

**47th Annual
Student Research Conference**
WKU REACH 2017
Research Experiences and Creative Heights

Saturday, March 25, 2017

Abstracts



Explanation of Abstract Listings

The alphabetical abstract listing includes details for each presentation in the following order: presenter, co-presenters (as applicable), co-authors (as applicable), the session title, the mentor for a project, and the abstract. Each WKU student was permitted to serve as the primary presenter on one presentation at the conference. Up to three co-presenters and up to six co-authors could also be listed. A sample is shown below to illustrate the form.

Sample

Presenter Last Name, First Name; Co-presenter 1 Last Name, First Name; Co-author Last Name, First Name; "Title of a Great Presentation" (Mentor First Name Last Name)

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Adigarla, Sai Pavan; Gray, Elmer; "Continued Longitudinal Studies of Family Size and its Relationship to the Human Sex Ratio" (Elmer Gray)

The study was focused upon the relationship between gender composition of children and family size in humans. It was the fifth in a longitudinal series conducted at approximately decadal intervals. Survey data were obtained from students enrolled at Western Kentucky University. For families of the parental, present, and projected generations, average numbers of children were 3.52, 2.58, and 2.50; secondary sex ratios (males: 100 females) were 101, 102, and 152, respectively. Trends towards fewer children per family over periods of time and from the parental to the present generations continues throughout the studies. Gender composition of existing children continued to influence preferences for additional children and their gender. The most desired family consisted of two children, including both genders, with the boy being born first. Sex ratios for the desired future generation favored more males than females and were higher than observed ratios for the parental and present generations. There was evidence of greater preference for both genders than for either alone. Also, there

was evidence of male preference in the present and projected generations.

Adkins, Callie; Treon, John; "The Effects Foster Care Independent Living Programs on Aging-Out Youth" (Whitney Harper)

In the United States, the foster care system is assigned the role of protecting children that are in the state's custody (Blakeney-Strong, Scannapieco, & Smith, 2016). But the protections and resources these children are guaranteed while in the system do not necessarily roll over when these young adults age out of the system at age eighteen or twenty-one, depending on the state. A significant issue exists when these young adults are met with the many real world challenges. This difficult transition has made young adults aging out of the foster care system the most vulnerable population in the United States (Jacobs, Muller-Ravett, 2012). Studies suggest that more than 50% of foster youth have at least one mental, physical, or behavioral problem (Blakeney-Strong, Scannapieco, & Smith, 2016). In order to ease this transition from foster care to the real world, independent living programs have been established to help prepare young adults in the foster care system for their transition to independence. The scope of this study is to determine the effectiveness of these independent living programs. A survey was developed to ascertain the effectiveness of the independent living programs for the foster care youth as they enter early adulthood. Components of the program were measured for effectiveness such as; financial literacy, social/ communication skills, and employment.

Adkins, Dane; Redifer, Jenni; "Jamming Out While Studying: Impacts of Musical Components on Retrieval Performance" (Jenni Redifer)

We investigated the effects of complexity and lyrics in music played during encoding on retrieval performance. Complexity was measured using songs with either homophony (simplistic) or polyphony (complex) music styles. Each music piece had an instrumental counterpart to investigate the effects of lyrics versus no-lyric conditions. We hypothesized simple music conditions would score higher than complex music conditions, and that no-lyric conditions would score higher than lyric conditions. We also investigated the impacts of working memory and how often students reported listening to music while studying. Participants ($n = 144$) were randomly assigned a condition and studied thirty English-Swahili word pairs for ten minutes, while listening to music created by the researcher. Afterward, participants had ten minutes to take a thirty-item verbatim recall test in silence, followed by two working memory tasks. Higher working memory had a positive impact on performance, $F(1, 133) = 9.00$, $p = .003$. Among participants who reported listening to music frequently during studying, performance was better in the complex music with lyrics condition than in the simplistic music with lyrics condition, $\beta = 3.95$, $p = .008$. This may be because the complex song with lyrics was closer to what students typically listen to and therefore, less distracting.

Alam, Shaumik; Kim, Moon-Soo; Brown, Audrey; Chung, Minsub; "Pathogen-Specific DNA Detection via Engineered Zinc-Finger Proteins" (Moon-Soo Kim)

DNA-binding proteins perform some of the most important functions of all biomolecular systems. They are frequent throughout nature, playing roles in cell apoptosis, protein folding, and DNA recognition. Consequently, engineered sequence-specific DNA-binding proteins are one of the most versatile biotechnologies currently being researched. There is high demand in global healthcare for an innovation that can sensitively and selectively detect

pathogenic DNA. Our research on DNA-detection via engineered DNA-binding proteins aims to deliver such a technology for use in sensitive medical diagnostic devices as well as for food and water safety assays in parts of the world with limited resources. 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. The engineered ZFPs were immobilized in the acrylamide gel surface, which allows for protein arrays. The fluorescence detection system was used to improve the sensitivity of our system.

Allen, Laura "Intergenerational Living between College Students and Nursing Home Residents in a Global Context" (Dana Bradley)

One promising strategy to combat ageism is the development of relational programs between college students and elder residents living in senior housing. This paper explores a plan to implement a university-based intergenerational living program in the United States and reasons why it might benefit both younger and older adults. One example of an intergenerational living program is in the Netherlands where students can live in a nursing home room rent-free in exchange for 30 hours per month of student interaction with residents and being "good neighbors." Early results indicate that these intergenerational friendships have helped combat loneliness in the older adults who live in the facility. This project began with a literature review of the research seeking to frame this work in the field of intergenerational relationships, ageism, and experiential learning. The primary investigator visited with key informants in Zwolle, Netherlands and interviewed key informants from Cleveland Institute of Music and the University of New England College. Findings include recommendations that attention should be paid: to underlying reasons guiding university students' participation; to how the presence of the students could affect elder residents; and, how the needs of elder neighbors could affect both student academic and personal lives.

Allen, Robert "Abandoning 'Human Rights'" (Michael Seidler)

This essay challenges the language of human rights, arguing in dependence on philosopher Raymond Geuss that human rights talk may be more harmful than helpful, undermining the very purposes it claims to pursue. 'Human rights' has been a lazy phrase used to peddle smug assertions across the political spectrum – whims, often, that deserve in-depth philosophical scrutiny instead of automatic assent. Indeed, rights claims can be manufactured to serve almost any interest, including – at times – heinous ones. I will argue this view by analyzing the concrete use of rights language in the current political landscape, focusing on the right to free speech, the right to bear arms, and the respective rights of women and their fetuses. In each case, I will show how rights claims confuse the moral issue and actually make it harder to resolve. My talk concludes with a challenge to Geuss himself, asking whether rights language should be used at all (rather than sparingly), and proposing another way to achieve its purpose of allowing human agents to assert their legitimate interests in a political context.

Alobaid, Fares "The Co-Existence of Divergent Spaces" (Neal Downing)

We live in a world where efficiency in design is and will continue to be a key for our future.

We cannot either waste nor consume as we used to in past decades. Due to these altered circumstances, architecture must change as well and innovate to offer more sustainable and efficient future for our building environment. Due to evolution of lifestyles, architecture is utilizing multi-use buildings; where people can access malls, residences, offices as well as gyms, stadium, and Parks to other functions in a convenient arrangement supporting our modern society. This phenomenon creates new relationship between part of the programs that were usually never mixed. The primary objective of my research is to demonstrate how offices and residences can co-exist in the same building while complimenting one another. This is what we tried to solve throughout our research. I will use my interest in perusing an innovative approach to develop improved offices and homes that respond to our contemporary needs to achieve a better future for the Occupants of my vision.

Alqahtani, Mohammed "The Space of a Better Environment" (Neal Downing)

The idea of my project is to make a healthy and nursing retirement home for the old family members. After spending years of struggle and then not getting enough family attention is a very hard thing that most of the senior members of our society have to face. Especially, in Saudi Arabia and other countries throughout the Middle East do not support the idea of getting rid of your old family members just because they are old and they need a lot of care. The reason families don't want to keep them in house is because they cannot give their all-time to those old members and they have to move on with the life and make their careers and their positions in their workplace better. So, the project is about making a home for the old members where they are being given enough care and healthy environment. The retirement home is giving all the necessary facilities to old members and giving them environment where they feel relaxed and happy and they find other people of their age and be friends with them. The idea is going to be very drastic as it will give families satisfaction about their old ones.

Amiri, Nasim "Examination of LEED Certified Building's Electricity Usage" (Shahnaz Aly)

The number of new buildings seeking LEED certification has been growing steadily over the past few years. In this study, three academic LEED certified buildings were targeted in the state of Kentucky, the city of Bowling Green. Their electricity cost effectiveness was examined and compared with pre-designed LEED efficiency models for those buildings. This research directly examines cost effectiveness of LEED buildings in terms of electricity usage. T-tests were conducted and three case studies were completed to find out the initial and on-going electricity costs of LEED buildings and verify the LEED standard results. Contractors, architects and building owners who participated in a few LEED projects and non-LEED sustainable projects, were interviewed in order to collect data and learn about their perception of LEED too.

Anderson, Jacob "Southern Cinema" (Jerod Hollyfield)

In R. Bruce Brasell's Humid Time: Independent Film, Gay Sexualities, and Southerscapes, the author writes about how filmmakers such as David Gordon Green (Prince Avalanche, George Washington) and Phil Morrison (Junebug, All is Bright) make films about Southern American culture but ultimately seek not to define the south with their films. At a Sundance Panel, Phil Morrison spoke on this subject by saying, "We all struggled to say we're not trying to define the South with our movies. You can tie your brain in knots trying to talk

about that.” This explosion of Southern filmmakers and films that came during late 2000s is referred to by Brassell as a “regional zeitgeist,” and has become a very important movement to follow in American Cinema for the last couple of decades. However, even though Southern filmmakers seek not to define the American South with their films, it is important to note how each of these films contribute to a broader understanding of the South that contradicts cultural stereotypes and labels that are put upon the region, especially within cinema culture.

Anglea, Edward. "The Smith Building: New Living in Old Louisville" (Neal Downing)
The reasoning for this research project, which is both for my senior project in the AMS major and this research conference, is to design a mixed-use building containing apartments, a parking structure, a restaurant, a café, and at least one office suite with various components that will be on the corner of sixth Street and Oak Street in Louisville, Kentucky. My rationale for choosing to design this building is threefold; to jump-start some economic and developmental growth in a beautiful neighborhood, to fuse the historical and modern aesthetic of Louisville, and to create a hub of the neighborhood which provides places to live, work, eat, and gather. The reason I chose this location is because of the neighborhood it is in, Old Louisville. This neighborhood is a beautifully preserved glimpse of the Gilded Age of the United States but is frozen developmentally and aesthetically in the late 19th century. My primary goal is for this building to be a theoretical catalyst for new commercial development, as well as respect and expand the neighborhood’s historic nature.

Aroh, Joseph "Comparing the Deformation Rate of High Grade Metals" (Chris Byrne)
As the automobile industry is exploring a wider range of metals to use in cars manufacturing, it becomes increasingly important to better understand a metal’s ability to be used under the harsh conditions that these modern applications require. Metal deformation is known to depend on many factors, and one that is not well understood is how to correlate data from different testing methods. The objective of this project is to study the influence of deformation rates on metals and correlate the data obtained from two different test methods that engineers traditionally use. Measuring a flexure force is most commonly performed on a load frame test machine that is set up to do a 3-point bend test and generally takes up to a minute. An impact force is traditionally measured on a Charpy impact test machine, which can be performed in a matter of milliseconds. Both test methods are instrumented and allow data to be collected through force sensors and stored electronically. This enables direct comparisons between the datasets of each test apparatus, which will indicate any relationship between the two completely different deformation rates. With this information, automobile engineers will be better prepared to create the next generation of vehicles.

Carver, Nicholas; Aroh, Joseph; Stewart, Patrick; Abuhulaigah, Ali; Li, Jianwei; "The Design of an Autonomous Robot for the Spring 2017 IEEE Competition" (Ron Rizzo)
Robotics is changing the way the world can efficiently tackle various problems. Every year, IEEE hosts a robotics competition for engineering undergraduate students. The goal is to build an autonomous robot that accumulates the most points by completing tasks in an arena while also meeting specific build constraints. This year, the competition is Star Wars themed and the various stages in the competition arena reflect depictions of the movie scenes. The design of the robot must be autonomous and should navigate successfully to each stage on

the arena to complete its task. The WKU IEEE Robotics team spent the Fall 2016 semester designing a robot that could correctly navigate the arena and interface with each stage to complete the task. The team focused the design of the robot to solve each mechanical and electrical problem in the simplest way and with a low build cost. The robot will perform all tasks by relying on sensor input and feedback. The extensive, meticulous design of the robot shows the challenges of locating and completing all the components of the competition, exemplifying the efficiencies of the many robots used in modern applications today.

Aromiwura, Afolasayo; Fields, Christopher; Srivastava, Ajay; "Functional Characterization of a Basement Membrane Degradator and Its Role in the Development of *Drosophila melanogaster*" (Ajay Srivastava)

Basement membranes are a layer of tissue that separate the primary germ layers from underlying connective tissue. Among several other functions, basement membranes provide structural support to the tissue, and act as selective barriers that prevent tumor metastasis. By assaying the activity of collagenase, a BM degrading enzyme, previous research in the Srivastava lab has identified a novel basement membrane degradator called SNUTS. The SNUTS protein has been suggested to play a role in the gonadal stem cell development of *Drosophila*. To further understand the function of the protein, several approaches were taken. First, a SNUTS targeted antibody was generated and characterized using Western blots. Additionally, the antibody was used to assess the localization of the protein in tissues. SNUTS clones with specific sequence deletions are also being made with the aim of creating transgenic flies that will further our understanding of the requirement and functions of the various protein domains during development. Lastly, we will utilize these reagents to further explore the function of this gene during stem cell development.

Ascensio, Zona "Pharmacy-Based Barriers to Adolescent Access to Emergency Contraception in Kentucky" (Darlene Shearer)

Background: Since June of 2013, Plan-B and its generics have been available over-the-counter without age restriction nationwide. Even so, pharmacy-based economic, physical, and false barriers still exist, potentially leading adolescent customers to fail to obtain emergency contraception (EC) in a sufficiently timely manner to prevent pregnancy.

Purpose: This study explores these pharmacy-based barriers to EC in the State of Kentucky focusing on comparisons of urban and non-urban pharmacies and chain and private pharmacies.

Methods: Using a secret-shopper survey technique, the researcher called 220 Kentucky pharmacies acting as a 15-year-old girl seeking information about EC.

Results: Among other findings, a logistic regression analysis revealed that private pharmacies were 97% less likely to carry EC compared to chain pharmacies (OR= .027; $p < .001$). Linear regression analyses found that urban pharmacies scored higher on EC knowledge ($\beta = .608$; $p < .05$) and lower on negative attitude ($\beta = -.622$; $p < .01$) than rural pharmacies.

Conclusion: This research reveals that rural Kentucky adolescents face more barriers when seeking EC than urban teens. Further, it supports the argument for more pharmacy-staff training to effectively counsel those seeking EC and for better promotion of the EC and other family planning resources available through the public health system.

Askins, Morgan; Palkovic, Alexandra; Leppoo, Kelsy; Jones, Grace; "Effect of Feeding Teff

Hay on Dry Matter Intake, Digestible Energy Intake and Resting Insulin/Glucose Concentration in Horses" (Jennifer Gill)

Weight loss in horses involves dietary restriction; however, some owners find limiting feed difficult. Offering Teff hay at 2.0 kg/100 kg body weight (BW) may achieve voluntary dietary restriction because of its low sugar content and palatability. Six horses were used to determine the effect of feeding Teff hay on voluntary consumption rate and blood insulin and glucose concentration. Horses were offered 2.0 kg/100 kg BW of Teff or control (Ryegrass) hay daily in a crossover design, where each horse received each diet type for 10 d periods. Feed refusal was collected daily and recorded. Following the initial 10 d period was a 9 d washout period of free-choice mixed hay. Fasting venous blood samples were collected on d 1 and d 10 of each period. Horses consumed significantly ($P < 0.01$) less Teff hay than control hay. The calorie intake from Teff hay was significantly ($P < 0.01$) less than control hay, with a mean difference of 7.4 kcal/kg BW. Insulin and glucose concentration did not differ according to diet type. The results indicate that feeding Teff hay at 2.0 kg/100 kg BW will result in voluntary feed restriction and have the potential for weight loss.

Atici, Enes; Srivastava, Ajay; "Hemocyte Development and Wound Healing in *Drosophila* - Assessing the Role of a Cathepsin L" (Ajay Srivastava)

Cathepsin L like cysteine protease is encoded by the gene CP1. The CP1 gene has been demonstrated to degrade the extracellular matrix (ECM) during development of the air sac primordium (ASP). This degradation of the ECM assists the burrowing of ASP into the wing disc - a sac of epithelial cells from which the adult wing develops. This burrowing behavior of ASP is similar to events during cancer metastasis. These invasive behaviors are also observed during the wound healing process. We are currently investigating the role of CP1 in wound healing. This study is particularly significant given the similarities between cancer metastasis and wound healing. We will also examine if regulation of CP1 effects differentiation and proliferation of hemocytes, given the similarities between hemocyte proliferation and leukemia.

Bagli, Sravya Patil "Occurrence and Discharge of Pharmaceutical Waste in Water" (Elmer Gray)

Pharmaceuticals are being extensively used in human medicine and personal products all around the world. The continual input of pharmaceutical waste into water draw the public concern because they show toxicological effect to the human population as well as aquatic life. If receiving water is used for potable supplies, the presence of harmful compounds in pharmaceutical products represent potential hazard to human life, especially in the areas where they lack advanced water treatment. The focus of this study is to know how these products are discharged into water & its influence on aquatic environment. Also, statutory body's rules and regulations that allow the going of waste into the water thereby performing some preventive steps that could help to hinder the water pollution like conventional drinking water treatment. Although several agencies recommend that toxic compounds are required to be removed from the water to protect environment, more research must be conducted to develop rapid and accurate methods for the disposal of pharmaceuticals from water.
Keywords: Pharmaceuticals, Potable supplies, Toxic compounds

Bailes, Lauren; Lickenbrock, Diane; "Examining Longitudinal Predictors of Parental

Sensitivity: The Role of Parental Personality and Infant Temperament across Early Infancy" (Diane Lickenbrock)

Parents play a critical role in infant social and emotional development (Zeifman, 2003). Various internal and external factors may influence their sensitivity displayed towards their infants. Personality might influence how parents respond to their infants. For example, 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). The present study examined how parent personality and infant temperament contributed to parental sensitivity across early infancy. The longitudinal study involves 4-, 6-, and 8-month old infants and their parents (n=49) (mothers, fathers), who are part of a larger, ongoing study. Parents completed questionnaires to assess their personality (Carver & White, 1994) and their infant's temperament (Gartstein & Rothbart, 2002). Coders rated parental sensitivity during a face-to-face play task (Tronick et al., 1978). Results revealed different predictors for mothers and fathers. For mothers, a significant BAS Reward X Infant Orienting interaction at 4-months predicting 6-month maternal sensitivity ($B=1.670$, $t=3.509$, $p<.01$). For fathers, a significant BAS Drive X Infant Surgency interaction at 6-months predicted paternal sensitivity at 8-months ($B=.815$, $t=3.288$, $p<.01$). Implications and limitations will be discussed.

