, primarily examining nutrient inputs and E. coli bacteria contamination, in addition to hydrometeorological influences. To accomplish this task, monitoring of the nutrient loading, E. coli, and the stable isotopes of nitrate, ^{15}N and ^{18}O , at three sites per lake and the output of each lake's dam was conducted since summer of 2015. a look at the preliminary isotope data indicate that the detectable portion of the nitrate loading at Nolin River Reservoir is a mix of anthropogenic sources, while at Rough River Reservoir, the nitrate loading is primarily derived from nonpoint agricultural contributions. The hydrological data collected so far indicate that the lakes both are influenced by karst groundwater sources. Some sites see more influence than others, but an influence is detectable.

Schulte, Alexandra “Universities and Local Food Practices: An International Comparison Along the Pacific Coast of North America” (Alexander Olson)

In an article on local food systems and sustainable communities, Gail W. Feenstra stated that, “the long-term health of a community's food system is an important indicator of its vitality and sustainability.” In the present study, I explored available foods and food systems within and around universities along the west coast of North America that are all bordered by the Pacific Ocean and foster an abundance of “local” foods and food industries. This research specifically seeks to understand the role of the community in building a local and sustainable food culture at University of Alaska Anchorage, University of California Santa Barbara, and University of British Columbia. I conducted a review of relevant literature, collected data on the foods available in university dining services, and interviewed faculty and staff at the three universities. I discovered the challenges and opportunities generated by the demands of a university community. I have produced an examination of food availability and choices in three urban locations with major academic institutions on the Pacific coast. In this paper, I will further discuss my analysis and the potential influence my research could have on sustainability, global food politics, and university and community relations.

Scott, Derek “Disparities In Felony Case Processing: An Analysis of a Southern, Semi-Urban Jurisdiction” (Jeffrey Budziak)

Many studies examine the effects of race and ethnicity in criminal case processing. Most of them are conducted using large samples retrieved from northern, urban areas and they seek to determine whether race and ethnicity are factors in sentencing outcomes. With a fast growing prison population, the Kentucky legislature implemented reforms in 2011 and made changes to their risk assessment of offenders in 2013. The study attempts to measure the effects of these reforms as they relate to race and ethnicity. This statistical analysis consists of data obtained from all felony convictions in one southern, semi-urban jurisdiction in 2013. The jurisdiction provides an adequate arena for investigation due to its size, diversity, and location. Regression is used to determine the impact of race and ethnicity at both stages after relevant legal and socioeconomic factors are held constant. a quasi-experimental design is used to compare before and after effects of the reforms on race and ethnicity. The findings reveal unwarranted disparities in felony case processing after reforms attempted to reduce judicial discretion. This study attempts to expand the literature on race, ethnicity, and crime at a time when race and ethnicity have resurfaced as pertinent issues in our justice system.

Sehgal, Rippa “Reactions of Oxaliplatin and Its Analog With DNA Nucleotides At Variable pH and Concentration Levels” (Kevin Williams)

Introduction: Oxaliplatin is one of three FDA-approved platinum anticancer drugs. For Oxaliplatin and other platinum drugs, reactions with DNA occur primarily at guanine residues and secondarily at adenine residues. We have studied the reactions of Oxaliplatin and its analog with AMP and GMP at various pH and concentration levels. Methods: We have prepared Oxaliplatin and its analog and have set the reactions with both guanine and adenine nucleotides at pH 4 and pH 7 and variable molar ratios. Reactions have been characterized by NMR spectroscopy over time to observe the formation of products. Results: Reactions are generally faster at pH 7. The dominant products are usually those with two nucleotides coordinated to one platinum center even under conditions of excess platinum. Both oxaliplatin and its analog react with

similar rates, and the reactions with GMP are faster than that with AMP. Discussion: At pH 7, deprotonation of the phosphate group fastens the reactions. The pH generally affects the rate but does not affect the product distribution. The extra methyl groups on the oxaliplatin analog do not slow reactions with nucleotides considerably. Platinum center reacts faster with GMP than AMP because of the chelate formed by the oxalate ligand.

Seitz, Megan “Zarzuela: North America's Missing Performance Genre” (Liza Kelly)

Zarzuela is a genre of Spanish musical theater that is unfamiliar with and unavailable to most American audiences. The goal of this project is to create more awareness of Zarzuela in the United States by giving a presentation about the art form followed by a performance of various Zarzuela pieces. My methodology for this project entailed studying Zarzuela in its birthplace of Madrid, Spain, and working one-on-one with a Zarzuela company in Quito, Ecuador, in order to better understand the art form and how it is unique from opera and musical theater we are accustomed to in the United States. My presentation will compromise the discussion and implications of my research by highlighting the specific characteristics of Zarzuela, such as Spanish folk music and dance, common themes, styles, and a brief history of Zarzuela's evolution in Spain and later to its colonies. There will be a performance following the presentation to display the results of the creative research experience abroad and showcase the unique elements earlier described in the presentation. English translations of the Spanish Zarzuela texts, as well as a brief contextual descriptions, will be available for audience members to better appreciate and understand the performance.

Senay, Taylor; King, Rodney; Rinehart, Claire “Spontaneous Mutations In a Viral Population Increase Genetic Diversity” (Rodney King)

Bacteriophages are the most numerous biological entities on Earth, found anywhere a suitable bacterial host exists. The purpose of this project was to gain insight into the genetic diversity of the phage population by isolating and characterizing novel phages that infect the bacterial host *Mycobacterium smegmatis*. Mycobacteriophage Jeckyll, was isolated and purified from a soil sample taken from Elizabethtown, Kentucky. It produced turbid, 2-3mm diameter plaques and electron microscopy analysis showed that the viral particles have icosahedral heads with noncontractile tails. Genomic DNA was isolated and analyzed by DNA restriction digests and gel electrophoresis. These results were compared to the Mycobacteriophage Database and showed that Jeckyll belongs to the KI subcluster of mycobacteriophages. During isolation, a spontaneous mutant, JeckyllCM, was also recovered. JeckyllCM produced clear, 3-4mm diameter plaques. The clear plaques indicate JeckyllCM cannot lysogenize host cells. There was no difference in viral morphology but there was a single difference in the DNA restriction pattern. Genomic sequencing showed that JeckyllCM contains two independent base changes: one in the phage repressor and another in a gene of unknown function. Our results show that novel mycobacteriophages can be isolated from the environment and that spontaneous mutations contribute to bacteriophage diversity.

Senig, James; Belcher, Michael; Avery, Dustin “Cluster-Weighted Modeling Approach To Constructing Potential Energy Surfaces” (Jeremy Maddox)

The potential energy surface is an important theoretical device used to model molecular physics. However, it is computationally demanding to calculate molecular potential energies accurately over a wide range of molecular configurations. One approach to this problem is to fit a finite set of accurate molecular potential energy surface data with a mathematical or numerical model. The goal of the present work is test a new type of potential energy surface model that is based on a numerical technique known as cluster-weighted modeling (CWM). CWM combines both global and local modeling strategies that take advantage of machine-learning type algorithms to adaptively fit a functional form to a set of molecular potential energy data points. We present the results of benchmark studies where different parameters for the CWM algorithm have been tested, such as: number of data points, spatial distribution of the data set, and basis functions.

Shah, Jimmy; Ellis Griffith, Gregory “Trailblazing Uses of Health Information Technology” (Gregory Ellis Griffith)

The tremendous advances in the technology has made it possible to improve the quality of care received in many Public Health Community. The innovative practices has led to improved methods in collecting and transferring patient data in electronic formats. The recent advances have helped the whole world to move from paper to electronic data. There are difference databases used for the applications such as OLTP and OLAP. Such databases help in keeping the patient information in safe and secure manner. The advances have helped people living in rural areas by avoiding long distance travelling with the effective use of Telehealth and shared data. We propose that with the correct usage of the technology, patient visits can be reduced to the hospitals and can bring more prosperity among the patients. There have been many different programs to promote Health Informatics such as Broadband Loan Program, Community Connect Grant Program, and Telecommunications Infrastructure Loan program to promote Health Informatics. The innovative practices manage privacy of the data, provide an environment for syncing and anonymizing the data, and create uniform measures for electronic data transmission.