Bailey, Heather "Truth Today: A 21st Century Examination of Sojourner Truth's 'Ain't I A Woman' Speech" (Andrew Rosa)

The oppression of African-American women in the United States is an issue activists have been battling since slavery. While some people would claim that racism is largely a relic of the past the lived experiences of African-American women shows this to be far from true. By juxtaposing Sojourner Truth's "Ain't I a Woman" speech with the lived experiences of 21st African-American women one can see that in fact these women face many of the same obstacles their ancestors did during slavery. This analysis of oppression also illustrates the need for intersectional principles in the feminist movement to ensure inclusion of issues particular to African-American women.

Baker, Alan; Wulff, Andrew; "Understanding the Geology of the San Jose Mine Collapse" (Andrew Wulff)

Understanding the geology of the San Jose Mine collapse The San Jose mine in Chile experienced a collapse on August 5, 2010. Thirty-three miners were trapped underground for 69 days. The miners were kept alive by the geology of the mine, while the rescuers tried to save them. The Chilean government failed at a rescue operation, so they got help from the USA, Canada, and South Africa. The overlying rock that had to be drilled through was diorite, which is an intrusive igneous rock made up of silicate minerals with an interlocking pattern. The overlying strata was not fractured or under stress, so there was not a chance for another collapse. The mine was mining the minerals chalcocite, bornite, and chalcotourmaline. The Chilean navy and NASA created a special escape pod called the phoenix. If the nations did not think these miners were going to live, then they would not have tried. The media tried to write a narrative of a catastrophe because they did not understand there was a high chance of success. This research is to show that having a basic understanding of geology can tell the difference between disaster and critical success.

Ballentine, Michael; Garcia, Marco; "Synthesis and Characterization of Semiconducting Nanoparticles" (Lawrence Hill)

This poster presentation will describe the synthesis and characterization of cadmium selenide nanocrystals and cadmium sulfide nanorods. Cadmium selenide nanocrystals were prepared by hot-injection methods with a batch yield of 556 mg. These cadmium selenide nanocrystals were determined to have an average diameter of 2.5 nm, weight percent inorganic content of 37%, and a molar mass of 7.25×10^4 g/mol. Cadmium selenide nanocrystals were then used as seed particles for the growth of cadmium sulfide nanorods with a batch yield of 60 mg. These cadmium sulfide nanorods were determined to have an average length of 47 nm and an average diameter of 3.6 nm. Characterization methods included transmission electron microscopy, thermogravimetric analysis, ultraviolet–visible spectroscopy, and fluorimetry. This presentation will explain how these characterization techniques were used to determine the structure and composition of nanocrystals at each stage of the synthesis. Future directions in the synthesis of more complex nanoparticle architectures will be discussed.

Banaszak, Alexander; Smith, Tyler; Gupta, Sanju; "Molecular Sensitivity and Selectivity of Metal Nanoparticles Decorated Graphene as ‘Smart’ Surface-Enhanced Raman Scattering (SERS) Platforms" (Sanju Gupta)

Raman scattering signal enhancement that uses graphene as support, graphene-enhanced Raman scattering (G-SERS), is a recent phenomenon. It can produce clean and reproducible Raman signals of chemical molecules with significantly enhanced signal intensity in contrast to traditional surface- (SERS) and tip- enhanced Raman scattering (TERS) techniques. While enhancement in SERS and TERS arise due to the electromagnetic mechanism, G-SERS also relies on a chemical mechanism and therefore shows unique molecular sensitivity and selectivity. In this work, we developed graphene materials decorated with noble metal (silver and gold) nanoparticles for detection of different chemical and biomolecules in view of optical and biological importance. The results illustrate that silver and gold nanoparticles immobilized on graphene and its derivatives (graphene oxide and reduced graphene oxide) significantly enhance the signal, in general, and as cascaded amplification of SERS signal on multilayer architecture, in particular, larger than those on only metal nanoparticles. Moreover, these highly-sensitive graphene-nanoparticle sensors are capable of detecting chemical molecules over a broad range of concentration ranging 10 pM to 100 microM. Therefore, these substrates are promising as advanced ‘smart’ SERS platforms and the enhancement mechanism is discussed in terms of molecular structures, charge-transfer interaction and graphene- metal nanoparticle interfacial hybridization.

Baughn, Cayla "Sustainability and Season Extension: A Kentucky Case Study of Low Tunnels in Action" (Leslie North)

A low tunnel is a structure employed at all scales of plasticulture, or plastics-based agriculture, that uses the greenhouse effect to create a microclimate conducive for crop growth. As of 2014, 90% of U.S. farms were small family farms and 52% of the nation’s farmland was operated by these farms, yet these farms only account for approximately 26% of the nation’s farm production. These farms often utilize low tunneling, but evaluation of the sustainability of low tunnels for small family farms has been limited. To evaluate the sustainability of low tunnels for Kentucky small family farms, in a field-based experiment basil and lettuce were grown in identical garden beds with and without low tunnels, in

triplicate. Data were collected from October 2016 to January 2017; data loggers were used to measure temperature and relative humidity, a handheld soil moisture tester was used to measure soil moisture content, germination and crop fatality were recorded periodically, and crop yield was measured at the experiment's conclusion. A small farm sustainability indicator was applied to derive a sustainability score. Preliminary results reveal that low tunnels increased the total lettuce yield by 10.27% and had no effect on basil yield.

Bentley, Matthew; May, Michael; "Geophysical Characterization of Mississippian Carbonates of South Central Kentucky and Northern Tennessee" (Michael May)

Use of geophysical tools is one of the best options for collection of subsurface data in soil and rock. Such tools are minimally invasive and applicable in several geologic subdisciplines. Geophysical data combined with petrofacies data permits the most accurate interpretative view of the subsurface. Instrumentation used in this study includes: Electrical Resistivity Tomography (ERT), Refraction Microtremor (ReMi), and a new Ground Penetrating Radar (GPR) that can potentially image down to 200 meters. Testing of the new GPR has proven it to be efficient at defining several geological features including structural (folds and faults), stratigraphic (bedding planes), anthropogenic (mining voids), and karst features. Testing is being conducted at several sites however, the Salem-Warsaw limestone units are the primary research focus. These limestones nearly exposed and are charged with hydrocarbons. The Salem-Warsaw has been a prolific hydrocarbon producer and remains prospective today. The oil in place creates a unique opportunity to study these saturated lithofacies. The Salem-Warsaw is also moderately dissolved, creating karst plain geohazards (flooding, collapse) that are challenging for local governments. Geophysical tools can be used to locate the voids responsible for these hazards and aid local governments in land-use planning.

Berger, Mollie "Birth Plan Non-Adherence: Impact on Birth Satisfaction and Perceived Birth Trauma" (Marilyn Gardner)

Birth plans help to empower women in their birth decisions and create a means to communicate with the healthcare providers prior to going into labor. Birth plans play a distinct role in overall birth satisfaction, which in turn has an impact of maternal well-being and bonding with the infant. When changes are made to birth plans, especially without the mother's consent, overall birth satisfaction may decrease and the risk of developing post-birth traumatic symptoms may increase. An online survey of childbirth experiences was administered to more than 2000 women. Birth satisfaction and post-birth traumatic symptoms were compared between women who had birth plans that were followed and those who either did not have a birth plan or had a birth plan that was not followed. Findings from the study will be discussed along with their public health implications.

Berlanga, Jesus; Nee, Matthew; "Kinetic Modeling of the Atmospheric Oxidation Pathways of Dimethyl Disulfide and Dimethyl Sulfide" (Matthew Nee)

Dimethyl Disulfide (DMDS) and Dimethyl Sulfide (DMS) are two of the most abundant volatile reduced sulfur compounds produced by anthropogenic sources. Oxidation pathways of these compounds are mainly by OH radicals and photolytic pathways, which produce sulfates that ultimately lead to formation of secondary organic aerosols (SOA). In this study, we use kinetic modeling of the atmospheric oxidation of DMDS and DMS to simulate

aerosol chamber experiments and to help interpret the ionic content of detected particles. The kinetic models were built as systems of differential equations for the atmospheric photooxidation mechanisms of both gases. Then, gas phase data from chamber experiments, where either DMDS or DMS in the presence of H₂O₂ or N₂O₅ as the oxidant source, was simulated to benchmark our models. Modeling the gas phase data allowed us to determine photon flux and initial radical concentrations. This allows for the accurate prediction of SO₂ formation, which further allows estimate SO₄²⁻ ion formation in a predictable manner. Observations from modeled data show prompt SO₂ formation from DMDS, while it is slower for DMS. Future research will include incorporation of amines commonly found in atmosphere that affect gas-phase reactions into our models to more accurately represent atmospheric conditions.

Bezawada, Nandini; Weisbrodt, David; Taylor, Ritchie; Hwang, Jooyeon; "Noise Exposure Levels among Bowling Green City Employees Operating Different Equipment" (Jooyeon Hwang)

Objectives: 1) To measure noise exposure levels of employees of facilities working with different types of equipment, 2) To compare the noise exposure levels between old and new equipment, and 3) To evaluate how various factors effect exposure levels. Methods: We evaluated different types of equipment in four facilities, Bowling Green, KY. 49 employees answered the exposure questionnaire about the duties and type of facility equipment. We measured noise exposure levels of employees when they were operating equipment using Sound level meter (Q-2200, Quest Technologies, Roseville, CA) and Noise Dosimeter (Q-400, Quest Technologies, Roseville, CA). Results: The observed exposure levels of all the equipment's ranged from 67.0 to 102.7 dBA. Older facility equipment tended to be nosier than new equipment. For instance, the manufactured in 2000 monitored 97.9dBA Sound Pressure Level (SPL) whereas, the manufactured in 2014 monitored a 91.9dBA SPL. Duration, frequency of equipment usage, type of equipment and location where equipment is being used contributed to changes in noise exposure levels. Conclusion: Majority of the employee's sound levels were not exceeding the OSHA Permissible Exposure Level of 85dBA and are likely safe to operate equipment without having a potential hearing loss.

Bhatia, Gurpreet "The Water Fluoridation Controversy: Do We Really Need It?" Darlene Shearer)

For over half a century, a controversial discussion over the issue of "Water Fluoridation" has continued among scientists, medical professionals including dentists and chemical manufacturers. Research has shown evidence to support the use of water fluoridation to prevent tooth decay. In addition, Centers for Disease Control and Prevention (CDC) has named community water fluoridation as one of the ten greatest public health achievements of the 20th century as 66.3% of the US population receives fluoridated water. Kentucky ranks first with 99.9% population receiving fluoridated water in United States. On the other hand, various studies have shown harmful effects associated with long term fluoride usage. This poster will address the process of water fluoridation and its evolution of the process over time based on scientific advancements. The poster also addresses the pros and cons of water fluoridation based on evidence based literature. The goal of this informative poster is to make people think about the safe levels of fluoride intake and the ways to limit it.

Biddle, James; Stone, Martin; Smith, Gordon; Weaver, Eric; "The Effect of Gravity Level Variation on the Growth Rate, Behavior, and Nutrient Uptake within a Crop of Sample Plants" (Martin Stone)

As humanity presses forward in its quest to explore further away from our terrestrial home, food will increasingly become a tether holding us close to earth. The question we are focused on is that of gravity and what relationship it may hold to overall health within plants. Our goal is to determine and verify a relationship between plant health and gravitational levels. In order to determine this relationship, we are interested in investigating the effect of various high-gravity environments on plant growth, physiology, and reproduction. We will be using, *Arabidopsis thaliana*, more commonly known as Mouseear Cress. We chose this plant due to its common presence within agricultural research. Generally, this plant will go from seed to seed in 4-6 weeks. This is exciting because with this information, we will be able to study several generations of plants in higher g-force and the effects of such environments. In order to study the nature of the effects of g-force on plants, we used a centrifugal rig, with a series of rings of increasing radius mounted on a central axis, which will rotate at a constant rate of speed for a period of time, analyzing plant growth and characteristics until maturity.

Biggs, Austin "The SBC in Crisis: A Collision of Worldviews" (Tamara Van Dyken)

From the late 1970s through the early 1990s, a minority conservative faction took over the Southern Baptist Convention (SBC). This chapter is part of an overall project that seeks to answer the questions of how a fringe minority within the nation's largest Protestant denomination could undertake such a feat and why they chose to do so. The framework through which this chapter analyzes these questions is one of competing worldviews that had emerged within the SBC in response to decades of societal shifts and denominational transformations in the post-World War II era. To place the events of the Southern Baptist "crisis" within this framework, this chapter seeks to refute the prevailing notion put forth in earlier works that the takeover was driven purely by doctrinal disputes between conservative Southern Baptists and SBC leadership. Illustrating the differences between the rhetoric and actions of the conservative bloc and those that opposed their bid for denominational control, this chapter asserts that the "crisis" was driven as much by cultural and political factors as it was religious. Placing these events within the context of broader worldviews, this project highlights and examines the intertwined nature of religion, culture, and politics in modern American society.

Blythe, Shaire "Who's Really to Blame: Violence & Films" (Jerod Hollyfield)

Gregg Easterbrook published "Watch and Learn: Yes, the Media Do Make Us More Violent" in 1999. He argued that if it wasn't for Hollywood's relentless depiction of violence, such as in Oliver Stone's *Natural Born Killers* (1994) and Wes Craven's *Scream* (1996), violence wouldn't be on the rise. The argument Easterbrook made seventeen years ago continues to be a topic of discussion. Violence in films surpass the limitations that were once presented on screens, and the material has found multiple outlets to reach a wide-range of potential viewers. Considering these factors, more research has been conducted and no definite conclusion has been drawn. Most studies, like Timothy P. Meyer's, have agreed that the exposure to violent films equaled "greater aggression" within individuals. However, other factors outside the world of film are not equated in when it comes to justifications similar to Easterbrook's. In this paper, studying specific criminal cases, I argue that films don't make us

violent, but it has the possibility to serve as a catalyst for violence. What actually produces a violent individual traces back to the perpetrator's family dynamics, psychological state and social and environmental factors, which moderates the fear of violent films provoking violent crimes.

Boisture, Maleah; Ezekekwu, Emmanuel; Onan, Rachel; "Aging and Caregiver Issues Related to HIV Care in Tanzania" (William Mkanta)

Tanzania is one of the sub-Saharan countries that have been greatly impacted by HIV/AIDS since it emerged in early 1980s. As a result, there is an important meaning attached to the terms "aging adults" and "caregivers" in the community. The aim of this study was to assess behavior, knowledge, and attitudes on HIV among providers and caregivers aged 50 and older and to determine measures caregivers and providers in this age group need to take to protect themselves against acquiring HIV infection while in the process of care. The study was conducted for five weeks during the summer of 2016 in Dar es Salaam, Tanzania. The data was collected from formal providers (WAMATA an NGO and community hospital) and informal providers or caregivers based on voluntary surveys. Only 55% of the providers/caregivers felt adequately prepared to interact with HIV patients in the process of care. Older adults providing care for HIV/AIDS patients constitute an important group of caregivers supplementing HIV care. Our results suggested the importance of continued education and training that should be specifically designed to meet the needs of older providers in both formal and informal settings to improve care and prevent provider infections while caring for patients.

Boone, Ryan "Improving Water Quality through Data Mining Application" (Leyla Zhuhadar)

The main objective of this research is to develop an automated predictive water quality control system for Kentucky's natural water ways. Keeping our waterways healthy ensures that the agriculture and aquaculture sectors remain a strong industry for current and future Kentuckians. Using data sets from the Green River Preserve and Kentucky organization of field station sites, we are implementing data mining algorithms to predict instances of harmful levels of pollution. These algorithms will uncover where and when our attention should lie to effectively improve our state's waterways while simultaneously creating a very detailed image of how Kentucky's ecosystem changes over time. When implemented this system will collect data for vital to biological research and send alerts when certain factors such as oxygen saturation, E. coli levels, and certain herbicide and fertilizer chemicals exceed healthy or acceptable levels necessary for local wildlife populations. Once this system is fully integrated in Kentucky, it can be expanded to the other states, not only improving scientific research and understanding through mass data collection and sharing, but also by improving the health of the United States' ecosystems by use of automated monitoring for efficient management.

Bowers, Isaac "Storm Chasing Across the Plains: An Experience Portfolio" (Joshua Durkee)

The WKU B.S. Meteorology Program offers a unique experience to students each spring. The opportunity to predict and document severe weather across the Plains is not available to many, but it is a vital experience for those who hope to excel in meteorology. The ability to travel alongside a professor that has guided you through the program, apply knowledge gained from that professor and others, and view nature's power in person is truly a capstone

experience for any meteorology major. This portfolio report consists of documentation I recorded during my time in the classroom and the field as a participant in the Severe Storm Forecasting Field Methods course that took place in May 2016. This includes daily activity logs, brief forecast discussions, accounts of the decision-making process, and photography, as well as personal reflections authored over the course of the experience. The goal of this Capstone Project is to effectively convey the importance of the opportunity to chase severe weather and encourage others to take that opportunity in the future. This will hopefully bring students to the storm-chase program that would not have joined otherwise, and increase the WKU Meteorology Program's output of exceptionally trained, experienced, and highly qualified meteorologists.

Boyareddygari, Vishnu "Parameter Sensitivity Analysis of a Partial Differential Equation Wound Neovascularization Model" (Richard Schugart)

Mathematical models of wound healing inform researchers about the mechanisms involved and, in turn, the best path of treatment. Continued analysis of these models guides the refining process, leading to a more accurate model. Latin Hypercube sampling (LHS) is a stratified multidimensional sampling method used to produce a sample that is more representative of a population space than a sample produced through simple random sampling. Partial Rank Correlation Coefficients (PRCC) regression analysis of the LHS values allows for the correlation between a parameter and a model to be determined independently of the other parameters and assesses the sensitivity of the parameters in the model. This method has been applied to a wound-healing neovascularization partial differential equation (PDE) model formulated by Schugart et al. (2007) to determine which parameters have the strongest influence on the model output. This can aid in the determination of factors that are the most important in positively or negatively affecting the healing response.

Bragdon, Blake "'Just Can't Wait To Be King' – The Revitalization of the Walt Disney Company (1989-1999)" (Jerod Hollyfield)

The contemporary history of the Walt Disney Company would be incomplete without the discussion of The Disney Renaissance; the period between 1989-1999, in which the Company produced ten films of generational significance, financial success, and artistic development. This period is incredibly significant when one examines the history of the Company as a whole, in particular its influence on 21st century Disney, in regards to style, topic, and financial stability. While Chris Pallant's *Demystifying Disney: A History of Disney Feature Animation*, offers a more complete view of the Renaissance compared to other scholars "Not only did the Renaissance witness a qualitative revival in the Studio's animation it also helped stimulate industrial change" (pg. 110) he does not go deep into the socioeconomic background of the period and the effect that it had on the generation that preceded it. In this paper I propose a merging of the two prevailing observations regarding the Disney Renaissance, the artistic analysis and the business perspective. Specifically, I shall focus on the ideological shift of the company from early Disney; the impact on the economics of the company, which affected all business practices; and the artistic innovations that were implemented to create future works.