Shaker, Nuha; Winchester, Lee J.; Maples, Jill; Veeranki, Sudhakar; Tyagi, Suresh “Exercise Reverses the

Pathophysiology Associated With Elevated MMP-9 In a Hyperhomocysteinemic Mouse Model” (Jill Maples)

Background: Hyperhomocysteinemia (HHcy), characterized by elevated homocysteine in the blood, is heavily implicated in cardiovascular diseases. HHcy promotes systemic inflammation and vascular remodeling, potentially through elevated free radical production and MMP-9 activity. Exercise reduces homocysteine levels and therefore, could serve as a promising intervention for HHcy. Purpose: To investigate whether HHcy elicits its pathologies through MMP-9 and determine if exercise can mitigate these effects. Methods: C57, CBS+/-, FVB, MMP-9 -/-, and CBS/MMP-9 double KO were subjected to a 6 week treadmill exercise protocol. Arterial blood pressure measures were taken through tail-cuff method. Hind limb perfusion was measured via laser Doppler and vascular diameter was measured using ultrasonography. Collagen deposition in the skeletal muscle was measured using Masson’s trichrome staining. Results: In CBS+/- mice, decreases in body weight and femoral artery perfusion and lumen diameter were observed. These mice displayed increased wall to lumen ratio, mean arterial blood pressure, and skeletal muscle fibrosis. CBS/MMP-9 mice did not display any of these conditions. Exercise was capable of mitigating all of these effects in CBS +/- mice. Conclusions: We conclude that HHcy elicits its pathologies through induction of MMP-9. Exercise is capable of mitigating pathologies associated with HHcy.

Sharma, Aditya “Inappropriate Use of Emergency Services In Immigrant Populations” (William Mkanta)

Immigrants settling in U.S. communities may not clearly understand the importance of having a usual place for primary care services (PCS), and may consequently use the emergency department (ED) for non-emergent care. High costs of care, lack of preventive care, and poor quality of care are some of the negative effects of using the ED for regular care. The aim of this study is to promote healthcare education and awareness among immigrant populations on the importance of establishing routine PCS. The experience of the immigrants in ED service utilization in major Bowling Green area hospitals will be used for this study. Student workers will collaborate with hired language interpreters to collect information on different aspects of care including knowledge about the U.S. healthcare system, health insurance, and availability of PCS. Patient records will be reviewed to determine provider’s assessment of the patient’s ED visit. Focus group discussions involving providers and members of immigrant populations will be conducted to further discuss the issue of ED utilization and assess the types of interventions that might be needed to create awareness about the need for PCS and appropriate use of ED in immigrant populations.

Sheinidashtegol, Pezhman “Impact of DDoS Attack On Three Common Hypervisors” (Michael Galloway)

Hypervisor, or Virtual Machine Manager (VMM), is a software layer that enables the virtualization of hardware, isolation of resources, and creation of transparent access. Hypervisors are located between guest operating systems (OS) and hardware and are responsible for monitoring and maintaining resources such as network, I/O, CPU, memory, etc. Hypervisors are divided into two categories; type one hypervisors, at times called bare-metal hypervisors, are installed directly above the hardware and have direct communication with the hardware, hence eliminating the need for an operating system. These hypervisors act as a medium through which the guest OS communicates with its resources. Type two hypervisors on the other hand require a base operating system to be installed, since they are in fact adding the virtualization feature to the base operating system. Although this might be a positive point allowing for further flexibility in regards to policies and configurations, any security issue in the base operating system can affect the entire system. My research is focused on measuring the impact of DDoS Attack (most common attack in ten years ago) on three popular and open source hypervisors (KVM, Xen, Virtual Box).

Sherrill, Brenna “The Manic Pixie Dream Girl In Independent Film” (Ted Hovet)

For my master’s thesis, I am conducting a character study on the Manic Pixie Dream Girl character trope. The term was coined in 2007 by a film critic about a very specific kind of female character—one who exists “solely in the fevered imaginations of sensitive writer-directors to teach broodingly soulful young men to embrace life and its infinite mysteries and adventures.” the MPDG has often been written off as nothing more than a stereotype or sexist characterization of a woman, but I argue that the MPDG can be much more than a flat character. I will be presenting a chapter of my master’s thesis project on the Manic Pixie Dream Girl character trope in independent film. The presentation will focus on a case study of three films—*God Help the Girl*, *Listen Up Philip*, and *Ex Machina*—that show how the trope has changed since the term was coined in 2007. I will also be showing images and clips from these films to further illustrate my arguments about how the MPDG has the possibility to exist as a fully developed character, not just an archetype.

Shin, Eura “The Development of a Computer Program To Simplify Complex Knot Diagrams Using Global Moves” (Uta Ziegler)

A mathematical knot is similar in concept to the everyday head phone cable, with the ends closed together to form a continuous loop. These knots are the subject of discussion in molecular biology, mathematics, physics, and chemistry. This poster presentation will include a brief introduction to knot theory, focus on the problem of knot simplification, cover algorithms developed to represent simplification moves numerically, and discuss the approach used to determine the order in which each move is performed to lead to an optimal simplification. In addition, this program brings what we have coined “global moves” to the table, a large-scale approach to minimizing knot diagrams more effectively. The impact the global

move has on the simplification process is tested in the form of a “global slide” and the results are compared to that of a previous simplification program.

Shircliff, Molly “Multi-Physics Modeling and Simulation Using Modelica/dymola and Matlab/simulink – a Comparative Study” (Farhad Ashrafzadeh)

Simulation environments for multi-physics modeling are becoming more and more important in new product design. Such software environments allow performance optimization at the system level, leading to competitive advantages in the marketplace. While a number of new simulation software packages are emerging, fulfilling the conflicting criteria in concurrent modeling of various physical domains remains a challenge. Numerical convergence, stiff equation solving, speed of simulations, ease of use, interfacing capabilities with other simulation software, are all criteria that need to be considered when choosing modeling software. The goal of this research is to make an objective benchmark between two multi-physics modeling simulation environments called Modelica/Dymola and MATLAB/Simulink. The comparison will be performed using complex simulation problems such as an inverted pendulum, multi-model optimization surface, etc. Interactive simulation, hardware interfacing, real-time animation, and software interfacing capabilities are other dimensions considered in this work. This research also seeks to compare advanced simulation features such as optimization, real-time simulation, numerical stability, and analysis of variations. A benchmark matrix will be presented summarizing the research outcomes with specific recommendations for the application of each simulation environment.

Shirley, Matthew; Lauth, Rebecca; Taylor, Ritchie “Watershed Health Assessment For a Small Municipal Separate Storm Sewer System Within the Mansker Creek Watershed “ (Ritchie Taylor)

Watershed health is a concept that includes protection of water quality, stream corridors, and human and ecosystem health. This process in Tennessee, and according to U.S EPA Phase II Rule, is now regulated within small municipal separate storm sewer systems or MS4s, via a general stormwater permit. A general stormwater permit requires small MS4s to conduct analytical and nonanalytical monitoring to assess water quality, biological integrity, and stream corridor health in streams with impaired aquatic habitat or water quality. Tennessee Department of Environment and Conservation (TDEC) requires application of specific methods to conduct these assessments. Methods that are encouraged by the permit are Maryland Department of Natural Resources stream visual assessment methods, U.S. EPA habitat assessment, and TDEC protocols for macroinvertebrate stream surveys. This study evaluates the procedure for stream visual assessment that is required by TDEC for small MS4s within the City of Goodlettsville, TN. Objectives of the research are to determine effective methods for small MS4s to assess watershed health within a limited budget, evaluate the use of the Marplot software as a cost-effective method to include GIS analysis, and develop a stream corridor rating system that other small MS4s can utilize.

Shultz, Sarah “Transformation and Transgression In the Complete Fairy Tales of the Brothers Grimm” (Ann Ferrell)

The Complete Fairy Tales of the Brothers Grimm has significantly influenced the world since its first publication in 1812. The stories have made their way into popular movies, television shows, and novels for children and adults. Instances of humans transforming into animals are ubiquitous in this collection. What is the meaning behind these transformations? Is it possible that this trope might fulfill a common purpose throughout the collection? What significance might instances of shape-shifting have had for those who told oral versions of the tales, and what do instances of shape-shifting mean to readers today? How does the trope of shape-shifting work in the collection as a whole?