Bragdon, Dakota "Make Your Way through the Fog, Little Hedgehog: A Formal Analysis

of Soviet Animation from 1949-1979" (Jerod Hollyfield)

Russian animation has existed for a little more than a century now, but it wasn't until 1947, when the Soviet Union denounced the Marshall Plan, that animated cartoons became a vehicle for propaganda and creativity. While A.V. Fedorov illustrates the sociopolitical implications of the Soviet films, which were critical of the West through the use of fairy tales, in his essay "The Application of Hermeneutical Analysis to Research on the Cold War in Soviet Animation Media Texts from the Second Half of the 1940s", he does not go into detail in the formal techniques of the films, nor does he address the problem of those techniques being in danger of becoming impractical methods of filmmaking. As famed Russian animator Yuriy Norstien explained in an article for *Russian Life* in 2010: "The country killed animation and left." In this paper, I shall expand on Fedorov's research by proposing that from 1949-1979, Russian animators were critical of the West, however, they ironically used Western techniques to create their films, were allowed more creative freedom than their Western counterparts, and to make a case for the revitalization of Russian animation and the techniques used in order to save the traditional medium from extinction.

Brock, Kelli "The Art of Post-Production" (Jerod Hollyfield)

The work of directing is something that has been celebrated by audiences from the beginning of cinematic history, while the art of post-production is often under looked by the average viewer. Without doubt, the separate parts of productions are brought into different lights. French director, Claude Chabrol, even goes on to state these separate parts into terms of dinner: "Script writing is like cooking. Shooting, the part I enjoy the most, is like eating. Editing therefore is, well, the washing-up." (Crawler 1991:104). Although Chabrol makes a stab at the editing process, pointing at its main focus of cleaning up shots and piecing them together, the comment shows editing in a bland nature. Post-production is the structured and mechanical position of film, but can be pinned as one of the most creative trades in the movie business. Throughout film history, the art of editing has advanced movies and their narratives from blockbusters like *Star Wars* (1971), to purposely ill temporal films like *500 Days of Summer* (2009). Between these two films, I will discuss how the cutting room saved and made the story.

Brown, Alec "Investigating the Student Enrollment Decision at WKU" (Melanie Autin)

The purpose of this research is to investigate the relationships between the enrollment decision of first-time, first-year students admitted to WKU and the amount of financial aid awarded, as well as demographic information. The Division of Enrollment Management has provided a SAS dataset containing various information about all WKU students admitted from 2013, 2014, and 2015. The data has been analyzed in SAS Enterprise Miner, STATA, and other statistical software. Multiple statistical analyses have been performed to model the student enrollment decision. Additional research with this data is currently being conducted with specific focus on areas of marginal benefit to WKU's goal of enrolling more students. The focus of this talk will be presenting a decision tree model, discussing its impact on WKU's recruitment strategies, and investigating its ability to predict the enrollment decision for future incoming classes.

Brown, Drew "Bromance Movies Champion Modern Masculinity" (Jerod Hollyfield)

Masculinity has been addressed countless times throughout the history of cinema, whether

intentionally or unintentionally. In the 21st century, stereotypes and preexisting standards of what a man should be are constantly challenged. In *Journal of Men's Studies*, R. Colin Tait posits that modern "bromance" films, such as *Step Brothers* (McKay, 2008), are sophisticated critiques of modern male relationships as well as an assessment of standards for male behavior in a modern world. This paper supports claims like these and asserts that masculinity, particularly in America, has been portrayed in a narrow frame in Hollywood and has a detrimental effect on younger generations. While "bromance" films are often written off as farcical and unimportant comedies, maybe even illegitimate cinema, they provide a unique perspective, as they argue for the permission of male sensitivity and complexity, something many film critics often neglect. Since the definition of masculinity varies from region to region, this paper will primarily focus on American film and its effect on American society.

Brown, Katherine; Gani, Nahid; "Understanding Tectonic Processes from the Distribution Pattern and Interaction of Strike-Slip Faults and En Echelon: A New Study from the Solis Planum and Lunae Planum Regions of the Valles Marineris Plateaus in Mars" (Nahid Gani) While consensus has begun to turn towards affirmation of the existence of strike-slip faulting on Mars, the faults have not been extensively studied in relation to en echelon. This study aims to investigate tectonic processes by mapping and analyzing the relationship of en echelon and strike-slip faults emerging from the region surrounding Valles Marineris. We used histogram equalization, hill shade, slope and overlay functions to process DEM and to maximize identification and mapping of en echelon and strike-slip faults. This fault map was used to measure fault lateral extent and offset, orientation, and spacing. We generated models, scatter plots, and bar and rose diagrams to investigate faulting on the Martian surface. Results of this study show a majority of these faults are east-west trending strike-slip faults following the general east-west strike of the Valles Marineris. Fault length varies between 18 to 285 km. The presence of many en echelon offset by these east-west trending strike-slip faults form overlapping zones with average 30 km long faults. Fault lateral offset values range from tens to hundreds of km dominating dextral slips. Thus, the presence of this number of en echelon provide indication of past strike-slip tectonics within Solis and Lunae Planum.

Brown, Laysha; McCoy, Lauren; Oregon, Evelyn; "Student-Athlete Activism - Where do We Go from Here?" (Lauren McCoy)

Recently, student-athletes initiated group and individual activism movements related to social issues affecting college campuses and society as a whole (ESPN, 2015). Mainstream media coverage highlights only some of these activism efforts. The University of Missouri's football team boycott of all team activities, as an example, received heavy media focus. This coverage focused on the potential loss of revenue, and briefly the power to student-athletes to initiate change in the immediate aftermath. However, once the boycott ended, the coverage subsided, leaving many to wonder about the final impact of their efforts (Sports Illustrated, 2016) This presentation will review student-athlete activism campaigns, both those that have received mainstream media coverage and those that have not. Through an examination of these campaigns, the apparent trends related to student-athlete activism and related outcomes will emerge. This information can improve understanding about the impact of social justice activism involving college athletes and what can be done to assist their efforts for change.

Brown, Sarah "Company Stress Relief through Anonymous Employee Feedback" (Helen Sterk)

Workplace stress is a burden that all employees bear, however, striving to reduce it is essential for productivity. This literature review discusses how organizations may choose to address and/or tackle the issue of workplace stress among employees. Although workplace stress can be attributed to a number of factors, this research focuses on employees' perceived lack of control in the workplace serves as a significant stress trigger. Through examining studies and reports pertaining to organizational stress and communication, this review argues that the aforementioned stress trigger, lack of control in the workplace, can be combated effectively through opportunities for anonymous upward dissent. Not only does this upward flow of feedback allow employees to have more control of their work environment (and therefore less stress), but it also improves communication between employees and managers within an organization.

Brown, Trevor "Virtual Lab" (Michael Galloway)

Students attending public universities are provided at least one free, accessible, fully equipped computer laboratory. In these computer laboratories, personal computers, printers, and personnel to assist anyone with questions are available. The fallacy with computer labs is that they are restricted to students who are physically attending the institution, and potentially within a specific time frame. Virtual Lab strives to combat this fallacy. Virtual Lab will recreate the traditional computer laboratory experience by employing virtual machines – “computers within a computer” – to act as the PCs. These will run on dedicated servers with sufficient computing power within the cloud infrastructure. These virtual machines will have all the software generally available in a computer lab. Remote access technology will be implemented within a web interface. Students, faculty, and staff with can access virtual machines with an up-to-date internet browser from anywhere. Support chat and remote access features to assist clients will be available. Integration with cloud printers, or potentially file to email technology, will be available for students to print files. “Local” file storage will also be available for clients to store files. Virtual Lab intends to have a functional prototype available by Spring 2018.

Browning, Shelby "Russellville Youth & Development Center" (Neal Downing)

The purpose of an architectural capstone project is to provide an example of knowledge gained from previous years in the program and creatively demonstrate abilities to solve a problem that provoke personal concern. For my capstone project, I am designing a mixed use facility located in my hometown, Russellville, Kentucky. The "why" behind my proposed project lies in the future. Children are widely known as the future of civilization, this is why I personally believe that how they are impacted in their earlier development years determines what life will be like in the years to come. By providing the community with programs that instigate a positive mind set, it is taking the focus off of the increasingly violent nature of their surroundings. This will help emerge today's youth into a positive environment that will allow them to take on the world around them confidently.

Brugh, Christopher "'Desetha, Deseti, Disati, Diśati, Diś': A Philological Study on 'Preach' in Early Buddhism'" (Jeffrey Samuels)

“Desetha bhikkhave dhammam...” Purportedly spoken by the Buddha over two and half millennia ago, scholarly interest in the aforementioned words have pointed to a multitude of definitions and contextual complications with the word “dhamma(m),” however the word “desetha” has been of less concern. In this presentation, I articulate the challenge in translating between multiple languages with consideration of diverse religio-cultures’ histories, to address the larger scope of Buddhism as a “missionary religion.” I investigate how examining a word philologically, such as “desetha,” further develops the Western concept of “missionary religion” through additional constituents or features integrated into the written words in the Pāli canon. My hope is to provide a small but significant look into early Buddhism, while addressing a need to reevaluate Pāli words and their English translations. I present definitions and problematize not only the translation of the word “desetha,” but as a result of pursuing the former, I also provide a contextual reinterpretation of the verses from “Mara’s Snare;” a section from the canon identified as “missionary”-oriented having been interpreted through Western lenses. Thus, I demonstrate that how “missionizing” was performed during the time of the Buddha did not include “proselytizing” and “conversion.”

Brumley, Jacob; Lienesch, Philip; "The Correlation between Madtom Biomass and Mussel Shell Distribution within the Green River in Kentucky" (Philip Lienesch)

In Biology, symbiosis refers to a close relationship between two separate species. A category of symbiosis, known as commensalism, involves one species benefiting from the relationship, while the other is neither harmed nor assisted. The Green River in Kentucky, like many of the rivers in the southeastern United States, is very species rich for both fishes and macroinvertebrates. This experiment tested the hypothesized commensal relationship between madtom catfish and freshwater mussels. It has been observed that madtoms use dead mussel shells as housing and protection when not actively hunting. I conducted snorkel surveys at three sites along the Green River to assess whether the madtoms were found preferentially in shells of dead mussels or under similarly sized rocks. Data analysis exposed that the madtoms preferred the shells from dead mussels and that the use of shells and rocks was dependent on the density of madtom catfish.

Bruns, Brody; Ogbonnaya, Caleb; "Expanding the Accessibility of Conventional Smart Home Systems" (Michael Galloway)

Smart home systems can improve a person’s way of life and has evolved how they live and interact with their environment. This project will seek to explore the interaction between users and systems of smart devices and how the interface for this interaction can be improved. Our project aims to consider alternatives and supplements to the traditional smart system interface in order to improve its usefulness. These alternatives include technology such as voice recognition and motion control. In order to gain insight into the design and implementation of a smart home hub, our group previously designed and created a smart home system with a Raspberry Pi acting as the central hub. Our system utilized the ZigBee wireless protocol to allow a user to control several smart devices using a web based interface. We are now focusing on expanding the interface for our system by allowing the user to interact with our devices using a voice control application and by utilizing their hand gestures. Both methods will expand on conventional smart home controls and make the use of smart home systems more accessible to users.

Burchett, Seth "Hard Times, Professional Wrestling, and a Look at Working Class Masculinity" (Jennifer Hanley)

This research analyzes 1980s working class masculinity through the lens of professional wrestling by examining wrestling publications from the decade. The 1980s working class is often overlooked but their hobbies and past times give a glimpse into what they valued and what masculinity meant to white working class men. Through professional wrestling we can see what values the working class had based on the characters that were set forth from professional wrestling organizations. What mattered to this group of people was exemplified in who were the good guys and who were the bad guys and more importantly why they were the good guys and the bad guys. The individuals that the working class were cheering for and who was written covered in the magazines allow us to learn more about this class of people and their past times that have had so little attention paid to it.

Burgess, Kelly; Payne-Emerson, Heather; "Nutritional and Behavioral Repercussions of Food Insecurity and the Impact of Nutrition Education" (Karen Mason)

Food insecurity occurs when an individual does not have consistent access to fresh, nutritious food in safe, socially acceptable, and affordable ways. This is a significant challenge facing Kentuckians, with one in six adults and one in four children experiencing some degree of food insecurity. The present investigation examines the effectiveness of customized nutrition education in improving 1) nutrition-related behaviors associated with food insecurity and 2) management of household food supply in food-insecure individuals with and without children. Two participants, one from a household with children and one with no children, were recruited from HOTEL INC. A pre-assessment survey was completed to evaluate food insecurity levels, coping behaviors, and basic nutrition status. The participants received customized nutrition education through an interactive grocery store tour. The post-assessment survey will occur in March to determine if nutrition education is an effective method for improving behaviors associated with food insecurity, leading to more effective management of household food supply. Comparisons between nutrition behaviors in households with and without children will be performed. Although the study is small in scope, the results could establish effective nutrition interventions for reducing food insecurity.

Buscaglia, Alexandra; Kuhlenschmidt, Sally; Clayton, Krisstal; Zhao, Qin; "The Effects of Assertiveness on Dating Initiations" (Sally Kuhlenschmidt)

The purpose of this study is to increase understanding of the initial screening process that occurs during dating interactions and to measure the perceptions of different communication styles that individuals use during such interactions. The present study examined how individuals view others' approaches in initial dating interactions, and which of these approaches are most effective for increasing the target's interest in spending time with the pursuer. One hundred and seventy undergraduate psychology students from Western Kentucky University completed measures of sexism, social desirability, and dating initiation preference. Results will discuss the implications for dating interactions.

Busannah, Shaima "Ibrahim Palace" (Neal Downing)

Busannah, Shaima" Ibrahim Palace Hotel a place where different culture gather under the

roof of Ottoman civilization" (Neal Downing) My goal is to make entertaining hotel which visitors will enjoy its historical architecture and that include accommodation, food, shopping and other events that the hotel will host around the year. As Saudi Arabia is working to add more sources to its economy beside oil production, and improve the lifestyle in the country. This encourages me as a Saudi woman to be part of this development. Therefore, one of the new plans of Saudi Arabia is to focus in local tourism. In order to catch our tourists' eyes and make them experience living inside our history and our heritage, the hotel will be in Alhasa, which is located in the eastern province of Saudi Arabia. It will be influenced by the old city architecture and style, which my focus is Ottoman time period when they had controlled over the city and they had built the Castles and Palaces. The hotel will be inspired by Ibrahim Palace, which one of the historical site in Alhasa. Ibrahim Palace was headquarter of the Ottoman Empire. It has two style Islamic style and military style.

Byrd, Adam "Warren County International Learning Center" (Neal Downing)

My research consists of designing a new international school in Bowling Green, Kentucky on Morgantown road. There is an international school housed inside the old annex building that used to be home to Warren Centrals elective classes. The international school in Bowling Green is the first of its kind in the south-eastern United States, there are less than twenty open in the United States. My international school will hold 27 classrooms, a cafeteria, and a large lab for shop classes, a library, a courtyard, a main office and teacher's lounges. The school will function as a K-12 learning environment during the day, and an adult education building at night for the international adult population. The building will be environmentally friendly with features such as green roofs, natural heating and ventilation, Photovoltaic panels, or panels which harness solar energy, and the use of new landscaping and green areas surrounding the new building. In conclusion, the main focus on this international school will benefit the always growing international population as a primary learning space when coming to America.

Caro, Cara "Interlayer Bond Strength of Abs Plastic" (Gordon Smith)

Rapid prototyping technologies have gained traction recently, with fused deposition manufacturing (FDM) emerging as an option. The FDM process consists of laying down plastic layer by layer, with water-soluble material as support when needed. The WKU Engineering Department has a 3D printer that uses this process, and students use it to create parts that are too expensive or difficult to machine. While the physical properties of the ABS plastic used in the printer are known, the details of how the layers interact are not well-understood. It has been observed that if the parts break, it's usually between two layers of plastic under loads inconsistent with those properties. The purpose of this research was to determine the nature of interfilament bond strength of fused deposition rapid prototyping. As there was no ASTM standard for finding the strength of FDM interlayer bond strength for plastic, testing protocols were based on similar ASTM standards – most particularly ASTM D3165 and ASTM D897 to find shear and tensile strength, respectively. Comparisons were made between fine (0.007in) and (0.1in) coarse layers, and how they affect bond strength. The shear and tensile strength were determined to be 4799.74 ± 1708.56 psi and 1218.45 ± 277.59 psi, respectively

Carrender, Mark "Synthesis of Heteropolyoxoniobate using a Water-Soluble Nickel-

Substituted Decaniobate Ions" (Bangbo Yan)

Polyoxometalates are inorganic cluster anions with important applications in catalysis, medicine, and materials science. We focus on the synthesis of new lanthanide polyoxoniobate materials with catalytic properties. We have explored the reactions of nickel-substituted decaniobate ion with lanthanide ions using the hydrothermal method at different reaction conditions.

Carrico, Christopher; Hahn, Lance; "A Natural Language Approach to Email Encryption" (Lance Hahn)

Encryption is necessary and important when transferring data over the internet, especially when this data is sensitive and personal. This project uses the local context of words to encrypt computer-mediated communication. Local context was computed with the conditional probabilities relating words within a sentence. These conditional probabilities are based on the bigram frequencies and word frequencies in a large language dataset. A message is obfuscated by replacing a target word with a different word that fits the local context. This method of encryption will be hard to crack because the encrypted data will appear unaltered when sent across the network. For example, the message "The Chinese will invade Russia soon." could be transformed into "The Americans will investigate Russia soon". This new message seems unaltered, but has a completely different meaning than the original message. The algorithm, outcomes of obfuscation, and identified strengths and weaknesses of this method will be discussed.

Carrizosa, S. "Scanning Electrochemical Microscopy of Electroactive Cobalt Oxide/Graphene Hybrids for Energy Storage Devices and Electrocatalytic Glucose Sensing" (Sanju Gupta)

This work reports on the electro-assembling of two- and three-dimensional graphene variants with nanostructured cobalt oxide (CoO and Co₃O₄) polymorphs to create hybrid electrodes with improved properties for electrochemical energy storage (supercapacitors) and enzymeless glucose sensing. To fabricate the cobalt oxide/ graphene hybrids, electrodeposition and annealing was used to facilitate loading of cobalt oxides micro/nano particles on the surface of graphene, creating interfaces crucial to electrochemical enhancement. The surface morphology and structural features of the hybrids were collected using electron microscopy, X-ray diffraction, and Raman spectroscopy. Employing an advanced technique known as scanning electrochemical microscopy, the electrochemical reactivity is monitored and mapped at a micro-scale to capture local electroactive sites and their distribution, resulting in areal-scans that confirmed the synergistic effects of coupling graphene and cobalt oxide polymorphs. Moreover, the scanning electrochemical microscopy allows gaining insights into fundamental physicochemical processes at electrode/electrolyte interface operated in probe approach and feedback modes determining hemi-spherical diffusion coefficient, kinetic transfer rate and distribution, respectively. The interplay of heterogeneous basal and edge plane sites graphene (conducting/ semiconducting) and crystalline spinel cobalt oxides (semiconducting) reinforce density of states in the vicinity of Fermi level, efficient interfacial electron transfer and short diffusion distances.

Carver, Krystal; Johnson, Samantha; Turner, Ben; "Assessing the Community Impacts of Project Breaking Ground (A Sustainable Jail Garden and Food Justice Service-Learning

Project)" (Nicole Breazeale)

Project Breaking Ground is a service-learning project at WKU-Glasgow in partnership with the Barren County Detention Center. The class was modeled after the Inside Out Prison Exchange program, with 15 undergraduates and five incarcerated women taking the class together with the same readings and assignments. The class was divided between learning about the challenges of the contemporary food system and discussing emerging alternatives, and students learning sustainable agricultural techniques from local farmers. Then a $\frac{3}{4}$ acre jail garden was installed next to the facility using these techniques, that provides meals to approximately 200 inmates several times a week. To evaluate the impacts of Project Breaking Ground, students used a mixed-methods approach. They surveyed jail staff and all WKU classes involved in the project, conducted a focus group with undergraduates, a dozen key stakeholder interviews, and analyzed Dr. Breazeale's curriculum notes as well as media reports and the project's Facebook page. Beyond student learning, our analysis revealed five broader impacts of the project: 1) changed community perceptions; 2) enhanced community capacity to address local problems; 3) indirect effects on jail staff; 4) altering social relations between jail staff and inmates, and 5) long-lasting impacts on inside students.

Cecil, Wendy "A Study of Mercury in Bald Eagle Feathers" (Cathleen Webb)

Bald eagles are high-end predators and are highly susceptible to mercury bio accumulation. Mercury is a toxic element that may cause harmful neurological effects at high-enough levels. Mercury is found naturally; however, most mercury exposure is due to anthropogenic sources (predominately atmospheric mercury). Atmospheric mercury deposits onto water and sediments in water. Microscopic organisms in the sediments transform mercury into methylated mercury, a more toxic form of mercury, which readily transfers into cellular membranes and adipose tissue and binds to proteins as well. Consequently, methylated mercury transports through the food chain. For eagles, a diet of fish makes them particularly vulnerable to significant mercury bio accumulation. In summer 2016, a young adult male bald eagle tragically died at Mammoth Cave National Park. An autopsy was completed. Tissue and feather samples were collected for analysis for mercury. Over thirty feather samples were analyzed for mercury content by direct combustion using a LECO AMA254 mercury analyzer, which allows for accurate determination of trace mercury in solid samples including animal tissue with no sample pretreatment. Levels of detected mercury typically ranged from 5-12 ppm. This is one of the few reported studies of mercury bio accumulation in bald eagle feathers.

Chen, Yu-Hsuan "Investigating the Influence of the Transition from High School into College Life on Dietary Pattern Among College Students at Western Kentucky University" (Colin Farrell)

Not perceiving themselves at the risk of developing chronic disease, young adults are more likely to participate in behavioral risk factors such as unhealthy diet and substance use. Additionally, the young adults are experiencing the transition into living independent. Their existing health behaviors may change due to the changes in the available resources. Lack of capability to cope with the transition from living at home to living independently contributes a remarkable proportion in unhealthy diet especially among college students. As that the unhealthy diet behaviors in the young adulthood often remains over the lifetime, there is a need in assessing the impact of the transition into living alone and put it into the practice of

improving healthy dietary among young adults.

Chumbley, Allison; Watson, Chelsea; Young, Sonia; VanWye, Ray; Norris, Beth; Vanarsdall, Natalie; Downing, Tate; Clayton, Morgen; "The Effect of Foot Orthotics and Whole Body Vibration (WBV) on Balance and Gross Motor Skills in Children with Down Syndrome" (Sonia Young)

Introduction: The purpose of this study was to analyze the effect of foot orthotics and whole body vibration (WBV) on balance and gross motor skills in children with Down syndrome. Methods: A single-subject, interactive design was performed using two participants (DS1, DS2). Three interventions were provided during two-week phases over 14 weeks: WBV, orthotics, WBV with orthotics, and four baseline phases between. Balance and gross motor skills were analyzed using the BalanceMaster Sensory Organization Test (SOT) and portion D of the Gross Motor Function Measure (GMFM-88). Results: In DS2, balance was not improved with any intervention as measured by the SOT. Only DS1 improved in the GMFM-D, upon the removal of orthotics. Discussion: WBV showed more benefits with balance and gross motor skills than orthotics. WBV combined with orthotics showed no significant improvements among these parameters.

Clark, Terry "Christian Doctrine and Slavery: A Question of Compatibility" (Ann Ferrell)
In this paper, I will explore the use of Christian doctrine to support slavery during the pre-Civil War era in the United States. I will focus specifically on the arguments set forth by George Dodd Armstrong, a pastor of the Presbyterian Church of Norfolk, Virginia, in his controversial book written in 1857 titled "The Christian Doctrine of Slavery," in which he argues that slavery as practiced in the United States is not incompatible with Christian doctrine. The arguments he raises in support of his position are quite reasonable and logical, making them difficult to dispute. I will take a close look at some of his arguments with an eye toward discerning the suppositions prevalent during his time that may have influenced and given credence to his train of thought and the arguments that emerged from that train of thought. Furthermore, I will raise some questions that stand in opposition to his arguments to show that his thesis is not as foolproof as it appears on the surface. A study such as this is important in this era of continued racial bias and discrimination and may provide insight into why racism continues to be such a significant force in America today.

Clayton, Morgen; Downing, Tate; Vanarsdall, Natalie; Young, Sonia; Norris, Elizabeth; Vanwye, Ray; Chumbley, Allison; Watson, Chelsea; "Effects of Foot Orthotics and Whole Body Vibration on Gait in Children with Down Syndrome" (Sonia Young)

Introduction: The purpose of this study was to analyze the effect of foot orthotics and whole body vibration (WBV) on gait in children with Down syndrome. Methods: A single-subject, interactive design was performed using two participants (DS1, DS2). Three interventions were provided during two-week phases over 14 weeks: WBV, orthotics, WBV with orthotics, and four baseline phases between. Gait was analyzed using the GaitRite and part E of the Gross Motor Function Measure (GMFM-88). Results: Both participants increased RLE heel contact time during the WBV and orthotic phases while the LLE heel contact time increased for DS1. For DS2, toe out increased on the RLE. For DS1, the base of support increased during the orthotic phase on the RLE. GMFM-E improved with removal of orthotics (DS1) improved with vibration (DS1) and removal of WBV and orthotic (DS2). Discussion: WBV

showed more benefits with gait than orthotics. WBV combined with orthotics showed no significant improvements among these parameters.

Coates, Kyle "Jesus People: Spiritual Entrepreneurs" (Tamara Van Dyken)

The Jesus People were a social movement that fused countercultural norms and practices with evangelical Christianity that challenged the Christian establishment. The Jesus People illustrate a Hayekian "spontaneous order," that emerged organically in a decentralized process. Jesus, as well as participation in the movement, became a central aspect of members' identity as they developed symbols and iconography as signaling mechanisms of membership. Once the movement gained mainstream recognition, their focus shifted from personal salvation and an emphasis on premillennialism, to collective salvation and postmillennialism. Through Billy Graham, the movement shifted from fringe to Christian establishment by bringing Jesus into Popular Culture. The Jesus People were spiritual entrepreneurs that created innovative means of ministry that included coffee shops, music, drug rehab, "crash pads," and other forms of civil society. By drawing upon memoirs of former participants, sociological literature, as well as secondary sources, this paper provides a historical examination of the Jesus People; an analysis of the institutional relationships within the group, and an understanding of the movement's association with millennialism.

Cobaugh, Tyler "PTSD Portrayal in Film" (Jerod Hollyfield)

In this paper I will argue that PTSD shouldn't be glossed over and needs to be explored more in narrative film. I will in this paper go and talk and analyze how PTSD or Post Traumatic Stress Disorder through the decades has been portrayed in movies and how the topic has been incorporated either into the plot itself or the characters. Rebecca Maseda and Patrick Dulin said in a journal specific to PTSD in film called "From Weaklings to Wounded Warriors: The Changing Portrayal of War-related Post Traumatic Stress Disorder in American Cinema" they state "Traumatized veterans in particular have provided fascinating material for character development in Hollywood movies. In many film representations the returning veteran is violent, unpredictable and dehumanized; a portrayal that has consequences for the way veterans are viewed by U.S. society." It has been used as a farce in film as well and that is also something I want to tackle and really see how, through the decades, as more understanding of this disorder has evolved and how it's been portrayed differently. It's necessary topic because of the constant state of war the US has been in for years .

Collins, Christopher "Potential Energy Surfaces of Diatoms" (Jeremy Maddox)

We have calculated potential energy curves for several diatomic systems. For a given diatom, we have performed many single-point energy calculations at different internuclear distances using both SCF and post-SCF methods. These potential energy data points are used to construct accurate numerical models of molecular potential energy and force that are further used in simulations of chemical dynamics and molecular spectroscopy.

Conkright, Benjamin; Gilliam, Olivia; "The Effect of Chemical Sympathectomy on Mouse Sleep Using Piezoelectric Technology" (Noah Ashley)

The effects of many drugs on the phenotype of sleep in vertebrates have not been conclusively proven and are not completely understood. We took 16 female mice and injected (IP) half with 6-OHDA (6-hydroxydopamine) and the remaining half with saline

solution as a control once a day over a period of 5 days. 6-OHDA temporarily desensitizes the sympathetic nervous system (SNS) in the periphery, and the SNS is involved with sleep. We then monitored the effects on their sleep patterns using non-invasive piezoelectric technology. This technology emits a low electric field and senses small movements (including respiration rhythms) from the mice, which can be correlated with sleep/wake patterns. We looked at sleep bout lengths, percentage of sleep in light and dark environments, and sleep histograms to determine if the drug had any effect on sleep. The results showed that there were no outstanding differences between 6-OHDA and control groups.

Conley, Hunter "Less is More: Incorporating 'Tiny Living' in Bowling Green's T.I.F. District" (Neal Downing)

Minimalism is a design philosophy that has its roots in the early 20th and has become not only an increasingly popular architectural mentality, but an economical 21st century lifestyle – especially with those of newer generations (I.E. young professionals / recent college graduates). However, it is a mentality not commonly found in the Western Kentucky region. My capstone project revolves around incorporating affordable, 'micro' apartment units in the heart of downtown Bowling Green to further contribute to and develop available urban housing, while maintaining a small footprint. My design calls for a chic, mixed-use development comprising 3 levels of fully-equipped apartment units, coupled with a foods market and café at grade, encompassing a one-stop space to accommodate the target audience. To ensure the success of the development, however, a number of case studies and careful research of similar typologies in larger urban settings were fully examined, thus informing me of how to approach my own design. With each study, I found the smaller the space, the larger the appeal. In turn, I believe implementation of my proposed development could prove to be crucial as Bowling Green continues to expand. With population increasing each year, so, too, does demand for housing.

Cornelius, Christopher "Boys and Girls Club Meet the Sustainable African Termites" (Neal Downing)

I am developing my architectural science capstone project as a contemporary and highly sustainable Boys and Girls Club located in Clarksville, Tennessee. The overall objective of my research is to implement all the skills and knowledge gained from 4 years in the architecture curriculum by implementing computer programs like Revit and AutoCAD as well as problem solving ideas during the design of my project by focusing on functionality and aesthetics. I will present my research on a poster where I will talk about the purpose of the Boys and Girls Club and the theory behind its biomimicry aspect that is revolutionary to the United States. The conclusive result of my building will incorporate sustainable concepts that will ultimately save money through the lack of energy needed to operate the building year round.

Coughenour, Brent "Character, ASL, and Marlee Matlin: Representation of the Deaf On-Screen" (Jerod Hollyfield)

As methods of video production become more available, the presence of ASL becomes more common, although portrayals of Deaf individuals are not always positive. Previously these portrayals were almost exclusively negative, and the Deaf were presented in black & white. This treatment on the screen has tainted deafness for audiences, as Oliver Sacks argues in his

text *Seeing Voices* (117). Frequently casting Deaf roles that revealed in self-deprecation and self-loathing, the film/television industry holds some of the blame for the misinformation, yet these industries have attributed to the recent uptick in screen presence of deaf actors. Deaf equality movements have continuously worked to achieve equal representation in film, yet many members are just beginning to see the results. Sacks elaborates that portrayals of the Deaf are indeed becoming more positive, typically with an implicit political meaning that explains their presence (118). Deaf characters represent “the other” and filmmakers often use them to parallel the main character, yet the presence of the Deaf has expanded in recent years. This renewal of Deaf characters has taken on an expressly political purpose and oftentimes represents the very real struggle that the Deaf experience daily. I argue that this renewed visibility is a good thing, and it is becoming easier to effectively represent the complex world of the Deaf.

Crowdus, Nathan "Case Study of the January 22-24, 2016 Snowstorm across the Ohio Valley and Mid-Atlantic" (Joshua Durkee)

On January 22-24, 2016, a relatively mild and quiet winter came to an abrupt stop, as a disturbance propagated through the southeast U.S., providing lift for needed for storm development. In addition, cold air was in place, thus creating an anomalous winter storm setup across the Ohio Valley and the Mid-Atlantic states. The winter storm was characterized by impressive winds, ice accumulations, and feet of snow, from Kentucky to New York, leaving much of the eastern U.S. in turmoil. The storm dumped over a foot of snow in fourteen different states, including Kentucky. Locally, Bowling Green, Kentucky received a record-breaking 12.2” of snow, after 0.3” of ice glazed the town. All in all, the winter storm’s economic impact has been estimated between \$500 million to \$1 billion and claimed more than 50 lives. The purpose of this study is to diagnose the large-scale weather pattern setup that led to such a prolific and historic winter storm. Data, consisting of upper air reanalysis, surface observations, and satellite imagery will be subjectively analyzed from Unisys and the National Weather Service. Results signify that upper and mid-level atmospheric features were tied to surface conditions that aided the development of the winter storm.

Cruz, Linda "A Narrative of Kentucky’s Top 10 Invasive Plants through Maps" (Amy Nemon)

The National Invasive Species Information Center defines an invasive species as, “a species that is 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” Kentucky’s five distinct terrestrial habitats and shared border with 7 states makes it especially vulnerable to the spread of invasives. The goal of this project is raise awareness about the threat of invasive plant species in Kentucky through the use of a story map - a web based application that combines maps, text, images and multimedia content – that provides a narrative of each plant’s current and future risks. ArcGIS for Desktop was used to generate a site suitability analysis map for the potential spread of each plant by county. The model uses a weighted overlay of several factors: species distribution by county, transportation layers (rail, water, roads), land cover classifications, soil pH and drainage classes, and mechanisms of reproduction and dispersal. The story map will be uploaded to the Environmental Systems Research Institute’s story map gallery, allowing the data to be easily accessible by Kentuckians and organizations interested in the control of invasive plants across the

commonwealth.

Culton, Samuel "Analysis of Seed Caching by Smith's Bush Squirrel in Balule Nature Reserve, South Africa" (Michael Stokes)

Smith's bush squirrel (*Paraxerus cepapi*) is a diurnal, tree-dwelling rodent occurring in NE South Africa and known to demonstrate caching behavior. This study examines the relationship between the squirrel and seeds of the marula tree (*Sclerocarya birrea*) on Balule Nature Reserve in South Africa. Stations baited with marula seeds were placed in squirrel habitat. A camera trap was used to confirm squirrels were removing the seeds. Marula seeds had a brass thumbtack inserted in them before being placed out as bait. After the seeds were removed from the station, a circle of 50 m radius was scanned with a metal detector.

Condition of located seeds was recorded (i.e., eaten, gnawed, cached above ground, cached below ground, or cached in a tree). One hundred and ten seeds were placed in the field; of these 30 were located after being removed from the station and 80 were not relocated for a return of 27.27%. No seeds were found cached. Twenty-eight of the recovered seeds were eaten and two were moved and then dropped. These findings demonstrate that bush squirrels feed on Marula seeds. It also suggests that the squirrels do not cache seeds below ground within a 50-meter radius of where they found the nut.

Dallas, John "The Effects of Parenting Relationships and Sports" (Helen Sterk)

Youth sport participation in our society is on the rise, with 90% of children taking part in some form of organized sport between the ages of 5 and 17. With more children becoming more active in sporting activities, the role of parents can impact parent/child communication and mold the character of the child. Parents with positive involvement in their child's activities emphasized skills such as hard work and team building rather than winning or losing. The way involved parents communicated with children also impacted the motivation a child had for participating in a sport. Children receiving positive messages about their activity, participation, and involvement had more motivation to play. A project was proposed to examine the parental communication with children in various sports over a year. The researcher would observe children and parents in sporting events and take note of attitudes and communication. This study would help uncover the role of parental involvement and communication in sporting activities.

Dalton, Gared "A Dagger through the Heartland: The Louisville & Nashville Railroad In the Civil War" (Glenn LaFantasie)

The Civil War was a defining moment in American history. What began as a sectional debate over states' rights transformed itself into a bloody odyssey that would alter the national character itself. Within the wide scope of this conflict, scholars have sought to answer the multifaceted question of how the Union triumphed, often citing the proficient management of the railways as a key contribution to victory. Within this logistical network of rails, the Louisville & Nashville Railroad served as a vital mode of transportation for supplies and troop mobility through the heartland states of Kentucky and Tennessee. The Union exploited this advantage, thus making the Louisville & Nashville Railroad a case study in the field of Military History of successful defensive strategy, offensive strategy, tactical efficiency and establishment of secure logistical lines. Doing so helped it secure the strategically important border state of Kentucky, which in turn became a launching pad into Tennessee and

ultimately, the Deep South itself. Thus the Louisville & Nashville Railroad significantly helped the Union win the Civil War.

Daugherty, Zechariah; Nickell, John; "The Effect of Financial Literacy on Preventative Healthcare Usage" (Kam Chan)

With health care expenditures rising across the board, and financial literacy at a concerning rate for nations across the globe, it is only natural that we ask ourselves the question, "Could the two be related?" This study examines the impact of financial literacy on preventive health care participation using data taken from a survey of students at Western Kentucky University. This project argues that preventive health care is an investment in an individual's physical human capital, and financial literacy has a positive, significant impact on preventive health care. An individual with high financial literacy will recognize the economic value of their health and, therefore, will participate more in preventive health care. The results of our study support our conjecture that individuals who are financially literate also utilize preventive health care. These findings will help to carry out significant policy implications in health care and financial literacy education.

Davis, Andrew "Applying a Density-Dependent Leslie Matrix Model with Steady-State Distribution Control to Logistic Populations" (Bruce Kessler)

The Leslie matrix model allows for the discrete modeling of population age-groups whose total population grows exponentially. In previous work, we have developed a new model for logistic populations that tracks age-group populations with repeated multiplication of a density-dependent matrix constructed from an original Leslie matrix, the chosen carrying capacity of the model, and a chosen steady-state age-group distribution. The total populations from the model converge to a discrete logistic model with the same initial population and carrying capacity. This discrete model is computationally efficient to apply, once we have solved for the parameters in the model that best fit our data. Solving for the appropriate parameters is difficult. This poster will describe our new model, and also describe an algorithm we have developed to solve for parameters that approximate a best least-squares fit for a given data set.