Sircy, Megan; Williams, Christian “Nursing Home Administrators’ Perceived Knowledge of the Affordable Care Act (PPACA)” (Melanie Eaton)

Historically, skilled nursing facilities (SNFs) have been plagued with poor reputations due to a lack of quality and adequate care. The Omnibus Budget Reconciliation Act of 1987 was the first attempt at revising nursing care standards in SNFs. Since then, little has been done to improve standards of care in a SNF. The Patient Protection and Affordable Care Act (PPACA), signed into law in 2010, established new guidelines for SNFs as part of its health care reform goals. Title VI, Part B, of PPACA deals almost exclusively with SNFs. Some provisions under Title VI include increasing SNF accountability and transparency in order to enhance ethical standards and quality of care. To understand the effects of PPACA on SNFs, this study assessed the views of health care administrators on PPACA as well as gauged their knowledge level of PPACA and its implications. A survey was sent out to SNF administrators in Kentucky and Tennessee. The study showed that administrators showed concerns with the effectiveness of PPACA, agreed that they understood the implications of PPACA on its facility but not the entire act itself, and expressed issues with how to best implement the changes in their facilities.

Sizemore, Alex “An Investigation of the 16 June 2014 Pilger, Nebraska Tornado Event” (Joshua Durkee)

On the afternoon of 16 June 2014, a severe supercell thunderstorm developed in northeastern Nebraska that produced multiple tornadoes, hail, and severe convective winds. This storm was able to spawn and thrive in a highly sheared and unstable atmosphere where it generated a total of four EF-4 tornadoes, one most notably affecting the town of Pilger, NE at around 2110 Z, causing two fatalities and over \$10 million in damages. Its ability was made even more impressive by the fact that multiple tornadoes were on the ground at the same time. Although tornadic parameters were in place and well forecast by

the Storm Prediction Center, it is still an atmospheric science mystery as to why these ingredients can produce tornadic activity, but do not yield the same results most other times; research on this notion still continues to this day. Nonetheless, this investigation primarily focuses on the remote sensing observations with regard to large and local-scale atmospheric conditions. Furthermore, this analysis shows that the specific atmospheric parameters, that helped determine prospective causes of this unusual tornadic activity, was likely due to the more than sufficient values of low-level wind shear, thermodynamic instability, and low-level moisture ingested by the storm.

Skaggs, Megan “Invisible Children: The Effectiveness of Non-Governmental Organizations (NGOs) In Primary Education In Central America” (Timothy Rich)

To what extent are non-governmental organizations (NGOs) an effective tool in primary educational development in Central America? To address this concern, this project will address several months of research in Nicaragua, Guatemala, and NGO headquarters in the U.S., where interviews with educators, NGO workers, and citizens were conducted regarding the role of NGOs in effectively addressing educational concerns. My research begins by analyzing the historical and social structures in both Nicaragua and Guatemala, as well as how this affects civil society today. It will also examine NGOs’ work within these societies, noting what advantages they have in making advancements in education development for marginalized children, as well as the failures addressed by those in the field. This study focuses primarily on determining the success – and failures – of NGOs in three NGOs of various sizes.

Soult, Niah; Haynes-Lawrence, Darbi “Illustrated Storybook Helps Parents Explain Their Multiple Sclerosis To Their Children” (Darbi Haynes-Lawrence)

In response to a 2014 qualitative study on Multiple Sclerosis and parenting, in which parents identified issues faced in explaining their disease to young children, a creative project was founded, translating published research of Dr. Haynes-Lawrence into an illustrated children’s book. Carefully crafted in a language that is developmentally appropriate, respectful, and engaging of open and honest communication, the storybook serves as a vehicle for embracing and supporting the process in which young children are tasked with understanding, accepting, and adjusting to a parent’s diagnosis. Told through the point of view of a daughter and her mother, the story’s perspective appeals to a young audience with reading skills ranging from beginner to independent, while the text-picture relationship enhances accessibility for the youngest of children with emergent literacy skills, embedding opportunities for parent-child interactions and to strengthen scaffolding strategies.

Sparks, Megan; Duffin, Lisa “Prevalent Brain-Based Myths In Education” (Lisa Duffin)

There are several prevalent brain-based myths that exist in education that have not been supported by empirical research. This study examined four myths identified by Geake (2008): 1) VAK learning styles (i.e., the idea that students’ brains process certain sensory information more efficiently than others), 2) “left-brained” or “right-brained” thinking (i.e., that hemispheric dominance dictates learning capabilities – analytical vs. creative), 3) multiple intelligences theory (i.e., that our brain consists of 8 independent, self-sufficient processes), and 4) that we only use 10% of our brain. This study utilized a pre-post test design and measured pre-service teachers’ knowledge and beliefs about each of the myths before and after a semester-long learning experience about the myths. The most prevalent myths and the changes in reported beliefs will be presented. Differences in beliefs between science/math pre-service educators and other pre-service educators as well as implications for reducing the prevalence of brain-based myths in education will be discussed.

Spraggs, Mary; Gibson, Steven “Constraining the Physical Properties of Cold Interstellar Gas Clouds” (Steven Gibson)

Since the interstellar medium (ISM) plays an integral role in star formation and Galactic structure, it is important to understand the evolution of clouds over time, including the process of cooling and condensing that in turn forms new stars. This work aims to constrain the physical properties of the cold ISM using surveys of neutral atomic hydrogen (HI) 21 cm spectral line emission and absorption, carbon monoxide (CO) 2.6mm line emission, and infrared dust thermal continuum emission. We have developed an algorithm that identifies areas where the gas may be cooling and forming molecules using HI self-absorption (HISA), when cold HI absorbs radiation from warmer HI emission behind it, and analyzes the HI, CO, and infrared data. From these inputs, we determine the gas temperature, density, molecular abundance, and other properties as functions of position. We then map these properties to study their variation within individual clouds and across the Galaxy.

Stallings, Jessica “Childbirth Experiences of Doula-Assisted Births” (Marilyn Gardner)

Up to 20% of women who give birth each year experience postpartum depression and approximately 9% experience postpartum traumatic stress disorder. Each of these conditions is affected by the woman’s birth experience. A negative birth experience, real or perceived, increases the risk of post-partum depression and post-traumatic stress disorder, and can impede maternal-infant bonding and breastfeeding. Factors associated with negative birth experience include unexpected medical interventions, perceived lack of control during labor, and obstetric analgesia. A doula provides physical and emotional support during childbirth, in a non-medical capacity. Clinical studies have shown that doula-assisted births tend to be shorter, have less medical interventions, and higher birth satisfaction. This presentation will present findings from a cross-sectional study

that examined the effect of doula-assisted births on birth satisfaction, perceived control, and postpartum traumatic stress disorder.

Steiner, Anthony “The Differential Effects of Low-Intensity Fire and Precipitation On Fall Herbs In Kentucky” (Albert Meier)

The state of Kentucky has little land, if any, that has not been drastically altered by the presence of humans within the past 300 years. The presence of natural fire in the Southeast as a mechanism of disturbance is known to have played a major role in shaping plant communities. Fire is credited with aiding in the maintenance of stands of fire-resistant trees, like oaks. After years of employing fire prevention practices, oak stands in the Eastern United States have declined or failed to regenerate, apparently due to the lack of fire. There is thus a conservation imperative to understand how fire affects the ecosystem of Kentucky’s mesic hardwood forests. This study examines 36 plots located in mesic hardwood forest at the WKU Green River Preserve in Hart County. Half of the plots were subjected to a low-intensity burn in 2010 to study the effects of fire on the herbs. Five years later, the species richness and abundance was determined. The data will be analyzed in permutation analyses to test the differential effects of fire and precipitation on the sampled community.

Stone, Hannah; Funk, Amanda “Systemic Review of Benefits, Risks, Health Related Fitness Outcomes and Opportunities of Dance-Based Fitness Programs” (Amanda Funk)

Dance-based group fitness classes appeal to a diverse client base. Benefits, risks, health related fitness outcomes and opportunities of dance-based fitness classes are examined in this systemic review of literature spanning recent decades. The purpose of this project is to assemble relevant themes that will inform practice and identify opportunities for health related fitness outcomes research.

Sudbeck, Rachel “Bobbie Ann Mason's Tenth Birthday Party-- Cultural Coping Mechanisms In Dealing With Child Death” (Mary Ellen Miller)

This paper is taking off of a passage from Bobbi Ann Mason's memoir “Clear Springs.” In it she mentions a practice common to her hometown near Paducah, in which a child's tenth birthday was known as a significant milestone that marked a supposed point in which a child had passed by all the common diseases and was more likely to survive to adulthood. I'm relating this to a Catholic practice followed by my grandmother, in which a child was believed to not have a soul until age seven. The purpose of this paper is to explore these and other cultural practices that rose from the high infant mortality rates of America's past. I'm approaching it statistically, through analysis of death rates throughout American history, but also relating it more abstractly to the emotion felt in writings from the time, such as Robert Frost's poem “Home Burial.” The point is to explore the coping mechanisms, both cultural and artistic, that rose from something that was so unimaginably tragic, but also so commonplace.