Denhard, Chelsea; Lickenbrock, Diane; "Associations between Parent Involvement, Infant Temperament, and Parent affect during Early Infancy" (Diane Lickenbrock)

The relationship between a parent and his/her infant can predict long-term child developmental outcomes (Ainsworth, 1989). Many factors of the parent are known to affect parental interactions with his/her child. For example, parent involvement is found to vary between mothers and fathers (Mehall, Spinrad, Eisenberg, & Gaertner, 2009), and might influence how parents interact with their infants (Montague & Walker, 2002). The infant's temperament can also affect how parents interact with their children (Rothbart & Bates, 2006). In some studies, infants who displayed more negative reactivity had parents who were less involved (Mehall et al., 2009). To our knowledge, the extent to which parent involvement and infant temperament influence parent affect displays during parent-infant interactions has also not been examined by previous research. In addition, research examining the role of the father in infant development is relatively lacking (Lamb, 2010). The current study will address these gaps in the literature by examining associations between parent involvement, infant temperament, and parent affect in mother-infant and father-infant

dyads when infants are 4 months of age. The data presented (n=57) is part of a larger, ongoing longitudinal study on infant social and emotional development.

Devulapallivenkata, Lakshmi Narasimha "Application of Huffman Data Compression Algorithm in Hashing Computation" (Mustafa Atici)

Cryptography is the art of protecting information by encrypting the original message into unreadable format. A cryptographic hash function is a hash function which takes an arbitrary length of text message as input and converts that text into a fixed length of encrypted characters which is infeasible to invert. The values returned by hash function are called as Message digest or simply hash values. Because of its versatility, hash functions are used in many applications such as message authentication, digital signatures, and password hashing. The purpose of this study is to apply Huffman data compression algorithm to the hash function in cryptography. In the computer science theory, Huffman data compression algorithm is an optimal compression or prefix algorithm where the frequencies of the letters are used to compress the data. An integrated approach is applied to achieve the compression function by integrating Huffman data compression algorithm in the hash function which is a core functionality of hashing computation.

Dillingham, Megan; Rowland, Naomi; King, Rodney; Rinehart, Claire; Staples, Amanda; "Phages of the Moon: The Changing Morphology of Lunahalos Plaques" (Naomi Rowland) Bacteriophages (phages) are prospective antimicrobials for a range of bacterial hosts. This is achieved by lysis of bacterial cells by phage. Understanding this lytic activity enables improved use of phages as antimicrobials against a wide range of bacterial pathogens including Mycobacterium. Lunahalos, a Mycobacteriophage, was found to produce a variety of turbid plaque morphologies, suggesting a range of lytic activity. In addition, it produced clear plaques, which was thought to be the result of genetic mutation. Through dilution series purification and genetic analysis, this study investigates the cause of varying plaque morphology and lytic activity. Results indicate an alteration of lytic activity rather than genetic mutation for most varieties of Lunahalos plaques. These findings may be useful in understanding the effectiveness of bacteriophages as antimicrobials.

Do, Manh "Green Cloud – Load Balancing, Load Consolidation and VM Migration" (Michael Galloway)

Recently, cloud computing is a new trend emerging in computer technology with a huge demand from the client. The growing of requirements of cloud services leads to increase electricity consumption. Based on the pay-as-you-go model, a new challenge for cloud providers is providing a service that satisfies either the Service-Level Agreement (SLA) or efficient energy consumption to reach the green cloud. This research aims to introduce cloud architecture to reduce energy consumption (green cloud) based on load balancing and load consolidation algorithms. VM migration is a method to transform load balancing to load consolidation or vice versa.

Docekal, Gregory "The Large-Scale Atmospheric Conditions that Contributed to the Historic Atlanta Flood of 2009" (Josh Durkee)

From September 15th to September 23rd 2009, the metro Atlanta area was hit with prodigious rainfall amounts that produced a 500-year flood event. The flooding of the

Chattahoochee River and its tributaries produced approximately \$500 million in damage and ten deaths in the Atlanta area. The purpose of this study is to better-understand the large-scale atmospheric conditions that led to multiple days of heavy rain in the southeastern United States. The data used to complete this study includes surface observations, upper air weather model reanalysis data, radar, and satellite images. The data collected were subjectively analyzed and layered in order to find the predominant atmospheric conditions that led to this event. In conclusion, this study shows that a cut-off upper-atmospheric low pressure system stalled over the 'Arklatex' region, which pooled moisture from the Gulf of Mexico into the southeast. This helped facilitate deep atmospheric columns of water vapor up to two deviations above normal for September in the region, which provided the sufficient ingredients for this extreme flooding event.

Driskill, Sarah; Tinius, Rachel; Hoover, Don; "A Pregnancy-specific Equation for Predicting Cardiorespiratory Fitness" (Rachel Tinius)

PURPOSE: The ability to measure VO₂max is important for determining health status and prescribing exercise. However, directly measuring VO₂max is not always feasible for pregnant women. The purpose of this study was to create pregnancy-specific equations to predict cardiorespiratory fitness. **METHODS:** 19 pregnant women (Age: 29.8±3.1 years, Pre-pregnancy BMI: 23.8± 3.9 kg/m², Gestation Age: 22.0±1.4 weeks) participated in the study. Participants completed the Bruce protocol maximal treadmill test. Exercise data (obtained from the maximal test using heart rate from submaximal stages) was used to create regression equations to predict VO₂max. Other predictive variables such as body mass index, age, gestation age, and physical activity level were included in regression models. **RESULTS:** VO₂max was significantly related to maximum heart rate (maxHR), $F(1,11) = 22.38$, $p < .001$, and demonstrated $R^2 = .670$ and adjusted $R^2 = .640$. The regression equation for this linear model is: $VO_2max = -179.74 + (1.25 \times maxHR)$ The other baseline and exercise variables did not predict significantly in this sample. Based upon these results, maxHR appears to be the best predictor of VO₂max in pregnant women. **CONCLUSIONS:** The current study created an equation that can be used to predict cardiorespiratory fitness in pregnant women.

Dunbar, Tayshaun "Untitled" (Jerod Hollyfield)

Hollywood and the media in general are nearly inescapable especially in our modern age. The media is constantly showing its viewers with consumerism that it can be at times overwhelming. One thing that media believes it knows is what the consumer wants to see, what they will buy into. This is true for Hollywood as well but less inherent. As Hollywood has become so popularized within our culture it also has become pervasive in how consumers interpret different ideas. If we take our eyes off the screen look at the business of Hollywood we can see what ideologies are pushed to maintain a relationship of agreeableness with its consumers.

Edens, Nicholas "The Independent Internet: Streaming Media's Rising Golden Age." (Jerod Hollyfield)

Just as cable television re-invented the way we consume entertainment media, so too do live-streamed broadcasts on the internet. Television is still king of broadcast media, putting up impressive viewership numbers on a regular basis. However, livestreamed broadcasting is an

emerging alternative to traditional broadcast television and already spans a multitude of content genres from news to sports to gaming. Livestreaming is cheaper and easier to start and maintain than broadcast television. In his paper, Anirban Mahanti mentions that television is slowly taking note of this new market, adding “catch-up” video on demand services which in some countries, such as Australia, rival traditional television viewership. In this paper I argue that not only can streaming add reach to already televised content, it can enable independent content creators to join the media conversation on a professional level with a drastically reduced budget by taking revenue from advertising, sponsorships, direct donation, and subscription services; some of which are unavailable or underutilized in traditional broadcast television. This allows for independent parties to enter the broadcast world on a professional basis, something typically reserved for large companies. Further, I expand upon the changing viewing behavior of audiences with the advent of mobile streaming platforms.

Ellis, Shea "Hyper Masculinity in Film" (Jerod Hollyfield)

Saving the damsel in distress, charging bravely into battle, the need to fix everything yourself; all things that the film industry has reinforced many times in regards to men. Society as a whole have put these expectations on men and films, particularly in action and science fiction genres, reinforce these stereotypes on men constantly. Throughout this paper, I will show how these films continue to prolong the need for males to show hyper masculinity. The article Men in Movies written by Jeremy Van Wert talks about different elements that go into the male in movies, the strongest point he touches on is isolation; “according to the entertainment we watch, men don’t need friendships that much. How wrong they are”. I completely agree with Wert in his article. I believe films have a negative impact on masculinity and we’ll explore that further in this paper.

Ernst, Jasmine; Gregory, Jordan; Lemerise, Elizabeth; "The Effects of Classroom Context on Head Start Teacher Feedback" (Elizabeth Lemerise)

The Classroom Assessment Scoring System (CLASS) assesses quality of teacher social and instructional interactions with children, and classroom management and productivity. Prior research indicated low quality of feedback scores in programs serving low-income children. We assessed quality of feedback in Head Start teachers (N=8) during book-reading and center-time (unstructured play). Statement type (“do” and “don’t” commands, negative comments, general praise [good job], or labeled praise [Good job sharing your toys]) and purpose (managing behavior [not directly related to academics] or teaching behavior [guide child in academic learning]) were coded. Inter-rater reliability was high (kappas = .81 - .97). Multivariate analyses yielded significance of context and statement type rate per minute (rpm). The rpm of feedback statements was significantly greater during center-time than book-reading, and there were more “do” commands, “don’t” commands, general praise, and labeled praise in center-time than book-reading. Multivariate analyses also revealed a significant interaction of context and command/purpose. There was higher usage of “do commands” and “don’t commands” for behavior management in center-time and higher usage of teaching “do commands” in center-time than book-reading. Differences in quantity and quality of classroom management statements across contexts indicate that CLASS measures need to sample across a variety of contexts.

Evans, B.; Henson, A.; Carrizosa, S.B.; Gupta, Sanju; "De-agglomeration of Detonation Nanodiamond via Salt-Assisted Ultrasonication and Surface Charge Determination using Advanced Electrochemistry" (Sanju Gupta)

Nanoparticles in dry powder state tend to form agglomerates thus reducing surface energy and limiting their technological advancements. Traditional methods such as ultrasonication, ball milling and so on pose significant challenge. In this work, we investigated a facile, cost-effective and contaminant-free technique namely, salt-assisted ultrasonic de-agglomeration of nanodiamond. This technique is expected to prepare single-digit nanodiamond nanoparticles stable colloidal dispersion in a wide pH range from thermally treated nanodiamond and compared with those not treated as control. Utilizing ultrasound energy to break apart nanodiamond aggregates in sodium chloride and sodium acetate salts results in aqueous slurry of single-digit nanodiamond colloids produced by this technique. Since it does not have any toxic or difficult to remove impurities, they are therefore well-suited nanodiamond for numerous applications such as theranostics, composites, lubrication etc. besides scalability. We have structurally characterized these de-aggregated nanodiamond particles using electron microscopy combined with elemental composition, Raman spectroscopy for carbon bonding configurations and scanning electrochemical microscopy for surface charge determination.

Evie, Hosannah; Duke, Brooke; Williams, Kevin; Williams, Blairanne; "Cytotoxicity and Uptake of Platinum Compounds in Cancer Cell Lines" (Blairanne Williams)

Platinum-based FDA approved drugs are used to treat approximately fifty percent of cancers and include cisplatin, carboplatin, and oxaliplatin. Besides the platinum atom, each compound has two main structural components; the leaving and non-leaving ligands. The leaving ligand is lost as a biological target binds directly to the platinum replacing the ligand. The non-leaving ligand remains attached to the platinum and is not lost in the presence of the biological target. The three drugs mentioned above have unique toxicological profiles and structural differences. In our current studies, we are examining the effects of these structural components by analysis of cellular uptake and toxicity. We are initially focusing on compounds closely related in structure to oxaliplatin that have an oxalate leaving group: Pt(S,S-dach)(ox), and Pt(Me₂dach)(ox). Two cell lines, Ntera 2, a testicular cancer line and HEK 293, a noncancerous line were exposed separately to these two compounds and an MTT assay was used to examine the cellular toxicity. Our data indicates IC-50 values for the Pt(S,S-dach)(ox) compound which are similar to the published values of its enantiomer oxaliplatin. While Pt(Me₂dach)(ox) has limited toxicity, Pt(en)Cl₂ which has structural similarities to cisplatin has similar IC-50 values to the published data for cisplatin.

Ezekekwa, Emmanuel; Mkanta, William; Chumbler, Neale; "An Examination of the Likelihood of Home Discharge After General Hospitalizations among Medicaid Recipients" (William Mkanta)

Ability to predict discharge destination would be a useful way for optimizing post-hospital care. We conducted a cross-sectional, multiple-state study of inpatient services to assess the likelihood of home discharges in 2009 among Medicaid enrollees who were discharged following general hospitalizations. Analyses were conducted using hospitalization data from the states of California, Georgia, Michigan and Mississippi. A total of 33,160 patients were included in the study among which 13,948 (42%) were discharged to their own homes and

19,212 (58%) were discharged to continue with institutional-based treatment. A multiple logistic regression model showed that gender, age, race and having ambulatory care sensitive conditions upon admission were significant predictors of home-based discharges. Patients in California were at the highest odds of home discharges in the sample (Odds Ratio=3.79; 95% Confidence Interval = 3.377 to 4.258). As the nation engages in the continued effort to improve the effectiveness of the healthcare system, cost savings are possible if providers and systems of care are able to identify admission factors with greater prospects for in-home services after discharge.

Farmer, Angella "Sexual Identity and the Patient-Nurse Relationship" (Kim Vickous)

The topic of identity is an intricate one, which plays a complex role in an individual's life. A small part of assimilated identity, or sense of self, one can identify with an endless array of groups, individuals, places, things, and concepts. Sexual identity and sexual orientation affect psychological, social, mental, and physical health. Current research shows that health care providers attitudes and behaviors can have a profound impact on the psychosocial health of the LGBTQ population. This research focuses on gaining an understanding of the challenges faced by members of LGBTQ population, and how nurses as leaders in healthcare can better serve this population.

Fernando, Jeraan; Naidugari, Janki; ; King, Rodney; Rinehart, Claire; Staples, Amanda; "The Isolation and Characterization of Phages Ruvinda and Haiitspooja" (Naomi Rowland)

Bacteriophages are the most abundant biological entities on the planet. Exploring the diversity of bacteriophages by isolating and characterizing new bacteriophages from the environment is the mission behind the Genome Discovery and Exploration Program. Ruvinda and Haiitspooja are bacteriophages specific to *Mycobacterium smegmatis* that were isolated from soil samples in Bowling Green, Kentucky. Both phages were purified and morphology determined using an electron microscope. Under the electron microscope (EM), Haiitspooja's phages had "sticky heads", where the protein capsids would stick together in large clumps. Ruvinda's, however, was very scattered on the EM and finding images of multiple in close proximity was rather difficult. Ruvinda's plaque size was 2-3 mm. while Haiitspooja's plaque sizes were strictly 1 mm in size. Both of these phages were lytic phages, as they lysed the bacterial host cells. DNA isolation and restriction digests suggested that Ruvinda is a part of the K cluster while Haiitspooja's unable to be classified into a certain cluster. Both of the phages' genomes are currently being sequenced, which will reveal exactly which cluster they belong to and other characteristics about their genetic variability.

Fickey, Hannah; Maples, Jill; Blankenship, Maire; Cooley, Bailey; Olenick, Alyssa; Hoover, Donald; Cade, W. Todd; "The YMCA Submaximal Cycle Test and 6-Minute Walk Test are not Accurate Predictors of Cardiorespiratory Fitness during Mid-Pregnancy" (Rachel Tinus)

PURPOSE: The ability to accurately predict V02max using submaximal protocols is important, particularly in special populations such as pregnant women. The 6-minute walk test (6MWT) and the YMCA submaximal cycle test (YMCAT) are currently validated tests to predict V02max in non-gravid populations; however, neither test has been validated during pregnancy. The purpose of this study is to determine the validity of the 6MWT and the YMCAT as predictors of cardiorespiratory fitness in healthy weight women during mid-

pregnancy. **METHODS:** At Visit 1, participants completed the 6MWT and the YMCAT in randomized order. At Visit 2, participants completed a graded exercise treadmill test (V02maxJ using the Bruce Protocol. The predicted V02max from each submaximal test and the measured V02max were compared using Pearson Product Moment Correlation Coefficients. **RESULTS:** 16 women participated in the study (pre-pregnancy BMI= 23.8±4.3 kg/m², Age=30.1±3.2 yr, Gestation age=22.0±1.3 wk). Mean predicted V02max values were 36.3±3.9 and 41.1±19.0 ml/kg/min for the 6MWT and the YMCAT, respectively. Mean V02max obtained from the graded exercise test was 34.9±10.0 ml/kg/min. Actual and predicted V02max values were not correlated for either submaximal test (6MWT: r=0.28, p=0.31; YMCAT: r=0.08, p=0.79). **CONCLUSION:** The 6MWT and YMCAT do not accurately predict V02max values during mid-pregnancy.

Filiatreau, Lauren "The Art of Celebration: An Analysis of Storytelling within Film and Theatre" (Jerod Hollyfield)

When thinking about art, two mediums that are often viewed are film and theatre because of the similarities regarding how stories are told. Johannes Birringer enlightens in the essay *The Theatre and Its Screen Doubles*, "The paradoxical boundary relations between cinema and stage continue to be intimately dynamic throughout the later twentieth century..." There is importance with the divisions because of the connections that are made between characters and real people. By understanding the two as their own mediums, we can in turn know how to enhance storytelling by recognizing what aspects are expressed in each. In my conference paper, I will compare and contrast film and theatre through their story elements. I will examine the differences between how a piece of art can be theatrical or cinematic. My argument will include how theatre is more subjective than film and how perspectives change for audience members and characters when a story is translated from stage to screen. There will also be investigation of the intimacy that is created. Through analyzing suspension of disbelief within Tony Kushner's play and miniseries *Angels in America*, one will conclude the importance of celebrating film and theatre as two separate art forms.

Flinchum, Dane; Dong, Qian; Srivastava, Ajay; "Characterizing the Role of Cp1 in *Drosophila melanogaster* and its Effects on Basement Membrane Degradation and Signaling" (Ajay Srivastava)

Dane Flinchum, Western Kentucky University Qian Dong, University of Melbourne, Australia Dr. Ajay Srivastava, Western Kentucky University CP1 is a well-conserved cathepsin L-like protease essential for proper growth and development in *Drosophila melanogaster*. Previous research has demonstrated that CP1 has the ability to break down the extracellular matrix. Using the UAS-GAL4 system, immunohistochemistry, and antibody-staining, this research attempts to characterize the role of CP1 and its effects on basement membrane degradation and signaling. These effects include actions at the cellular level and on a known signaling pathway. The genes involved in this pathway are known to be required for proper development of the wing disc into the adult wing. These genes also have human homologues that play important roles in human development. Results from our knockdown experiments will be presented. Understanding how CP1 affects *Drosophila* development through cellular and gene activity is important because cathepsins are highly conserved between flies, humans, and have been implicated in several diseases, including cancer. Discovering the mechanisms by which CP1 functions allows for discoveries to be made in

connection with disease processes.

Forke, Cara "A Prolegomena to Understanding Folk Art Environments" (Ann Ferrell)

There are several theories about whether or not our idea of place comes first from space, or if we understand space because of our knowledge of place. A prominent theory in how we obtain knowledge about our environment is from philosopher Edward Casey. He argues that humans are place-bound creatures who think from our places out; we apply knowledge about our places onto other spaces. In this paper, I will explore the kinds of questions that arise when applying Casey's theory about our perception of space to a folk art environment. A folk art environment is a place that is personalized through use of sculpture, architecture, the surrounding landscape, and more. Individuals create these unique places that seem dissonant from the surrounding space. I believe taking a deeper look at how we understand our own sense of place will lead to interesting insights for how we examine folk art environments.

Freeman, Callie; Guernsey, Emily; Rowland, Naomi; King, Rodney; Rinehart, Claire; Staples, Amanda; "Comparison of Pemberley and Jeggs: An Exploration of Bacteriophage Diversity" (Naomi Rowland)

The global bacteriophage population is comprised of approximately 10³¹ bacteriophage particles, making them the most abundant biological component in the biosphere. As there are fewer than 3,000 genomically characterized phages, relatively little is known about this population. To contribute to the overall understanding of the phage population, bacteriophages Pemberley and JEGGS were isolated from soil samples taken from the Western Kentucky University Campus and purified for genomic study. Pemberley was isolated using *Mycobacterium smegmatis*, and JEGGS was isolated from a different bacterial host, *Arthrobacter*. Though these two phages were purified from similar soil samples, the bacterial hosts are from different genera. Hence, subsequent study revealed significant variation, suggesting diverse phage populations exist within small geographic areas. Homogenous populations of each phage were achieved through a series of dilutions. Pemberley and JEGGS' morphologies were observed using Electron Microscopy and compared. Both phages' tails were characterized as Siphoviridae. Pemberley's capsid was hexagonal, while JEGGS' capsid was elongated. DNA was isolated to conduct restriction digests and gel electrophoresis. Gel electrophoresis results were compared between Pemberley and JEGGS. Analysis of these gels did not yield major insights into their genomic similarities; complete genome sequencing and further analysis is required for more extensive comparison.

French, Caitlyn; Trimboli, Shannon; "A Preliminary Investigation into the Source of Micro-Climatic Changes Observed in the Lower Passages of Mammoth Cave" (Shannon Trimboli)

Mammoth Cave is the longest cave in the world, boasting over 400 mapped miles with exploration and mapping still continuing. Humans have been using Mammoth Cave for approximately 5,000 years and the cave contains many artifacts from prehistoric Native Americans, saltpeter miners during the War of 1812, and many others who have used the cave for various purposes. However, some of these artifacts are facing deterioration due to fungal growth likely caused by changes in the microclimate of Mammoth Cave. In the upper passages of Mammoth Cave, the microclimatic changes are due to seasonal changes in the air flow patterns through the cave entrances. Researchers are currently working to quantify and

better understand these patterns in the upper passages. However, little research has been conducted on the microclimatic changes that occur in the lower passages of Mammoth Cave. Anecdotal observations suggest the underground rivers may play a role in the microclimatic changes observed in the lower passages. This study compares two independently gathered data sets – one on air temperature and one on underground river temperatures – to determine whether a relationship may exist between the underground river and the microclimatic changes observed in the lower passages of Mammoth Cave.

Froedge, Tom "Mixed Valence Layered Vanadate Electrode for Rechargeable Batteries"
(Bangbo Yan)

In recent years, the design and development of new materials for higher energy density storage has been driven by fast-growing industries ranging from clean energy to computing. Layered vanadate materials have shown great potential as rechargeable Li-ion batteries because of their notable capacity. In this presentation, we will report our studies on the synthesis, structure, and electrochemical properties of an organic-inorganic layered vanadate material.

Gade, Keertana Reddy "Profile and Lessons Learned from Health Services in Zanzibar"
(William Mkanta)

The main purpose of this study is to present a profile of healthcare services in Zanzibar, Tanzania and make comparisons with the U.S. health system based on the eyes of a student in a 2-week study abroad program. The Zanzibar model of health care offers an economical alternative that creates healthy life effects and that the U.S. can adopt to help our nation in overcoming the burdens of cost and lack of access. Observations were made on areas such as the insurance system, chronic diseases, access to care, quality, mode of delivery, workforce crisis, and global influence on healthcare. There were several healthcare issues that differ in a manner likely to provide lessons for U.S. providers and policy-makers. We used a SWOT analysis to report the results. For example, the impact of chronic diseases revealed that: (1) physical activity is promoted at the national level; and (2) although there is a critical workforce crisis, community-based approaches tend to ease the problem. In this study, a detailed description is made of several aspects of health that we observed in Tanzania and also the reasons why the population is relatively healthy despite disadvantages including workforce crisis and low government funding.

Gao, Hongyan "Hierarchical Core-Shell Nanosheet Arrays with MnO₂ Grown on Mesoporous CoFe₂O₄ Support for High-Performance Asymmetric Supercapacitors" (Yan Cao)

We demonstrated the fabrication of unique core-shell CoFe₂O₄@MnO₂ nanosheets arrays (NSAs) on nickel foam via a facile method. The CoFe₂O₄ nanosheets (NSs) grown on nickel foam acted as a porous skeleton with large surface areas for the growth of MnO₂ NSs, achieving the enhancement of both the electrical and the ionic conductivities. Ultrathin MnO₂ NSs were found vertically grown on the CoFe₂O₄ NSs in a core-shell nanoarchitecture. Its thickness can be controlled by retention times during the hydrothermal process. The obtained CoFe₂O₄@MnO₂ NSAs electrode achieved a highly enhanced areal capacitance of 3.59 F cm⁻² at a current density of 2 mA cm⁻². An aqueous asymmetric supercapacitor (ASC) device was assembled using CoFe₂O₄@MnO₂ NSAs as its positive

electrode and the activated carbon (AC) as its negative electrode. The as-assembled ASC device can be operated in a voltage region of 1.6V and exhibited a specific capacitance of 103.86 F g⁻¹ at 5 mA cm⁻². Its energy density and power density were as high as 37 W h kg⁻¹ and 4800 W kg⁻¹ at 15.3 W h kg⁻¹, respectively. These remarkable electrochemical properties suggested that such CoFe₂O₄@MnO₂ NSAs nanoarchitecture could be one of the next generation energy storage devices.

Gearner, Olivia "Documentation and Conservation of Species of the Bizarre South African Endemic Genus *Meziomorphum* (Coleoptera: Ptinidae)" (Keith Philips)

South Africa is home to some of the highest spider beetle diversity in the world. However, due to their small body size and often small populations with limited distributions, many species remain undiscovered. Further, this megadiverse region includes three biodiversity hotspots - regions with both high diversity and under severe threat of environmental destruction. Species of *Meziomorphum* are found only in South Africa within two hotspots. Four species of this genus are known, including one endemic to a single cave in the Western Cape. Five new species were discovered from museum collections and recent field work. This genus is one of the most morphologically unique and distinct within the spider beetles. Species are characterized by a bizarre meringue-like and thick covering composed of fused and spongiform setae on the pronotum and rows of long, erect spines on the elytra and legs; the latter are potentially an adaptation for avoiding ant predation. Importantly, these beetles are useful for determining where protected areas should be created, as their distributions likely reflect habitats containing a wide variety of additional species with similar high levels of endemism that are also under great risk of extinction from habitat loss.

Gilliam, Ashley "How Muslims are Viewed by Majority Populations in the UK: A Qualitative Framework" (Ashley Stinnett)

Much of the Western world is wrestling with difficult topics such as multiculturalism, immigration, assimilation, religious freedom, and terrorism. These topics are intricately interwoven with how majority populations view the minority groups associated with them. While several studies provide a view of how Muslims in the West define their own identities, there is little on how Muslims are perceived as a group by majority non-Muslim populations. The purpose of this comparative research project is to gain an understanding of white-identifying populations' perceptions of Muslims in the United Kingdom (UK) and the United States (US) using qualitative and quantitative ethnographic methodologies. Methods utilized in both countries included free listing, card sorting, and semi-structured interviews. The UK is relevant to this larger discussion in that it recently finalized its 'Brexit' decision to leave the European Union. Brexit and the provocative campaign of the United Kingdom Independence Party (UKIP) were broader political movements reflective of individual reactions to immigration, and Muslim groups specifically, I encountered in the UK. This poster will present my initial findings with a focus on qualitative data gathered in the UK, as it provides one type of analysis framework for how Muslims are perceived.

Glasscock, Justin "Bowling Green Children's Museum" (Neal Downing)

The overall goal of the museum is to make learning fun for children by providing a safe and welcoming hands on learning environment outside of the classroom. To accomplish this, I will be using 3D software to design a renovation of the existing 38,000 square foot Scotts

Tobacco Warehouse on Adams street here in Bowling Green, Kentucky. The main focus of the children's museum will be earth and space innovations such as trains, cars, planes, and space. Exhibits in the museum are to be permanent and temporary with several of the exhibits being very interactive. Interior is only one transformation that will occur with this building, a new envelope will push out of its current cube form and replace its own footprint in the earth. In the end the hopeful result will be that this once historic but smudge of a building will become a beautiful attention grabbing addition to down town Bowling Green.

Gordon, Garrett; Beane, Forrest; Wright, Skyler; Bullock, Chris; "ME400 MTD Dyno Group" (Chris Byrne)

This project is in support of MTD, a company specializing in homeowner grade products such as lawn mowers. The project goal is to create a dynamometer to test transmissions installed in self-propelled lawn mowers in order to verify product lifetime. The testing efforts will determine how long a transmission will last, the data collected will be used to determine how long the transmission can be guaranteed for, possibly leading to the product being able to maintain market competitiveness. The test results could also prevent the shipping of sub-standard products thereby limiting warranty claims. The teams' design involves the use of a three horse power electric motor to simulate the engine on the push mower and a hysteresis brake in order to simulate real life loading of the transmission axles. The use of both of these fully electronically controllable components will allow for a completely PLC controlled testing device. This will allow the user to walk away and let the device run by itself without any supervision or user input once the start button is pressed. When the test ends or the transmission fails the device will automatically shut down and signal that it is ready for the user to return.

Graham, James; Bjarnadóttir, Brynhildur; Kristjánsdóttir, Sigrun; Gunnlaugson, Olafur; Oddsdóttir, Embla; "Assessing the Functionality of a Campus Carbon Calculator in International Settings" (Leslie North)

In the coming decades, as atmospheric carbon dioxide levels continue to increase from already unprecedented levels, a greater understanding of anthropogenic contributions to global climate change needs to be developed. By calculating a carbon footprint, organizations can determine what their contribution is and from where the majority of their carbon contributions are coming. This study used the University of New Hampshire's Campus Carbon Calculator to calculate the carbon footprint for the University of Akureyri in Akureyri, Iceland, a university with the declared goal of becoming carbon neutral. In addition to calculating the University of Akureyri's carbon footprint, this study aimed to test the international applicability of the Campus Carbon Calculator. Since the calculator was developed in the United States the international applicability of the calculator has not been evaluated. By applying this method abroad, the intention of this research was to recognize possible oversights in the calculator, so that they may be remedied and the calculator validated as an universally-applicable tool for enhancing our understanding of anthropogenic carbon emissions.

Grant, Byron; Seyitliyev, Dovletgeldi; Kholikov, Khomidkhodza; Thomas, Zachary; Er, Ali; "Recoverable Stress Induced Two-Way Shape Memory Effect on Niti Surface Using Laser-Produced Shock Wave" (Ali Er)

Byron Grant, Dovletgeldi Seyitliyev, Khomidkhodza Kholikov, Zachary Thomas, Ali Oguz Er Western Kentucky Univ. Shape memory alloys (SMAs) are a unique class of smart materials with the ability to modify their shapes with temperature and stress. 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, and high bending resistance have already resulted in their implementation in biomedical devices. In this experiment, the surfaces of NiTi (50-50 %) SMAs were patterned by laser shock-assisted direct imprinting. This approach is more efficient than traditional indentation techniques, and has also shown to be an effective method in patterning these materials. 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).” Experimental data is in good agreement with theoretical simulation of laser induced shock wave propagation inside NiTi SMAs. Stress wave closely followed the rise time of the laser pulse to its peak values and initial decay. Further investigations are underway to improve the TWSME such that the indents are recovered to a greater extent.

Granzow, Blair; Gomez, Jessica; Burton, Breanna; Ater, Taylor; "Hate Crimes against Sexual Orientation: Characteristics of Those Who Report" (Whitney Harper)

Hate crimes against gay men and lesbian women is a problem and often goes unreported. Such aggressions violate their civil rights and the effects transcend physically and/or emotionally (Chandler et al., 2013). After the Hate Crime Statistics Act of 1990, agencies started to collect data and looking at how many hate crimes are actually being committed (Ellingson, 2010). According to the FBI (2001), sexual orientation based hate crimes are in the three most reported hate crimes (Ellingson, 2010). This study was conducted to identify what hate crimes are most often committed and which are most reported against gay men and lesbian women. Social workers are to advocate and empower those who are vulnerable. It is important for social workers to be informed of situations and experiences the LGBTQ population may have. This study's aim is on aspects of situations often lead to reporting. A survey was developed to determine which hate crimes are most often reported and why. The support victims felt, confidence levels, and their ability to cope with post-crime effects are considered. Demographic data (gender, age, and length of time since coming out) was used to determine if there would be differences in their experiences.

Green, Skyler; Spillman, Kirstin; Krueger, Merry; Krueger, Hannah; Coleman, Hollie; "Eating Disorders and Athletics" (Rick Grieve)

Objective: Our first objective is to examine whether there is a difference between collegiate division I athletes, intramural athletes, and non-exercisers in the development of eating disorder symptomology. Our second objective is to examine which group has the highest level of competitiveness by nature and whether there is a correlation between eating disorder symptomology and competitiveness. Method: Female undergraduate (156) and graduate (2) students completed the Body Assessment Scale, the Eating Disorder Inventory Scale, the Eating Attitudes Test, the Competitiveness Questionnaire, and two demographics to measure activity level, competitiveness level, and eating disorder symptomology. Results: Results show that collegiate athletes show the most eating disorder symptomology, followed by non-

exercisers, and intramural athletes showing the least symptomology. Results show that collegiate athletes were significantly more satisfied with their bodies than intramural athletes and non-exercisers. Lastly, we discovered that across all three groups, the higher the competitiveness level, lower the levels of eating disorder symptomology. Conclusion: Collegiate athletes are at higher risk for eating disorder symptomology so coaches should be made aware of the risks associated with collegiate athletics.

Green, Steven "Perception towards Beef Industry and Willingness to Pay for Beef Products among Millennials in Kentucky" (Dominique Gumirakiza)

Abstract: As the future of the beef industry continues to develop, it is safe to say millennials are going to have a massive impact. This paper explained the perception millennials have towards beef products and the beef industry as a whole, beef consumption patterns, and compared willingness to pay between rural and urban millennials. We applied a conditional logistic model to online survey data collected from 219 millennials during Spring 2016. Data collection was done by distributing a web link to millennials in various colleges and universities throughout the state of Kentucky. Results indicate that millennials have positive perception towards beef industry and express significant willingness to continue consuming beef products in future. We further found that compared to rural millennials, those in urban areas are willingness to pay more for beef products. The results are important for beef ranchers/processors and marketers. Processors can use these results to better understand millennial perception towards beef production and can make better strides toward animal husbandry and enhance their practices from pasture to plate. Marketers in both urban and rural areas can better market beef products using these results. These results provide ranchers and marketers with crucial information to continue shaping the perception in a positive direction.

Gregory, Jordan; Ernst, Jasmine; Lemerise, Elizabeth; "How Does Classroom Context Affect Head Start Teachers' Use of Cognitively Challenging Talk?" (Elizabeth Lemerise) Preschool classrooms that serve low income children score very low in the concept development and quality of feedback scales on the Classroom Assessment Scoring Measure (CLASS) (e.g., Early et al., 2005). As an effort to address this, teacher training was implemented at a combined Head Start childcare program in order to increase Cognitively Challenging Talk (CCT) during book-reading. After teacher training, we compared the cognitive complexity of teacher discourse in two preschool classroom contexts: a) book-reading, and b) center-time in order to see if training generalized beyond the book-reading context. Video-recorded sessions from teachers (N = 8) and their students were transcribed and coded for statement type: Cognitively Challenging Talk (CCT) and Lower Cognitive Demand (LCD) talk. Across both book-reading and center-time contexts, the most frequently occurring CCT statement type was open-ended/thought-provoking questions (rate per minute [rpm] = 1.324); the most frequent LCD statements were chiming (rpm = 1.2533) and closed-ended questions (rpm = 2.2520). ANOVAs revealed that there was significantly more CCT during book-reading than during center-time, significantly more LCD talk than CCT during center-time, but no significant difference between LCD and CCT during book-reading. Thus, teachers did not generalize the book-reading training to the center-time context.

Groh, Brittany "Emotion Detection Impacted by Expressive Intensity and Location in

Peripheral Vision" (Andrew Mienaltowski)

Emotion Detection Impacted by Expressive Intensity and Location in Peripheral Vision
Previous research has indicated that the age of an observer, the peripheral location of a face stimulus on a display, and the intensity of the emotion expressed by the face all play a role in emotion detection. The purpose of the current study is to understand how an adult's ability to detect anger or fear in facial stimuli presented in the periphery will be affected by the intensity of the emotional expressions and the distance that the expressions are presented away from the center of the display. The current study presents emotional and neutral facial stimuli for a short duration to bypass reactionary attentional influences. Regardless of the exact discrete emotion depicted, emotion is more easily detected for stimuli presented more central to the display and for stimuli with greater expressive intensity. When comparing the ability of individuals to detect specific emotions, fear is more easily detected than anger. These findings are consistent with past research demonstrating that fearful expressions may receive a perceptual boost because of their relevance to human survival. Keywords: intensity, eccentricity, aging, facial expressions

Groves, Lauren "Learning to Listen for Success: Communication Studies Majors" (Bruce Crawley)

Many Communication Studies majors and minors are confused about what they will do with their major beyond graduation. After speaking with ten freshmen enrolled as Communication Studies majors or minors, most chose the major because it was so "broad", but did not know how to apply the degree to a real career after graduation. To most effectively approach this problem, I will create a presentation that addresses how a young undergraduate student who does not yet know exactly what he or she wants to do with a Communication Studies major can tailor courses in such a way that will be most effective post-graduation. With the department's approval, this presentation will be given during COMM 200 courses and any other during the spring semester. I will enlist the input of a range of five to ten Communication Studies seniors and faculty to ensure that the information I give will be broad and grant a successful understanding of how to tailor a Communication Studies major to career planning. I will also talk to recent Communication Studies graduates and the Communication Studies Advisory Committee.

Gruber, Brittney "They: The Best Gender Neutral Pronoun" (Elizabeth Winkler)

The English language does not possess a third person epicene pronoun, and speakers must fill the gap, which they do most commonly with "they". Scholars understand the implications of a gender neutral pronoun for non-binary persons, but besides linguists, they do not thoroughly examine grammatical reasons for the resistance to new pronouns. This paper addresses the grammatical issues and options available to the language, including the strengths and weaknesses of "they." Even with minor faults, "they" is widely used in both spoken and written English and should be adopted by Standard English.