Sullivan, Zachary; Fan, Xingang; Polk, Jason; Mahmood, Rezaul “Influences Karst Geologic Terrains Have On Atmospheric Phenomenon Within Tennessee and Kentucky” (Xingang Fan)

Currently, the Noah Land-Surface Model (Noah-LSM) coupled with the Weather Research and Forecasting (WRF) model does not have a representation of the physical behavior of a karst terrain found in 25% of land area worldwide. For this study, hydrological aspects, such as bedrock porosity and the hydraulic conductivity, were chosen within Tennessee and Kentucky in order to determine the most representative subsurface parameters for the Noah-LSM soil parameter table. Hydraulic conductivity values show a variation in ranging from around 10⁻⁷ and 10⁻⁵ ms⁻¹ for the karst bedrock. a sandy loam and clay soil type were used along with bedrock parameters to determine an average soil parameter type for the epikarst bedrock. a comparison between default model run and that of karst addition for a stationary frontal event (June 11th to 13th, 2006) to evaluate the atmospheric response to the addition to karst geologic terrains within the model. Results from this research depict an increase in precipitation intensity within the locations of karst. The sensible heat flux, temperature, and planetary boundary layer heights portray the preference for an increase within regions of karst within the model domain.

Tamatekou, Komlan “Sustainable Sports Facility” (Aly Shahnaz)

The project revolves around the design of a multi-sports complex. This facility is 109,274 square feet; it will be composed of six volleyballs courts, four soccer arenas and a fully functional gymnasium. To create the various sizes of the courts and arenas research was conducted into National College Athletic Association (NCAA) for the volleyball courts and United States Indoor Soccer Association (USISA) for the soccer field. For the gymnasium and the locker rooms in-depth researched was conducted into different gymnasiums around the country. This research included various L.A Fitness facilities around the country and the Preston Center located on Western Kentucky University campus. To create a sustainable building research was conducted on geo-thermal heating cooling, the use of sun light, rain water collection and the use of solar panel for energy. All these research led to the design of a self-sustainable and aesthetically pleasing sports complex that will serve the Bowling Green area.

Taylor, Casey “Hitler's Model Protectorate: Resistance In Occupied Denmark” (Beth Plummer)

The resistance in Denmark is a topic in World War II that is sorely underrepresented in historical study. The documentation on the topic tends to be short and makes Denmark's capitulation seem like an uneventful surrender to the superior Nazi forces. The truth is much more complex for the people of Northern Europe. In my paper "Hitler's Model Protectorate: Resistance in Occupied Denmark" I explore the monographs that were written in the immediate aftermath of the war as well as some newly published biographies and autobiographies written by the men and women that lived through the occupation. Though there was no resistance on the part of the Danish army or navy, an underground civilian resistance was formed within hours of the German invasion. That resistance, with little help from the other Allies, waged a sabotage campaign against the Wehrmacht that lasted the entire war and was more successful in those efforts than any other occupied country in the war. The resistance attacked weapons factories, and managed to evacuate nearly all of the Danish Jews, the only Allied European country to save the majority of its Jewish population. The story of the Danes is one of unparalleled resistance, not subjugation.

Taylor, Leah; Young, Sonia "Prevalence of and Risk Factors Associated With Congenital Anomalies of the Nervous System In Kentucky 2000-2010: Development and Initial Stages of a Prevalence Study" (Sonia Young)

Introduction: Birth defects present more frequently in Kentucky than on a national average. Children with Congenital Anomalies of the Central Nervous System (CACNS) present with physical and cognitive impairments that lead to motor delays. The purpose of this research is to demonstrate the development and initial stages of a prevalence study to assess the incidence and demographic risk factors associated with CACNS diagnoses in live births in Kentucky from 2000-2010. Methods: A literature review and assessment of public records from the CDC and the State of Kentucky determined the need for a population-based retrospective study. A research proposal was developed and approved by the Kentucky Cabinet for Health and Family Services (CHFS) IRB. Results: Incidence and demographic data was provided by the Kentucky Birth Surveillance Registry of the CHFS for analysis. From 2000-2010, there were 619,564 live births in Kentucky, with 1,308 being diagnosed with CACNS. This represents a prevalence of 21.1/10,000 live births, with males accounting for 54%. Average maternal and paternal ages were 26 and 30, respectively. Average birth weight was 1,841 grams. Discussion: Preliminary results indicate a state prevalence of these conditions which will be compared to regional results and demographics when aggregate data is received.

Ter-Grigoryan, Svetlana "No (Wo)man's Land: Popular Press Discourse" (Marko Dumancic)

After Mikhail Gorbachev's declaration that official censorship would end through his glasnost reform initiative, the popular press began covering sex and sexuality for the first time. Scholars have concluded that the burgeoning sex discourse of the glasnost years indicates a period of sexual liberation in the Soviet Union, or even the beginning of a "sexual revolution" akin to sort undergone in the west in the 1960s and 70s. I challenge this notion by examining journalistic discourse about "erotica," or artistic depictions of sex or sexuality meant to evoke an aesthetic or emotional response, and "pornography," or visual imagery of sex that are primarily meant to satiate sexual desire. Rather than recognizing press discourse on erotica and pornography as inherently liberating, I argue that the media's disinclination in recognizing erotica as separate from pornography demonstrated a continued loyalty to sexually conservative principles.

Thomas, Jodi "The Discovery and Analysis of Microbacteriophage Alleycat and Katy131" (Naomi Rowland)

Abstract Bacteriophages are the most abundant organisms on Earth. The purpose of this project was to gain a greater understanding of the diversity within the mycobacteriophage population, by isolating and characterizing a single bacteriophage from the environment. This research was accomplished through the Genome Discovery and Exploration Program, which allows undergraduate students to explore the diversity of mycobacteriophages and get experience working in a research setting. By using *Mycobacterium smegmatis* as a host, we were able to isolate our phages from soil through a purification process. The phages were observed with the Electron Microscope and DNA was isolated. Through EM imaging it was discovered that the AlleyCat phage had long, wavy tails and sticky heads. Katy131 had hexagonal heads. After streaking these phage on plates and introducing an aliquot of *Mycobacterium smegmatis*, it was discovered that both produced clear plaque mutants. AlleyCat had small bullseye plaques, and Katy131 had small, highly concentrated, turbid plaques.

Thompson, Patricia; Abate, Ethan; Bosh, Robert; Brown, Katherine; Hare, Honor; Weaver, Mia; Williams, Jessica "An Overview of the Citizen Cate Project For Continental Scale Data Collection During the 21 August 2017 Total Eclipse of the Sun" (Richard Gelderman)

The Citizen CATE project takes 90 minutes of continuous data of the inner solar corona using up to 100 observing groups along the path of August 2017 path of totality from Oregon to South Carolina. Each station observes the eclipse using a 90mm f/5.5 doublet refractor telescope, a rapid-readout detector, and a laptop running MATLAB software for image collection. The optical images of the inner solar corona will be used in further analysis of the corona to determine the dynamical oscillations of coronal plumes and the impact of Raleigh-Taylor prominence instabilities in the corona. Data collected from the 2017 total solar eclipse will be compounded with data gathered from two other total solar eclipses: 2016 in Indonesia and 2015 in the Faroe Islands.

Timmers, Jennifer; DeGraves, Fred; Galloway, Hunter; Brown, Linda “Comparison of the Effects of Two Growth Implant Strategies On the Average Daily Gain of Suckling Calves Fed ‘KY-31’ Endophyte Infected Tall Fescue” (Linda Brown)

The use of growth implants has become a common practice among beef cattle producers when battling the negative production effects caused by fescue toxicosis. The objective of this study was to compare the effects of two implant strategies on the average daily gain of suckling calves grazed on KY-31 endophyte infected tall fescue. Eighteen cows with spring calves were used in this study. Calves were divided by birth date into four blocks. Calves were stratified by sex and 45 days of age body weight into 3 implant treatment groups (control 90.3 ± 9.7 kg, zeranol 102.9 ± 10.9 kg, and progesterone (100 mg) and estradiol benzoate (10 mg) 92.4 ± 10.3 kg). Calves were weighed and re-implanted at 129 days of age (84 days after initial implant). Zeranol treated calves were re-implanted using the same implant as the initial implant. Progesterone and estradiol benzoate treated calves were re-implanted after reaching 181 kg body weight with either 200 mg progesterone and 20 mg estradiol benzoate or 200 mg testosterone propionate and 20 mg estradiol benzoate depending on sex. Calves were weaned at 210 days of age. Data were analyzed using the REPEATED function in the MIXED procedure SAS.

Tockstein, Sarah; Payne, Jason “Designing a Unique Therapeutic Agent Involving Gold Nanoparticles Capped With Cephalosporins For Potent Antibacterial Applications” (Stuart Burris)

The growing number of cases of multi-drug resistant bacterial infections has justified the need for innovative drug delivery systems. If nothing is done to combat these MDR strains, the world may enter a post-antibiotic era. This project attempts to find a solution to this issue by creating a drug delivery system for antibiotics currently in circulation. The method involves capping gold nanoparticles (AuNPs) with antibiotics (Cephalosporins). AuNPs were chosen for this study because of their non-toxic and biocompatible nature. A self-patented green process, where the antibiotic was utilized as both the reducing and capping agent, was applied for the creation of the Cephalosporin capped gold nanoparticles (Cep-AuNPs). Once synthesized, Cep-AuNPs were characterized using transmission electron microscopy (TEM), scanning electron microscopy (SEM), and UV-Visible spectroscopy to determine morphology. FTIR and TGA analysis was used to confirm the presence of the ligand on the surface of the AuNP. Bacterial growth, spread plate and XTT antibacterial assays were used to determine the efficacy of Cep-AuNPs against both Gram-positive and Gram-negative bacterial strains. The mechanism of Cep-AuNPs was visualized using TEM and propidium iodide assay. The minimum inhibitory concentration (MIC) determined for Cep-AuNPs was significantly lower.

Todd, Mollie “An Analysis of Female Genital Circumcision and Its Relation To Islam” (Kate Hudepohl)

Currently millions of females mostly concentrated in Africa and the Middle East have been circumcised. For those communities that engage in female genital circumcision, the practice holds deep cultural value. This paper provides an in-depth discussion about female genital circumcision, including where the practice began, what forms it takes, effects it has on the body and where it occurs today. Part of this analysis uses religious and historical texts to examine to what degree the practice can or should be understood as an Islamic custom. This work will also use cross-cultural anthropological perspectives to look at modern cases of female genital circumcision and their relation to Islamic tradition. The findings from this research will secondarily be used to speculate on the implications of the continuing practice of female genital circumcision in various societies and the repercussions this may have on perceptions of Islam.

Travis, Corey Travis “Text Mining and Its Place In Predictive Modeling” (Leyla Zhuhadar)

One of the goals of a business is to retain customers. Bringing customers back for repeat business is oftentimes cheaper than persuading new people to purchase products or services. This paper focuses on a method that analyzes prior purchase data in order to predict customers' levels of loyalty. The data analyzed describes a customer's last purchase period, frequency of purchases (over specific period of time), and monetary value of purchases. This is termed the RFM. In many cases, businesses only use numerical data when creating these predictive models. In this research, we focus on the use of numerical and textual data when creating a model. I will be using SAS Enterprise Miner to do the following: group customers based on their textual feedback; use algorithms to cluster the resulting data; compare the logistic regression model using only numerical data with the model using both numerical and textual data. A ROC curve, which ranks model predictions to actual occurrences, will indicate which is better. This will be reported accordingly. The goal of this research is to utilize unstructured data, analytical models, and ROC curves to establish a standardized method for comparing textual and non-textual models and their results.

Travis, Levi “The Impact of Risk and Volatility On Emotional States” (Andrew Mienaltowski)

Volatility in investment value can create uncertainty and decision regret. A minor inoculation that creates reasonable expectations for the risk of volatility can be used to diminish its emotional impact on novice investors. The objective of this study is to identify the degree to which risks influence changes in emotional state; one of the most stark examples of risk is volatility that exists in the stock market. The first phase of the study involves discerning which participants are successfully inoculated through exposure to a booklet containing basic information on proper investing practices. Participants then experience a simulated 30-year investment scenario in which, after picking from two of four fictitious mutual funds, they are

then shown a sequence of quarterly reports that track these investments over 30 years. Some participants experienced typical volatility and others experienced exaggerated volatility. Participants completed an emotion inventory at fixed intervals, and their knowledge about the change in the value of their investments was captured to assess the impact of volatility on their perceptions of the success of their mutual funds.

Urso, Olivia; King, Rodney “Discovery and Comparison of Novel Mycobacteriophages Schadenfreude and Widewale” (Rodney King)

Although bacteriophages, or bacterial viruses, are the most abundant biological entities on Earth, their usefulness as biological control agents has not been fully exploited because we lack sufficient understanding of their basic biology. The diversity among bacteriophages results in millions of unique viruses capable of lysing their host, a property that could be exploited to fight antibiotic resistant pathogens. This project explored bacteriophage diversity through the isolation and characterization of mycobacteriophages from the environment. Mycobacteriophages Schadenfreude and WideWale were isolated from soil samples collected less than two miles from each other. The morphologies of Schadenfreude and WideWale were determined using transmission electron microscopy, and their genomic DNAs were analyzed by restriction digestion and gel electrophoresis. We compared our results to the Mycobacteriophage database and this analysis suggested that Schadenfreude belongs to the B cluster of mycobacteriophages, whereas WideWale belongs the A2 subcluster. Even though these Mycobacteriophages were isolated on the same host from soil samples in close proximity to one another, they differ both genotypically and phenotypically, confirming that the bacteriophage population is diverse. A thorough understanding of bacteriophage diversity is a key step in exploiting these natural parasites in the fight against antibiotic resistant pathogens.

Uthoff, Ryan “Using GIS To Locate and Determine Areas Served By High Tunnels In Kentucky” (Kevin Cary)

A high tunnel, which is similar to a greenhouse, extends the crop growing season. This allows farmers to increase their profitability and productivity of their farms. Using GIS, the spatial distribution of high tunnels in Kentucky are evaluated by computing descriptive spatial statistics, spatial autocorrelations, and generating network service areas. Data at the county level is provided by the USDA Natural Resources Conservation Service through a freedom of information act request. Land cover data and road centerline data are also used to find suitable high tunnel areas within each county. Feature points corresponding to the number of high tunnels per county are randomly generated for a set number of iterations, and service areas are generated around these feature points for each iteration. The result is a raster data model representing the mean distance from the nearest high tunnel. The results can be used to determine areas where high tunnels are underserved.

Valadez Rodriguez, Alejandra “The Implementation of Alternative Pain Control Methods By Dental Hygienists” (Joseph Evans)

As a dental hygienist, it is important to understand new concepts and techniques that can contribute to a more comfortable setting for patients who experience dental anxiety. Alternative pain control methods can assist in alleviating patient anxiety providing a more efficient and relaxed clinical atmosphere for both patient and clinician. The purpose of my research is to find out how many dental hygienists are aware of alternative relaxation techniques and how many apply them during patient treatment. I conducted my study by creating a survey using Qualtrics software and released it via a compiled email list of Western Kentucky Dental Hygiene Program alumni. At the end of a one month active survey period, data will be analyzed with statistical software. By conducting this survey, we are able to decipher the level of knowledge pertaining to this treatment modality. Perceiving these trends enables dental professionals to provide a higher standard of patient care.

Valjien, Cory “Bowling Green Center For Natural Creativity” (Shahnaz Aly)

The primary goal of this initiative was to design a building of beauty and functionality to serve as a desirable locale for both artists and art enthusiasts alike. The guiding principle revolved around providing connections to nature. Using large windows and creating accessibility to the outdoors was essential to creating this feeling of connection. The design methodology came from researching concepts of natural design aspects. Ensuring that the artists have the amenities necessary for such a building is what propelled the design of the layout. As a result, local artists to have a means to create any kind of art they desire or teach courses for aspiring artists. The design also provides an opportunity for art therapists to have a space that allows the creation of their clients’ art in a place that is therapeutically evocative. The art gallery portion is designed with passive day-lighting techniques developed from sustainability research, to feature the most advantageous ways to view the art being displayed. The building invokes a feeling of connection with nature and a sense of personal fulfillment and was achieved by utilizing the research accumulated and applying it to this project.