Gunter, Benjamin "'What Did We Want to Be?' Nostalgia in Richard Linklater's *Boyhood*" (Jerod Hollyfield)

In 2014, critically acclaimed screenwriter and director Richard Linklater became even more praised for his semi-naturalistic coming-of-age film, *Boyhood*. As no stranger to coming-of-age films, Linklater was set on using a twelve-year filming process to make a film about

growing up and the "boyhood" of the titular character, Mason Evans, Jr. In his Film Quarterly article, *About Time: Before Boyhood*, Rob Stone examines a significant body of Linklater's work and the common elements within them. Stone states that "Remembrance without nostalgia is a crucial sentiment in the cinema of Richard Linklater." due to the tendency of his films to look both forward and backward in time, but resolutely focusing on the "now". Stone further goes on to concentrate on the negative repercussions of approaching *Boyhood* with a nostalgic viewpoint, leading to misunderstanding of the film and its focus. While Stone's examination is wonderfully insightful and full of merit, I think it overlooks the potential importance of how nostalgia can aid in telling *Boyhood*'s unique story of growing up and "living in the now". In this paper, I argue Richard Linklater's *Boyhood* utilizes nostalgia as a storytelling element and as a way to make audiences reflect on their own upbringings.

Guthrie, Sarah "From Beast to Beauty: A Prosthetic Quick Change Study" (Shura Pollatsek)

Guthrie, Sarah "From Beast to Beauty: A Prosthetic Quick Change Study" (Shura Pollatsek) Prosthetic makeup design is used throughout film and stage work to alter an actor's image. When done correctly, an audience member is never be able to see the difference between skin and silicone. In this study of the transformation scene from the musical *Into the Woods* in WKU's fall 2015 production, a procedure was developed for how to effectively create a quick change prosthetic that could allow the witch to transform from ugly to beautiful in a timespan of about 10 seconds while in full view of the audience. During the study, I had the opportunity to learn from several prosthetic makeup professionals and product companies on how to properly use silicone to create a false face that would mold seamlessly to the actress's face. Through the production of *Into the Woods*, I was able to gain experience in applying makeup to a silicone prosthetic and learned how to tweak the makeup for stage visibility. This study documents my findings on the logistics of a quick change face and explains the artistic and technical design elements that went into the final look of the prosthetic.

Hamilton, Emily; Smith, Michael; Huskey, Steve; "Substrate-Borne Communication in Chameleons: Do Vibrations Induce Behavioral Changes?" (Michael Smith)

Understanding the modes of communication used by a species is essential to the understanding of their ecology, behavior, and evolution. Substrate-borne vibrations have been reported to be produced by the veiled chameleon (*Chamaeleo calyptratus*), possibly implemented by use of a gular pouch. I tested the sensitivity of veiled chameleons and graceful chameleons (*Chamaeleo senegalensis*) to vibrations by placing chameleons, one at a time, on a wooden dowel attached to a permanent magnetic shaker. I video-recorded each chameleon's behavior before, during, and after a three-pulse vibrational stimulus of 50, 150, or 300 Hz. Vibrations were measured via an accelerometer attached to the dowel. Both species exhibited a stop-behavioral response (i.e., lack of movement) when exposed to a stimulus of 150 Hertz, while displaying a reduced sensitivity to 50 and 300 Hz (i.e., less or no reduction in movement). Future experiments will test behavioral responses at lower (25 Hz) and higher (600 Hz) frequencies, and the vibrational behavioral responses when two conspecifics are placed on the same dowel. These findings improve the understanding of behavioral responses between chameleons, and can be utilized as a basis for further research into the morphology and physiology of chameleons.

Hamilton, Luke "Prolongation of the Thymus Gland by Plant Extract" (Chandrakanth Emani)

The purpose of this study is to determine if plant extracts can increase the longevity of the thymus gland. Also this study intends to explain the phenomenon for the thymus shrinkage. As humans pass adolescence the thymus gland begins to shrink. The thymus gland is vital for the production of t-helper cells in the immune system. While this gland shrinks the chances for cancer may increase. Previous research has been focused on the functionality of the thymus and how it relates to the immune system. This study seeks to find a means of prolonging or enhancing this organ's functionality utilizing plant extracts.

Harney, Brent; Johnson, Veronica; Rice, Nancy; "Colocalization of Phk γ -181 and Na-14 In Sh-sy5y Cells" (Nancy Rice)

Colocalization of PhK γ -181 and NA-14 in SH-SY5Y Cells Brent Harney, Veronica Johnson, and Nancy Ayers Rice. Department of Biology, Western Kentucky University, Bowling Green, KY Phosphorylase kinase (PhK) is a serine/threonine kinase that is the key enzyme in regulating the breakdown of glycogen to glucose. The catalytic subunit of PhK is γ , and is encoded by the PHKG1 gene. Previous in silico work in Dr. Rice's lab identified an alternative polyadenylation signal in an intron in the human PHKG1 gene that yields a truncated γ containing only the first 181 amino acids. RNA analysis showed this γ variant is found primarily in brain and heart, and when expressed recombinantly retains its ability to phosphorylate proteins. While no binding partners have been identified in vivo, NA-14 was identified as a potential partner through a yeast two-hybrid screen. In this work, we use the neural cell line SH-SY5Y to show colocalization of γ -181 and NA-14 in vivo by immunofluorescent microscopy. This project was funded by a WKU FUSE grant, WKU Honors Developmental grant, and a research grant from the Gatton Academy of Math and Science.

Heinze, Jeffrey "Oasis Tower" (Neal Downing)

My goal for this project is to design a multi-use, all-inclusive skyscraper that brings nature into the building and blends architecture with renewable energy. This structure will house offices, apartments, an indoor garden, and a rooftop restaurant. I want to create a building that harness the power of solar energy to show that it is the best renewable energy source, and provides a sustainable life style for its residence. My concept uses the efficiency of a high-rise building and combines it with the renewable energy source. My research indicates that high-rise buildings can act as a solar power plant for cities; results, humans can move away from fossil fuels and use buildings and solar energy to power our world.

Henderson, Andrew "Journalism and Human Rights: From the Abolition of British Slavery to the AIDS Crisis and Injustices In-Between" (Patricia Minter)

How do we come to understand the idea of human rights? Depending on what theoretical camp of human rights framework one identifies with, human rights can be something that has grown and developed over a long period, or something that has only taken off in the past fifty-odd years. Regardless of where one may find themselves on the spectrum of the "when did human rights begin" argument, scholars cannot overlook the countless individuals who have helped us to understand not only the idea of human rights, but also have played a role in

bringing them to the forefront of public consciousness. This paper will examine the role one specific group of people who had a part in the evolution of human rights ideologies and movements--journalists. This paper will examine the roles of three individual journalists over the course of time and how their work altered human rights movements. Focusing on Thomas Clarkson, Ida B. Wells, and Randy Shilts, I argue that the contributions of journalists have had profound effects on human rights within the framework of rights struggles.

Henshaw, Presley; Ashley, Katherine; "Resilience: The Road to Maximum Recovery Following Brain Injury" (Jean Neils-Strunjas)

The purpose of this literature review is to identify the types of literature available to families of traumatic brain injury survivors, as well as to collect demographical information about what types of people characteristically prove to be most resilient following a traumatic brain injury. In order to collect data for this literature review, we reviewed scholarly articles and peer-reviewed journals. The objective of this literature review is to aid families in their transition and enable traumatic brain injury survivors to attain the best possible recovery. Our expectation for this literature review is to tie together past research about resilience and make this information more readily available to patients and their families. We have found that resilience in traumatic brain injury survivors supports maximum recovery; our hope is to spread the influence that resilience has on survivors to society.

Hesse, Caitlin; Tinius, Rachel; Cooley, Bailey; Olenick, Alyssa; Blankenship, Maire; Hoover, Don; Maples, Jill; "Secondary Criteria for VO₂max Testing among Pregnant Women" (Jill Maples)

PURPOSE: Plateau in VO₂ (oxygen consumption) is arguably the primary indicator for determining if an individual has reached their true VO₂max. Although age and gender-specific secondary criteria have been developed for the healthy population, no secondary criteria have been established for pregnant women. The purpose of this study is to analyze secondary endpoint criteria during VO₂max testing among pregnant women during the 2nd trimester. **METHODS:** 20 pregnant women (age=29.6±3.4yrs; gestation age=22.0±1.4wks, pre-pregnancy BMI=25.5±4.0) participated. Each participant completed a Bruce protocol treadmill test where heart rate (HR), VO₂, respiratory exchange ratio (RER), and rating of perceived exertion (RPE) were assessed. Post-exercise lactate was also measured. **RESULTS:** The mean VO₂max was 34.0±9.8 ml/kg/min. Mean RPE at maximal exertion was 17.6±1.8. Previous studies among the non-gravid have recommended values for maximal RPE as ≥17. HRmax was 165.3±14.3 bpm (87.8±6.2% of age-predicted HRmax) compared to the recommended 95% of age-predicted HRmax achievement for non-gravid populations. Maximal RER was 1.1±0.1 and lactate was 6.8±2.4mM. Recommended values for maximal effort RER and lactate for non-gravid women similar in age are ≥1.1 and ≥7.0mM, respectively. **CONCLUSIONS:** Our data provide preliminary evidence that secondary criteria may need to be adjusted for pregnant women.

Hickman, Thomas "Woodford County Youth Center" (Neal Downing)

WOODFORD COUNTY YOUTH CENTER (WCYC) My research focused on the design and development of a public facility that will serve the community of Versailles, Kentucky. The driving goal of the project is to design and create a safe place for adolescents and parents to learn and grow – while having fun, outside of the classroom in an area that currently offers

little opportunity for members of the community to develop necessary skills and experiences. Recent developments that have swept this wholesome town with the addition of corporate businesses has shined a light on a problem that has existed for many years – there is a lack of opportunity for children of the community, as well as the surrounding areas, to enhance their minds, skills, and emotions outside of the classroom. The absence of youth-friendly establishments in this region begs for a fun and interactive escape where children of all ages can develop their sense of capability, usefulness, belonging, and inspiration and become responsible, caring citizens. A multi-method approach was used to determine necessary programmatic elements and appropriate components. Research included case studies of similar facilities, visits to available B&G clubs and YMCAs, and personal interviews with members of the community.

Hicks, Joshua; Wood, Michael; Roberts, John; Liu, Alen; "Overhead Stacker-Type Crane Mast Rotate Drive Loading & Backlash Analysis in Logan Aluminum" (Morteza Nurcheshmeh)

Logan Aluminum, Inc., a leading manufacturer of flat-rolled aluminum sheet primarily for use in the beverage can market, contacted Western Kentucky University with a project proposal to rectify some troubling issues observed in their newest crane design featured in Crane 300. This crane lifts coils of aluminum sheet which weigh around 50,000 lbs. The crane can move in the cardinal directions, rotate the mast, and hoist or lower the coil. Previous cranes in the facility utilized a direct drive method for providing motion, but presented several problems including the breaking of rim gear teeth. The new design offers a chain drive providing power to a driver pinion cartridge along with a torque limiter at one sprocket to protect the gears from a torque overload. The torque limiter is believed to be inadequate for the dynamic torques experienced during movement. A noticeable vibration is also observed in the operator's cab which is attached rigidly to the main mast. Our team is working on the static and dynamic analysis which includes examining the statics of the rotate mechanism, the dynamics of the coil and crane in motion, and when the crane is subjected to an impact at the coil.

Hicks, Stacy "Characterization & Threat Assessment of Potentially Hazardous Near-Earth Asteroids" (Michael Carini)

I will present the results of a study of eight potentially hazardous asteroids identified in conjunction with NASA's OSIRIS REX Mission and observed via the Target Asteroids project and Western Kentucky University's Robotically Controlled Telescope. This study includes a characterization of these asteroids' orbits and physical characteristics as well as a threat assessment. Using images obtained by the Target Asteroids project, light curves for each asteroid were constructed and subsequent analysis of the light curves is used to determine the rotation period of the asteroid and its size. Additional observations from WKU's Robotically Controlled Telescope (RCT) are being obtained to confirm and supplement Target Asteroid data to ensure complete rotation period coverage. An asteroid's rotation period is an important parameter in determining the the objects size and structure. Asteroid structures fall into two main categories: monolith or rubble pile. A monolithic asteroid is one solid body whereas a rubble pile is a multi-body gravitationally bound system moving a single cohesive mass through space. Knowledge of the size, composition, and structure of the asteroid are critical parameters used in assessing the severity of the threat an

asteroid poses.

Hilger, Ashley "Incarcerated: Liberty and Justice for None" (Andrew Rosa)

The word democracy is derived from the Greek word demos, which means “the people,” and kratia, which means “power.” Democracy in America is built upon the idea that the peoples’ voices should be heard when it comes to their government. However, large swaths of the American public, particularly African Americans, have not evenly realized democracy as it relates to the right to vote—the main instrument through which the peoples’ voices are heard in a democratic society. Since the collapse of Reconstruction in 1883, legal and extralegal measures have been used by state governments to abridge the constitutional guarantees of African Americans as promised by the 15th Amendment. From Reconstruction’s demise, through to the era of the Civil Rights movement and the election of our nation’s first African American president, African Americans have, and continue to struggle through grassroots movements and the courts, to reclaim the right to vote. That large numbers of African Americans in the 21st century remain without the right to vote has been made visible in conversations on race and the criminal justice system, begging the question first raised by Martin Luther King, Jr.’s 1963 letter from a Birmingham jail cell: why are we still waiting?

Hinton, Will; Vanmeter, Nicholas; "Discovering Wolbachia in Common Insects" (Naomi Rowland)

Wolbachia is an intracellular bacterium that affects the reproductive system of arthropods, causing mutations like feminization, cytoplasmic incompatibility and parthenogenesis. In some cases, the presence of Wolbachia has been shown to decrease disease prevalence such as Dengue Fever in mosquitos. It is also being studied to elucidate the affect Wolbachia has on Zika virus. It is not fully known which insect species carry Wolbachia, or where geographically it is found in different insect populations. Wolbachia can have positive and negative effects on different arthropod species which is why it is so important to find out which species the bacterium does affect. In a collaborative effort with the Bordenstein Lab at Vanderbilt University, insects were collected from the Bowling Green area and analyzed for Wolbachia presence. DNA was extracted from the insects and Polymerase Chain Reaction (PCR) was performed using primers specific for Wolbachia DNA sequences. The PCR products were run on a gel electrophoresis. This was performed as a class project. It was found that the cave cricket did carry Wolbachia while the earwig did not. This was interesting because when compared to other data from the class, there were only six types of insects that were positive for Wolbachia.

Hobbs, Justin "An Investigation of the Driving Atmospheric Factors behind the Anticyclonic Tornadoes in Central Colorado on June 4th, 2015" (Joshua Durkee)

On June 4th, 2015, a line of thunderstorms initiated in central Colorado, while a developing low-pressure system surged to the southwest of Denver. The storm-system spawned six tornadoes across Elbert County, which left behind devastated homes, trees, and road signs. The strongest tornado was rated an EF-3 on the Enhance Fujita scale with winds ranging from 135-140 miles per hour. Meanwhile, three tornadoes were documented to rotate clockwise; an atypical occurrence. The purpose of this study is to determine the large-scale driving factors that lead to this unusual event. The data used for this event includes surface and upper-air observations, alongside with computer model-generated reanalysis data.

Weather analysis maps were constructed and subjectively analyzed to discriminate. The large-scale profile of the atmosphere is analyzed first by correlating the upper-air observations at four different pressure levels to typical recordings for tornado development. The low-level wind speeds and directions are analyzed for anomalies leading to clockwise rotation. Combining these anomalies and the examination of left turning split-off cells determined if these atypical rotating tornadoes were formed as offset systems or circular movement produced in counter to the main flow of a typical tornado.

Hodzic, Denis; Smith, Michael; Monroe, David; "Identifying Anti-Cancer and Otoprotective Synergisms between Cisplatin and Two Novel Curcuminoids" (Michael Smith)

Cisplatin is an FDA approved anti-cancer drug which can cause hearing loss from the release of reactive oxygen species (ROS). Curcumin, a natural compound found in various plants, can increase the activity of cisplatin against cancer and neutralize ROS. Because curcumin exhibits poor bioavailability, there is considerable interest in developing synthetic curcumin analogs (curcuminoids) that are more bioavailable and which retain ROS scavenging and anti-cancer activity. This study investigates whether two curcuminoids, EF-24 and CLEFMA, increase the effect of cisplatin against the lung cancer cell line, A549, and reduce hearing damage using the auditory evoked potential (AEP) technique in a zebrafish (*Danio rerio*) model. We found that higher concentrations of both curcuminoids could enhance the effect of cisplatin against A549. Our AEP experiments showed that both curcuminoids, when injected intraperitoneally into zebrafish with DMSO vehicle, could reverse the auditory threshold shifting caused by cisplatin treatment. These results suggest that curcuminoid treatment may increase the effect of cisplatin against this lung cancer and might also reduce hearing damage produced by cisplatin treatment. We intend in the near future to use the Western Blot technique to investigate if the curcuminoids modulate the effect of cisplatin on proteins that regulate ROS release.

Hoffman, Elizabeth "Art behind the Scenes" (Marilee Salvator)

I am a fine art major with concentrations in Graphic Design and Sculpture. I create a wide range of works from illustrating children's books to welding and woodworking. I want to present my diverse body of work as well as demonstrate how my ideas are inspired and the many steps I take to finish a project. I will display my sketches, photographs of my processes, and original finished works of art. As a supplement I will display a slideshow on my laptop showing all of the different stages my projects undergo before their completion. Oftentimes artists simply show their finished pieces. I want to feature the amount of care and labor that really goes into the creative process— all the struggles, mistakes, and experimentation. Many people may see me as just an artist, but I see myself as a visual problem solver.

Houchens, Logan "Hidden WKU: Abstract Photography as a Tool of Discovery" (Ted Hovet)

As Western Kentucky University has become a larger and more professional international school, its outward appearances have been polished to be more attractive. This creative research project focuses on appreciating the stark contrasts, visual characteristics, and beautifully authentic areas of campus that have persisted through this systematic cleaning. The result is a "reverse showcase" of the university aiming to appreciate what is not normally

considered to be attractive or worthy of attention. This project was created through the medium of Abstract Photography resulting in a collection of images that focus on unusual textures, colors, and shapes. These images will be used to create an expressive art installation showcasing the difference between the old and the new, the dirty and the clean, and ultimately, the beauty on the surface of WKU's campus and the beauty that must be discovered.

Howlett, Josiah; Howlett, Josiah; Rollings, Amelia; "The Short-Term Effects of Two Meal Choices on Perceptual and Acoustical Measures of the Singing Voice" (Amelia Rollings)
The purpose of this study was to determine the short-term effects, if any, of two breakfast meals from a local fast food restaurant with similar caloric values but different macronutrient values (a high fat, low carbohydrate breakfast compared to a low fat, high carbohydrate breakfast) on acoustical (long-term average spectra [LTAS]) and perceptual (questionnaire) measures of university female singers (N = 20) as they performed the same song. Results indicated that each meal group, including the control group, significantly decreased LTAS mean signal data between pre- and post-test conditions, although the sausage and eggs group did so to a greater degree (MD = -.842 dB SPL) than the fruit and oatmeal (MD = -.487 dB SPL) and control (MD = -.411 dB SPL) groups. A majority of participants (n = 18, 90%) commented that they believed what they ate could affect their singing. More participants in the fruit and oatmeal group (n = 8, 100%) reported that they felt higher energy when singing after eating the meal compared to the sausage and eggs group (n = 4, .66%). Although participants perceived a large difference in their singing between pre- and post-test conditions, LTAS indicated more nuanced acoustic differences in voice production.