Wade, Shelby “An SEM Image Reference Guide To Hairs of Seventeen Species of Large African Mammals” (Michael Stokes)

We developed a pictorial atlas of scanning electron microscope images of 23 different cuticular scale patterns found on the hairs of 17 mammalian species commonly found in the South African lowveld. Guard hairs were taken from the dorsoscapular or scapular region of each animal, and bristle hairs, if present, were collected from the manes of animals of each species. Images of cuticular scales were taken using a scanning electron microscope. These images, in conjunction with

other diagnostic features of hairs, can be used as an identification system. Such a system is useful for ecological studies of predator-prey interactions and identifying animal remains.

Wadlington, Meredith “Pan-African Pastoral: Reimagining the Natural Spaces of Harlem Renaissance Poetics” (Christopher Lewis)

When the plantation economy of the American South began to dissolve in the wake of Reconstruction, millions of African-Americans sought refuge in industrialized metropolitan areas. Amid this cultural shift from rural to urban landscapes, poets of the Harlem Renaissance took to cultivating a “New Negro” literary identity - and questions about the fundamental essence of Blackness in America emerged. Narratives of fractured identities brought white poetic convention to the (Northern) urban spaces of the Great Migration, and Pan-Africanism introduced a new sort of ecological nostalgia for black writers. In this paper, I examine the work of Countee Cullen, a Kentucky-born Harlem Renaissance poet, whose collection *Color* (1925) demonstrates both the ecospiritual sentimentality of the Romantic tradition and the inherited obscurity of the Pan-African tradition. This decidedly complicated relationship between African-Americans and the natural world ultimately points to a bigger question of Blackness in the emerging American literary scene of the early 20th century, as writers such as Cullen commonly claim identity within multiple distinctly rich geographies. Even when none of these landscapes are ostensibly “real,” the effects of such scattered geographical expressions still reverberate in modern considerations of urban literature today.

Walch, Riley “Exploring Electrohydraulic and Electromagnetic Forming of Sheet Metal” (Morteza Nurcheshmeh)

High speed deformation processes such as electrohydraulic (EHF) and electromagnetic (EMF) forming are on the rise. These processes can significantly improve the formability of modern high-strength steels and other lower density metals. Using these modern materials in automotive parts such as space frames and other body panels is a great way to lower the overall weight of a vehicle. This weight reduction leads to better efficiency and an overall better vehicle. With the increase in strength and the decrease in density of the materials, comes the inevitable loss of formability. Parts manufacturers are having trouble making components with conventional methods such as stamping or hydroforming and are looking for new ways to produce their products. Due to this complication, many new metal forming processes are being designed to methodically overcome the struggles of the parts suppliers. In this research two, highly promising techniques, EHF and EMF, are explored and summarized. The material behavior is studied in high speed forming processes, the major parameters which are effective on the processes are identified and the limitations and future trends are summarized. Through the findings and results of our research we hope to compile a complete guide to both EHF and EMF.

Walden, Jared “Facile Synthesis of Water-soluble Graphene Quantum Dots/graphene Hybrid Nanoplatelets As an Efficient Photodetector” (Sanju Gupta)

Graphene quantum dots (GQDs) are a kind of 0D material with characteristics derived from both graphene and carbon dots (CDs). Combining the structure of graphene with the quantum confinement and edge effects of CDs, GQDs possess unique properties. Intense research activity in GQDs is attributed to their novel phenomena of charge transport and light absorption/emission. The optical transitions are known to be available up to six eV in GQDs, applicable for photonics and biomedical technologies. We present a facile hydrothermal method for synthesizing uniform sized GQDs with a strong greenish and violet blue emission at ~ 10-14% quantum yield. This approach enables a large-scale production of aqueous GQD solution without the need for stabilizers. The structure and emission mechanism of the GQDs have been studied by combining extensive characterization techniques and rigorous control experiments. We further demonstrate the distinctive advantages of such GQDs as high-performance photodetectors.

Wallace, Franklyn “Use of Surface Enhanced Raman Spectroscopy To Monitor Photocatalytic Reactions” (Matthew Nee)

Studies have shown a recent increase in the concentrations of biologically harmful organic pollutants, including hormones from hospital waste and pesticides from farm runoff. Since current wastewater treatment processes are mainly focused on the removal of biological contaminants, such harmful compounds are subject to pass through into drinking water. A potential method for removing these organic pollutants takes advantage of photocatalytic degradation. Photocatalytic degradation refers to the breakdown of organic compounds upon exposure to ultraviolet radiation in the presence of a catalyst which acts to increase the reaction rate so that it will be useful in practical situations. Photocatalytic degradation can effectively remove organic pollutants at the minute concentrations at which they are biologically harmful, however, its mechanisms are not fully understood. This project uses surface enhanced Raman spectroscopy (SERS) to analyze photocatalytic degradation reactions in real time, tracking the progress of the reaction and attempting to identify any intermediate species that may arise over the course of the reaction, especially those which are short-lived and therefore potentially missed by conventional methods. This information is crucial to ensuring the safety of implementing photocatalytic degradation reactions in the wastewater treatment process.

Ward, Kaitlin “Sunlight Designs” (Sheila Flener)

The concept of this office was inspired by the vibrant innovative creations of Alexander Girard, paying tribute to the iconic designer's mixed style of folk art and modernism, as well as incorporating pieces from his textile and furniture collections to showcase his energetic spirit and design philosophy. The design will radiate effervescence, with a rich color scheme and bold material selections that serve to visually stimulate and enhance creativity. Lush plant life will be incorporated to not only add to the lively aesthetic, but also to revitalize users both mentally and physically by improving mood and air quality, thus creating an environment that promotes productivity and imagination in the workplace.

Warren, Ryun “Alvaton Church of Christ: A Contemporary Worship Center” (Shahnaz Aly)

The congregation at the Alvaton Church of Christ is growing faster than the current facility can accommodate. A plausible solution would be to construct a new, larger facility. Doing so allows an experiment into new forms, systems, and sustainability principles while fulfilling the traditional functions of worship, fellowship, and community while examining and following all applicable building codes. This concept presents a contemporary application of traditional, Christian architecture. The cruciform plan is adapted to a more contemporary layout and the steeple replaced with a roof-line curved toward the heavens. Complex structural systems and sustainability principles are examined. Incorporating photovoltaics (PVs), geothermal heating/cooling, rainwater collection, and green roof systems into the design of the building allows this concept to achieve net zero energy consumption.

Watkins, Tara; Gilfillen, Rebecca; Rowland, Naomi “Influence of Tillage and Fertilizer Regime On Presence of Select Pathogenic Organisms In a Silt Loam Soil” (Becky Gilfillen)

There has been increased interest in the use of poultry litter as a source of fertilizer in recent years, although there has been a lack of research done to examine the effects this fertilizer treatment makes on the soil microbial community. This study is to examine the effects that varying tillage and fertilizer applications has on select soil fungal pathogens. Varying tillage and fertilizer applications in corn research plots have been ongoing for the past ten years. Research is being conducted in a split plot design where tillage is the primary factor and fertilizer source is the secondary factor. Tillage treatments are conventional tillage (CT) or No-Till (NT), and fertility treatments were ½ poultry litter + ½ inorganic (HL), full poultry litter (FL), and inorganic (I). Organism DNA was detected within these plots through DNA isolation and PCR. Presence of select pathogenic fungal species (Rhizoctonia, Phytophthora, Pythium, and Fusarium) was analyzed through subsequent DNA sequencing. There were no significant differences found between tillage practices and fertility treatments as an influence on pathogen presence within the plots. However, organismal DNA quantity appeared to be uncharacteristically low, leading to opportunity for further research as to the cause of this occurrence.

Weinzapfel, Ali “Analyzing the Regionalized Awareness of Distraction Osteogenesis” (Joseph Evans)

There are multiple treatment options available to initiate bone growth within the oral cavity. Distraction osteogenesis is a surgical dental procedure performed to initiate new bone growth in the maxillofacial region. This procedure is an important advancement to dental professionals because of the minimal complications and great outcome of bone growth it offers. As dentistry is always evolving, it is imperative to relay current trends to other professionals within the field of dentistry. The goal intended for this research is to analyze the regionalized awareness of distraction osteogenesis. A survey was conducted among dentists in Kentucky and Tennessee with multiple questions to determine their knowledge and use of distraction osteogenesis. As a dental hygienist, it is important to be aware of these various procedures to provide current treatment options and inform each individual patient based on their particular needs.

Wessel, Paige; Clayton, BethAnne; Shaker, Nuha; Zagdsuren, Battogtokh; Grimes, Brooke; Maples, Jill “Accuracy of Accelerometers During High Intensity Body Weight Resistance Training In Males and Females” (Jill Maples)

Accelerometers have been found to accurately measure steps and caloric expenditure during walking and running activities. Circuit-style body-weight resistance training (BWRT) has become increasingly popular. PURPOSE: To evaluate the accuracy of five accelerometers in estimating energy expenditure while performing an acute bout of BWRT. METHODS: Participants (N=8) underwent baseline testing. At least 48 hours later, each participant completed the main test: A 15-minute workout consisting of 12 repetitions each of air squats, sit-ups, push-ups, lunges, pull-ups, steps-ups, and high knees; performed circuit-style by completing as many rounds as possible. During the main test, each participant wore a portable metabolic analyzer (PMA) and five different accelerometers. Intensity was standardized by monitoring breath-by-breath VO₂.

Westhues, Anita “Well Stories: Alternative Understandings On Water Purity and Stewardship” (Ashley Stinnett)

For this paper, I will address how localized knowledge about water purity is constructed and put into practice in the United States. My research focuses on roadside artesian wells and springs in the Midwest. I will discuss the question of why people choose to gather water from these sources. The knowledge that informs this choice often conflicts with the official, scientifically established concept of water quality. Gathering water 'from the earth' involves interactions with elements that are often considered impure. This includes natural material found at the well, such as dirt, algae, insects or animals. Science, in its efforts to provide pure water, separates it from its local ecosystem. The prevailing knowledge of what makes water sanitary involves removing all traces of nature in its delivery. Water that is disconnected from its local community can then

be treated as private property, which makes it increasingly vulnerable to commercial exploitation. In light of this, I present data from instances where public officials have attempted to limit access to these vestiges of the public commons, due to perceived health risks. Additionally, I will give examples of communities that have successfully lobbied for maintenance of specific springs to guarantee public access to water.

Wicker, Chase “Community Center For Now and Later” (Shahnaz Aly)

I am designing a Community Center for the city of Henderson, KY. My main focus, or goal, is to provide the county with an adequate area for Henderson County High School’s senior graduations. Through the programing and various types of research, such as sustainability research and case studies, I have determined the need for such a building and different ways to see that the building’s use is fictional and sustainable for the future. Furthermore for the project, I will design multi-function spaces throughout the space to be used by the county’s youth for reading, studying, and after-school actives that would bring together students from each elementary, middle, and high school in Henderson. The spaces throughout the building will not only be suitable for educational purposes, but also presentation, conferences, meeting, or anything the community sees appropriate due to these multi-function spaces.

Wilkins, Jacob; Mahmood, Rezaul; Durkee, Josh “Impacts of Land Between the Lakes On Local Precipitation Climatology” (Rezaul Mahmood)

The Land Between the Lakes is an inland peninsula located between two human-made reservoirs in western Kentucky and Tennessee. This study examines potential impacts the formation of the two reservoirs may have on the local precipitation climatology of the region. Data used in this study includes monthly total precipitation and monthly extreme precipitation from the National Climatic Data Center. Weather stations in Murray, KY and Dover, TN were chosen given their close proximity to Land Between the Lakes and the amount of data contained within these stations. Comparisons were made dividing the data into Pre- and post-Kentucky Dam time periods. Initial findings from the study include statistically significant increases in total precipitation in November and December after the completion of Kentucky Dam. Statistically significant increases in monthly extreme precipitation took place in February and November after completion of Kentucky Dam. With better knowledge of long-term local climatological influences of human-made reservoirs on precipitation patterns, better decisions could be made regarding its placement along major waterways.

Williams, Diane “Gaelic Women’s Stories: The Influence of Context On Narrative” (Ann Ferrell)

Folklorists have been analyzing storytelling within the performance context for well over fifty years and have categorized narratives into different folklore genres such as anecdotes, memorates, oral history, and personal experience narratives. During my second fieldwork season in June - July 2015, stories were collected from women of Gaelic descent in Cape Breton, Nova Scotia. The recordings included descriptions of, and stories about, personal experiences, which hold information of past generations from a female perspective. In analyzing the recordings for types of narrative performance, a pattern began to emerge between the types of narratives performed and the context in which the narrative was performed. Drawing on the work of contemporary folklorists, I analyzed the contexts in which the narratives of these Gaelic women were recorded. The findings presented in this paper indicate that narratives are affected by relationship between the informant and the ethnographer, the context/setting, and others present during the recording. This preliminary study will clarify the direction and methodology of future ethnographic fieldwork in Cape Breton, which will form the basis of my graduate thesis in Folk Studies.

Williams, Jessica; Abate, Ethan; Bosh, Robert; Brown, Katherine; Hare, Honor; Thompson, Patricia; Weaver, Mia “The Sun’s Magnetic Field and Its Impact On the Solar Corona” (Richard Gelderman)

One of the few ways to analyze the Sun’s magnetic field as it extends from the Sun’s surface out towards space is by observing the corona of the sun. The solar corona is the gas that surrounds the sun and extends out from the Sun for over five million miles. The corona can only be viewed when the much brighter photosphere of the Sun is blocked out. This occurs during a total solar eclipse or by using a special telescope called a coronagraph. Observations of the Sun’s corona will be analyzed, and using data gathered from previous solar eclipses, we show how our understanding of the Sun’s magnetic fields has been improved.

Williams, Kailee; Williams, Kailee; Brown, Aaron; Cowan, Christy; Tinius, Rachel; Crandall, K. Jason “Effect of Evidence-Based Educational Information on Knowledge Regarding Exercise During Pregnancy in Women of Child-Bearing Age” (Rachel Tinius)

Background: Physical activity before and during pregnancy has been shown to improve a number of maternal and infant outcomes. However, women report being uninformed or misinformed about the benefits and safety of maternal exercise. The purpose of this study was to increase awareness about the benefits of physical activity during pregnancy through the use of evidence-based educational brochures. Methods: A volunteer sample of women from the Bowling Green community were selected to participate (N=30, age: 21.4±1.5 years). Paired sample t-tests were used to determine statistical significance between surveys taken before and after exposure to educational brochures. Results: After reading the educational brochure,

survey scores increased from 75.9 ± 9.7 to 94.6 ± 7.1 (p less than 0.001). In addition, the number of advantages reported on the open-ended survey went from an average of 3.2 ± 1.3 to 4.7 ± 1.0 (p less than 0.001), and the number of disadvantages reported decreased from an average of 2.2 ± 1.3 to 0.6 ± 0.8 (p less than 0.001). Conclusions: The findings of this study suggest evidence-based educational information can improve knowledge regarding exercise during pregnancy. Therefore, educational information may be a critical step towards increasing physical activity levels among women of childbearing age before and during pregnancy.

Williams, Nicole “Expression of Cellulose-Digesting Enzymes In *Chlamydomonas*” (Sigrid Jacobshagen)

Chlamydomonas reinhardtii is a single cellular photosynthetic organism. The relatively small genome of the organism has been sequenced, making it an ideal organism for research. Recent studies have discovered that *Chlamydomonas secretes* three different cellulose-digesting enzymes that allow it to feed on cellulose in its environment. The genes encoding the cellulose-digesting enzymes were identified as CrCel9B, CrCel9C, and CrCel9D. The objective of this study is to better understand the expression of these three genes using qPCR. First experiments are testing their expression under circadian conditions. Primers have already been designed and amplicon sizes have been verified for the control gene. The goal of the study is to enhance the expression of the cellulose-digesting enzymes in *Chlamydomonas*, so that the organism can be utilized in biotechnology to produce biofuel from cellulose.

Willoughby, Jacob “The Concept of Truth: Examining a Cornerstone of Narrative Cinema” (Jerod Hollyfield)

The concept of truth can be found everywhere and is often a hot topic for discussion. Defined simply as “conformity to fact or reality”, it is a staple of culture, and the cinematic world is no exception. Truth is the crux of many popular stories, such as the *X-Files* franchise, whose entire story is built around the idea of the truth being “out there”. There are several ways in which truth fits into the cinematic world. In the *Routledge Encyclopedia of Film Theory*, editors Edward Branigan and Warren Buckland discuss the ways truth and reality pertains to the images in a film. However, I would take this a step further and emphasize truth as it pertains to the narrative of a film. Whether it is the hero trying to uncover the villain’s scheme, the villain trying to conceal it, or the mother who denies the loss of her child, the question of what is true and real is present in each story. Therefore, I argue that truth is not merely an element but rather a cornerstone of narrative cinema and, if it can be better understood, could be utilized more fully for the betterment of the craft of storytelling.

Wilson, Corbin “CSR Reporting and the University” (Steve Wells)

There is currently no mandatory sustainability reporting guidelines for institutions of higher learning which can be enforced by a governing body. In the absence of any mandatory regulations, a small number of institutions have started releasing self-reported sustainability reports. However, with no common reporting format or metrics, comparing the sustainability reports of two universities is often as difficult as comparing apples to oranges. A great deal of the information that has been reported is outdated, and all of it is subject to bias. In a time where social and environmental factors are as important as financial factors, shareholders have the right to know how responsible universities are with their resources. I am analyzing how these guidelines have been introduced in the corporate world and how these guidelines may be used as a template for future university reporting. The evidence that I find will hopefully encourage professionals, and academics alike, to push for the creation of a governing body to implement and enforce a standardized policy for reporting on issues of social responsibility.

Winstead, John “Genealogy of Race and State” (Tiara Na'puti)

In this paper, I argue that the current conception of race was borne out of the same conditions which allowed the contemporary nation-state to come into existence. I will draw on Anderson's *Imagined Communities* to establish the historical and material conditions under which the nation-state came into being, then develop an expansionary account to argue that the nation-state was just as predicated on the hegemonic imposition of race as it was print-capitalism. The dialectical nature of both the nation-state and race will be advanced and generally it will be demonstrated that the two cannot exist without each other.

Wise, Adam; Ford, Antony; Music, Sanel; Garmon, Andrew; DeGraves, Jayson; Cambron, Mark “Anti- Poaching Technology” (Mark Cambron)

Poachers continuously threaten the extinction of species. Through the establishment of reserves many countries try to protect their wildlife resources. In many cases this is not enough. The solutions to this problem are vast, yet none offer a complete solution. Working with South African land owners, this team hopes to add one more tool for the preservation of endangered species. Through the use of electronics utilizing an embedded system and wireless communication we plan to create a tool to monitor segments of the perimeter. These devices can be deployed in high-risk areas to assist in the protection of a wildlife area. Starting from scratch this team has developed and simulated a device that will establish a perimeter that will signal when breached. This would allow for a more efficient use of resources in the protection the worlds wildlife. If successful this could have wilder implications than just South Africa, and help maintain certain endangered species populations.

Wong, Chi Fai; Fan, Xingang; Yan, Jun “Historical Cropland Distribution Change Over the Past 300 Years In China

At Provincial Level” (Xingang Fan)

Existing studies have extended estimation of global land cover change back in time for 300 years at 5-year to 10-year intervals. Many existing research noted that historical cropland change is a particularly important driver of global environmental change. There, however, is a lack of historical land use data for use. Therefore, a simple approach was used to derive geographically explicit changes of historical croplands data over the past 300 years in China based on the refined relationship between croplands and population in our previous study. Those historical cropland data had been used to develop about 300 Chinese historical croplands distribution maps for the past 300 years in this study. These maps showed that the cropland distributions of sixteen Chinese provinces did not change much before 1831. The results also revealed that Northeast China was the region that had the most increase in cropland in the earlier years. Base on these results, the specific environmental change can be easily related to the cropland changes of particular area on the distribution maps. The estimation will also facilitate the development of regional and global climate and ecosystem models to simulate and understand the effects of land-cover change on climate and the cycling of energy.

Wood, Rebecca “Development of Aptamer/graphene Oxide FRET Biosensor For Ultrasensitive Detection of Bisphenol A and Analogues” (Sanju Gupta)

Graphene oxide (GO) and reduced form (rGO) are potential candidates in various biological fields attributed to larger specific surface area, facile surface modification, good water dispersibility, and strong photoluminescence. Because of larger cross section and non-radiative electronic excitation energy transfer from a fluorophore to GO/rGO, it is employed to construct fluorescence or Förster resonance energy transfer (FRET) biosensor. While bisphenol A (BPA) is an important industrial chemical for polycarbonate and epoxy resins in paper and plastic industries, it is a common pollutant and toxic to human and animal health. We developed a novel ultrasensitive BPA detection sensor based on GO/rGO and anti-BPA aptamer (5'-FAM-ssDNA) design. GO/rGO specifically adsorbs and quenches the emission from fluorescently modified ssDNA or aptamer-based probes. BPA can combine with anti-BPA aptamer and switch its configuration/conformation to prevent aptamer from adsorbing on GO/rGO surface.

Wooldridge, Shelby “Culture Shock: Understanding World Cultures Through Arts Integration” (Jennifer Adam)

Teachers often have difficulty engaging students in arts and humanities classes. To aid in this struggle, a series of lesson plans applicable for kindergarten through twelfth grade students in music and arts and humanities classes will be presented. These lesson plans will teach students about world cultures, such as West African, Appalachian, and Latin America, through arts integration. In order to reach this goal, there will be a component on student development in order to match the units with students' developmental levels. From there, the lesson plans will be developed to incorporate all of the art forms, with an emphasis in music, reflecting world cultures. The students will understand these topics through a variety of products and performances that they will create. With the development of these lesson plans, students should become more culturally aware. They will have an understanding of people that are not like them, but realize that they are just as alike as they are different because of the cultures' contribution to the arts.

Woolen, Erin “17th Century Views of Witchcraft In Shakespeare’s *Macbeth*” (Alison Langdon)

Shakespeare's presentation of the witches in *Macbeth* both draws on and reinforces stereotypes of the day and implicitly justifies the persecution of witches by verifying their villainy and power while illustrating the great harm they can do. Scholars have taken a variety of positions on the actual or symbolic role of the witches, but within the context of the beliefs and practices in Shakespeare's day the witches would not have been interpreted by audiences as anything but witches in the “Christian” sense. The early 17th century fell in the midst of three-centuries-worth of intermittent witch hunts throughout Europe (beginning in the 1400s and lasting into the 1700s.) To create his characters, Shakespeare married existing literary constructions of witches with the sorcerous conventions of the times, conventions viewed with serious dread by the people of England and Scotland and their leaders. The events that unfold throughout *Macbeth* illustrate the danger witches present to society, and the prudence in rooting out such deviants. *Macbeth* illustrates that the most potent danger witches pose is that they can unlock men's inner evil and thereby spread damnation while bringing great harm to individuals and society.

Wright, Alexandra “Reactions of Anticancer Analogs With Proteins and DNA” (Kevin Williams)

Several platinum(II) compounds are known to demonstrate anticancer activity. In particular, platinum compounds of a “triamine” structure are known to contribute significantly to cell toxicity. Here, we have investigated platinum triamine complex that mimics the size and shape of other potential anticancer drugs. We observed the reactions between our platinum compound and small-molecule models of proteins and DNA. Our platinum compound was reacted with an amino acid (N-acetyl-L-methionine) and a nucleotide (guanosine monophosphate) with the expectation that either the methionine or the guanine would react. However, under some conditions, both the methionine and the guanine were shown to react with the platinum compound. The unique behavior of our compound is one that may be exploited in the design of future platinum-based drugs. An insight into the conditions that cause such unusual behavior could potentially be used to improve the efficacy of anticancer drugs used in chemotherapeutics.

Xu, Qianna; Collyer, Michael “Body Morphology Diversification Among the Pecos Pupfish Populations In Relation To Interspecific Interactions and Environmental Factors” (Michael Collyer)

During the 19th and 20th centuries, drastic anthropogenic alterations of the Pecos River (NM, USA) have greatly influenced the fish fauna within the drainage by fragmenting historically interconnected series of sinkholes and wetlands in the Bitter Lake National Wild Life Refuge. The Pecos pupfish (*Cyprinodon pecosensis*) might be the most impacted endemic small-bodied fish species. It was once abundant and relatively widespread; however, the large population has been disrupted and currently exists as sub-populations persisting often in small numbers at a few isolated sites in New Mexico. However, no research has been performed to consider the coordinated evolution of different species interacting in replicated communities. As part of a comprehensive multi-species evaluation, in this study, I examine body shape variation in *C. pecosensis* from multiple major sites within and around the BLNWR. Geometric morphometric methods were used to examine the morphological divergence among natural *C. pecosensis* populations including: (1) between sexes (i.e. sexual dimorphism) within isolated sub-populations; (2) between allopatric and sympatric populations in similar environments; and (3) associated with environmental variation, independent of species interactions. The preliminary data and results suggest that body shape variation of *C. pecosensis* is substantial and in part related to variation in communities.

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