Hughes, Bonnie Susanne "Antonín Dvořák: The Slavonic Dances, 1841 – 1904" (Ann Ferrell)
Hughes, Bonnie Susanne. (Western Kentucky University). Antonín Dvořák: The Slavonic Dances, 1841 – 1904. In this presentation, I will be providing an overview of the life of the composer Antonín Dvořák, a reflection of the impact of Romantic Nationalism upon his music, musical excerpts from The Slavonic Dances, and sheet music examples of the listening excerpts. The Slavonic Dances brought Dvořák fame and success across Europe, and were highly influenced by the folk music of his youth. Each of the movements in the symphonic work were based upon the rhythms and meters of traditional folk dances. The melodies, however, were original to Dvořák, even though they were framed in the modes and harmonic structures familiar to his region's folk music traditions. The influence of Dvořák upon classical music is important to note, specifically in his encouragement of the embrace of folk music in the United States by classical composers. Later in his life Dvořák came to the United States and composed symphonies based upon patterns he found in the folk music of Native Americans and African Americans, and claimed that the future of classical music depended upon drawing upon the folk traditions of the people.

Hughes, Ruth; Huskey, Steve; Pedersen, Kristen; "The Kinematics of Envenomation by *Urobatis jamaicensis*" (Steve Huskey)
The yellow stingray, *Urobatis jamaicensis*, is a saltwater stingray species that can administer a fast, venomous sting usually as a result of being inadvertently stepped upon. This species has been studied by a number of investigators, however, very little is known about the

kinematics of its strike despite the large number of injuries resulting from it annually. High-speed cinematography was employed to film strikes catalyzed by a foot-like apparatus used to pin down the animals. It was found that the yellow stingray is capable of two types of strikes: horizontal and vertical. Various measures such as: length of strike, distance moved, velocity, and acceleration, were recorded for vertical stings. Further, it was determined that a stingray will flex the tip of its tail downward to reveal the barb, forming an angle with the tail designated the angle of maximum flexion. Upon dissection of one of the specimens, a muscle was found which is responsible for this so far undescribed phenomenon, and the vertebral column decreases in thickness creating a hinge at the point of flexion. Greater understanding of the mechanism and behaviors used by stingrays to stab threats will aid in the prevention and treatment of stingray inflicted wounds.

Hunter, Caitlin; Wulff, Andrew; "Chert Artifact Analysis" (Andrew Wulff)

What is chert and how can chert artifacts help us to understand trade patterns and movements of early civilizations? Chert is a sedimentary rock formed in various geological environments, including by accumulation of the microscopic tests of diatoms and radiolaria, and sponge spicules, with various impurities. These are all important for determining the provenance of the chert. Chert breaks along conchoidal fractures forming sharp durable edges, leading to its value for making projectile points. Although it is primarily cryptocrystalline silica, whole-rock geochemistry analyses of chert reveal a range of trace elements and elemental ratios. The main hypothesis of this research is that chert artifacts can potentially be traced back to their original outcrop by studying the various types of colors, textures, and geochemistry. Cherts were collected from different outcrops in the greater Bowling Green area and characterized by color, textures, and whole-rock geochemistry. A local knapper created typical points from these samples, which were analyzed to establish the within-outcrop variability. This will inform the viability of correlating the small points to the samples and, ultimately, to the outcrops. This in turn will help us to distinguish migration and trade patterns of early civilizations here in this region.

Husk, Mary "Molecular Evolution of App Gene in Alzheimer's Disease" (Chandrakanth Emani)

The purpose of my study is to examine the role of the APP gene in Alzheimer's Disease. Also this study intends to explore the interactions between the APP, PSEN1, and PSEN2 genes in the molecular pathways related to the Alzheimer's disease . My central theme of research is to decipher the molecular evolution of the APP gene and utilize the phylogenetic analyses to examine specific molecular domains involved in the molecular pathways related to Alzheimer's disease . Current research indicates the role of several types of mutations discovered in the APP gene related to disease. My study intends to look at the mutations of the APP gene and also the interactions between the APP, PSEN1, and PSEN2 genes.

Hutson, Katie; Watkins, Chanel; "Interfamilial Abuse: Effects on Social Development" (Whitney Harper)

This proposed study explores the effects of interfamilial sexual abuse and its impact on social development. Though it has become uniform to avoid this topic because of its perturbing and secretive nature, it's essential we address it. According to the National Sexual Violence Resource Center (2015), 34% of child sexual abuse victims identified a close family member

as their perpetrator and more than a 1/3 of women who reported being raped before age 18 also experience rape as an adult. This study focuses specifically on females who fall victim to father-daughter victimization. A survey was developed to assess the development of social functioning; it contains various questions pertaining to the types of abuse experienced, and their social functioning involving peer/intimate relations. Crosson-Tower (2014) suggests victims of interfamilial abuse regularly develop a difficulty in relating to peers. Thus, these victims often turn to drug use, alcohol, prostitution, or suicide (Mullen and Fleming, 2014). Factors that will be measured are related to social development deemed appropriate for the specific age range of (18-25) years. The correlation between the types of abuse committed and its impact compared to other forms of abuse will inform social workers on the needs of this vulnerable population.

Ihom, Saidjafarzoda; Kholikov, Khomidkhoidzha; Seyitliev, Dovletgeldi; Er, Ali Oguz; Grant, Bayron; "Laser Shock Wave Assisted Patterning on NiTi Shape Memory Alloy Surfaces" (Ali Er)

An advanced direct imprinting method with low cost, quick, and less environmental impact to create thermally controllable surface pattern using the laser pulses is reported. Patterned micro indents were generated on Ni50Ti50 shape memory alloys (SMA) using an Nd:YAG laser operating at 1064 nm combined with suitable transparent overlay, a sacrificial layer of graphite, and copper grid. Laser pulses at different energy densities which generates pressure pulses up to 10 GPa on the surface was focused through the confinement medium, ablating the copper grid to create plasma and transferring the grid pattern onto the NiTi surface. Scanning electron microscope (SEM) and optical microscope images of square pattern with different sizes were studied. One dimensional profile analysis shows that the depth of the patterned sample initially increase linearly with the laser energy until 125 mJ/pulse where the plasma further absorbs and reflects the laser beam. In addition, light the microscope image show that the surface of NiTi alloy was damaged due to the high power laser energy which removes the graphite layer.

Jackson, Leah; Polk, Jason; "Epikarst Hydrogeochemical Processes in Telogenetic Karst Systems in South-Central Kentucky" (Jason Polk)

Telogenetic epikarst storage and carbon transport processes are often complex and dynamic. Among the processes involved in their development and evolution are a highly variable storage and flow relationship that is often influenced by the type, rate, and amount of dissolution kinetics involved. Additionally, rapid exchange of CO₂ and initial dissolution in the epikarst zone may drive hydrogeochemical change that influence carbonate dissolution processes and conduit formation. This study aims to identify epikarst behavior characteristics and mechanisms that influence storage and flow propensity and carbon flux within telogenetic epikarst systems in two systems in south-central Kentucky. High-resolution hydrogeochemical and discharge data from multiple data loggers and collected water samples over one calendar year (including storm events) serve to provide a more holistic picture of the processes at work within these epikarst aquifers, which are estimated to contribute significantly to carbonate rock dissolution processes and storage of recharging groundwater reservoirs on the scale of regional aquifer rates. Preliminary data indicate rapid responses to storm events, including variable storage and meteoric water fluctuations, which drive the carbon storage and removal rates. Additionally, epikarst storage volumes may meet or exceed

those of major springs in regional telogenetic aquifer systems that are primarily conduit-dominated.

Jacobson, Sean "American Public Memory of Mass Atrocities" (Marko Dumančić)

In recent decades, the proliferation of monuments and museums commemorating mass atrocities has expanded discussions on public memory. By synthesizing scholarship regarding genocide memorialization and “sites of conscience”, this study brings attention to two important developments in the field. The first development concerns debate over the use of Holocaust memorialization as the model for other memorialization efforts. Promoters of the Holocaust model use it as a universal allegory for the human condition, while critics argue that it confines past atrocities within a historical vacuum and fails to encourage connections with present responsibility. The second development shows the emerging mission to equip museums and memory sites with greater moral agency. The post-9/11 intellectual construct of “memorial museums” as a distinct genre is an attempt to push the boundaries of public memory. In the 21st century, a new memorial museum framework is changing the way museums utilize space to shape public memory. The Smithsonian Institution’s recently opened National Museum of African American History and Culture is considered as an example study.

Johnson, Julia; Pearson, Regis; Winchester, Lee; Olenick, Alyssa; Shaker, Nuha; Oregon, Evie; Maples, Jill; "The Effects of a High Fat Diet on Gene Expression in Lean and Obese Women" (Jill Maples)

Previous studies have indicated that peripheral blood mononuclear cells (PBMCs) can respond to dietary stimuli, such as a high fat diet, which modulates the up-regulation of pro-inflammatory cell signaling. The purpose of this study was to investigate the impact a high-fat meal has on the expression of inflammatory genes from PBMCs isolated from lean and obese women. METHODS: 12 lean (age: 26.337.23; BMI

Johnson, Nicholas "Phylogenetic Evolution of the GAP Gene from Seven Different Leafy Green Plants" (Chandrakanth Emani)

Phylogenetic evolution of the GAP gene from seven different leafy green plants: The Purpose of this study is to examine the GAP gene sequence in basil, tobacco, cilantro, kale, spinach, parsley, thyme. We will be comparing the phylogenetic similarity in the GAP sequences. In this experiment we are going to isolate the genomic DNA from the different plants. After amplifying the GAP gene by PCR, the PCR product will be purified and inserted into an E. coli based DNA vector and the recombinant DNA will be purified for sequencing. We will then log the sequences into the NCBI gene data bank to compare and study the phylogenetic similarity of the seven different plant GAP sequences.

Jones, Andrew "The Geographic Perspective of Populist Attitudes in Eastern and Southern Germany" (Laura McGee)

Abstract: Recent geopolitical trends have witnessed the emergence of national populism in Europe and the United States. Citizen anger in Germany, due to economic disparity and uneven regional development, has been unleashed at existing neo-liberal systems in the form of increased membership in right-wing populist parties. This study traces contributing factors, among them being the Second World War and the recent refugee crises. How has the

division and reunification of Germany created current inequality, particularly in regards to economic opportunity? Methods: Using a geographer's perspective, the causes of increased populist party enrollment will be analyzed based on the place and situation of affected states in eastern and southern Germany. Special emphasis will be given to historical factors leading to present day political change. The lower levels of development of the eastern German states will also be given a clearer context by contrasting them with the more developed western states. Perceptual regional identity will also be researched in order to explain why certain populist beliefs are being held so strongly.

Jones, Justin "In Union Lies Strength: Facilitating Situation Awareness through Team Processes" (Betsy Shoenfelt)

Teams have become an integral part of work performance. Accordingly, research is needed to investigate team processes and outcomes to improve team effectiveness across various contexts. An important relevant construct is situational awareness (SA). SA involves cognitive processes that integrate information about the situation in the past and present, and enable predictions about the future. My literature review suggests a better understanding of team SA will enable industrial-organizational psychologists to develop methods to improve team member interaction, adaption to dynamic work environments, and performance of complex team tasks. Researchers theorize that team processes can facilitate team SA, which, in turn, can improve performance and decision making while reducing critical errors. To further investigate the impact of team processes on team SA, I will conduct a study in which participants will serve as highly specialized team members who will attempt to complete a complex team task. Team processes (e.g., leadership roles) will be manipulated to better understand their function in the development of team SA. Task performance, communication, in-task planning, coordination, as well as individual and team SA will be evaluated. The results of this study will have implications for job design, team selection and development, training, and team performance appraisal.

Jones, Konnor; Nee, Matthew; "Temperature and Electric Field Dependence of Asymmetric Stretching Of Nitrate Ion" (Matthew Nee)

The decomposition of nitrate ion by exposure to sunlight (photolysis) produces gases such as NO, NO₂, and O₃. Nitrate geometries in solution may contribute differently to the amount of products from photolysis. To better understand the nitrate photolysis mechanisms, an understanding of the effects of electrolyte concentrations on nitrate geometry distortion is needed: nitrate geometry may be linked to the initial reaction pathway. Infrared spectroscopy was used to measure the nitrate geometries at a series of controlled temperatures with varying electrolyte concentrations. The charged particles (water molecules and other ions) in solution distort the geometry of the nitrate ion. Nitrate molecular vibrations are observable in the infrared spectra. The energy difference between the two geometries (determined by the temperature dependence of the spectra) is linearly proportional to the electrolyte concentration of the solution. At high electrolyte concentrations, the more symmetric geometry is more favored. Thus, in photolysis, a particular initial path may be favored in low ionic strengths, producing different ratio of products during photolysis than would be seen in oceanic bodies. The ratio of the nitrate geometries can be correlated to the amount of products from photolysis to help understand the impacts of ionic strength on photolysis product yields.

Joyce, Caitlyn "Habitat for Humanity Community Center of Bowling Green/Warren County" (Neal Downing)

Habitat for Humanity has been developing homes in downtown Bowling Green for many years and has become aware of some uprising issues. The current Habitat for Humanity office, which is joined with the Habitat ReStore, is not only in rough condition but it needs to be closer to the residents. The residents need a place for their families to play, grow and gather. Therefore, creating a community center that incorporates a safe place as well as an office suite would suffice the needs of both parties. Durbin Estates community center will provide the next step in fulfilling the American dream by financial, social and cultural education.

Kamer, Mary; Gumirakiza, Dominique; "Comparing Financial Positions between Farms Using the Guidelines and Those Who Do Not" (Dominique Gumirakiza)

This paper studies the effects of accounting procedures developed by the Farm Financial Standards Council (FFSC), commonly referred to as "the guidelines". A survey of 650 small and medium farms in summer 2016 examined the financial positions between producers who are using the guidelines on their operations and those that are not. We found that those producers who are utilizing the guidelines have stronger financial positions and greater confidence when making financial decisions. This paper is significant because its results can help develop a set of recommendations for agriculture producers to utilize the guidelines further. It can also help to develop educational opportunities for those not currently using the guidelines to mitigate potential future farm failures in Kentucky.

Kanthawar, Arjun; Krishna, Nikhil; "Uniquely Identifying Parameters in a Differential Equation Model using Practical Identifiability" (Richard Schugart)

In order to formulate a mathematical model that accurately represents the physiology of a wound, the model and its parameters must be identifiable when given actual data. Practical identifiability is a method used to determine whether parameters in a model can be uniquely determined given actual data. We are working with a differential equation model that describes the interactions among matrix metalloproteinases, their inhibitors, the extracellular matrix, and fibroblasts (Krishna et al., 2015). Our approach uses a Fisher information matrix to find unidentifiable parameters using their coefficient of variations. We then find different subsets of these parameters that form identifiable combinations. We use a profile likelihood method to determine the algebraic relationship between different parameters. This method allows us to "profile" a single parameter, p , by fixing p across a range of values and fitting the rest of the parameters for each fixed value of p .

Karimli, Nigar; Prasad, Ayush; "Constructing an Optimal Design Method in a Mathematical Model for the Interactions of Matrix Metalloproteinases and their Inhibitors in a Wound" (Richard Schugart)

Because the medical treatment of diabetic foot ulcers remains a challenge for clinicians, a quantitative approach using patient data and mathematical modeling can help researchers understand the physiology of the wounds. In this work, we estimate parameter values using individual patient data curve-fitted to a modified version of a mathematical model that describes the interactions among matrix metalloproteinases, their inhibitors, extracellular

matrix, and fibroblasts at a wound site (Krishna et al., 2015). The model and parameter values were then analyzed using global and local sensitivity analyses, which were used to describe how sensitive each parameter value of the model was to changes in the system. However, these model parameters can be estimated more efficiently and accurately by implementing an optimal design method that calculates optimal observation times for collecting clinical data. We introduce a SE-optimal design (standard error optimal design) by using a Fisher Information Matrix (FIM) to determine time evolution of sensitivity values. The goal of this work is to quantify and understand differences between patients to predict future responses and individualize treatment for each patient.

Kaur, Simrat "Health-Related Quality of Life among Kentucky Adults with Diabetes Mellitus" (Colin Farrell)

Diabetes is a major public health issue with serious long and short term consequences for those afflicted. It is one of the leading causes of death and disability in the United States. Kentucky has the 12th highest diabetes mortality rate in the nation and it is the 7th leading cause of death by disease. Measuring HRQoL can help determine the burden of preventable disease, injuries, and disabilities, and can provide valuable new insights into the relationships between HRQoL and risk factors. It can further help to identify suitable efforts and implement appropriate policies to improve quality of life for better management of the disease for a satisfactory outcome. The aim of present study is to examine the associations between demographic and medical characteristics among adult population with diabetes in Kentucky and four different health-related quality-of-life outcome measures, including general health status, physically unhealthy, mentally unhealthy, and functionally limited days. The demographic and medical characteristics to be studied include age, sex, ethnicity, marital status, education, income, health insurance, obesity, duration of diabetes, and insulin use. Analysis of 2015 Behavior Risk Factor Surveillance System (BRFSS) data, a nationally representative sample will be done using regression model to study these associations.

Keen, Keagan; Tinius, Rachel; Maples, Jill; Cooley, Bailey; Olenick, Alyssa; Hoover, Don; Blankenship, Maire; "The Impact of an Acute Bout of High Intensity Exercise on Mood among Pregnant Women" (Jill Maples)

PURPOSE: High intensity exercise is safe and effective for low-risk pregnant women and their developing babies; however, little is known about the psychological effect of an acute bout of high intensity exercise among pregnant women. The goal of this study is to examine maternal mood in response to an acute bout of high-intensity exercise.

METHODS: 15 pregnant women (18-24wks gestational age) completed the BRUMS-32 Profile of Mood and Subjective Exercise Experience Scale. Surveys were administered before and after an acute bout of high-intensity treadmill exercise. Data were entered into SPSS for statistical analysis.

RESULTS: Pregnant women reported an increase in vigor (9.73 ± 3.13 vs. 2.73 ± 2.34 , $p < 0.01$) and a decrease in anger (1.00 ± 1.81 vs. 0.07 ± 0.26 , $p = 0.04$) [pre vs. post-exercise] after high-intensity exercise. Trends revealed increases in scores for strong (4.57 ± 1.09 vs. 5.00 ± 1.30 , $p = 0.09$), terrific (5.00 ± 0.88 vs. 5.43 ± 1.16 , $p = 0.08$), happy (11.53 ± 3.07 vs. 13.07 ± 2.92 , $p = 0.06$) [pre vs. post-exercise], and decreases in scores for discouraged (1.64 ± 0.93 vs. 1.14 ± 0.36 , $p = 0.08$) and tension (2.13 ± 2.88 vs. 0.67 ± 1.11 , $p = 0.06$) [pre-vs. post-exercise].

CONCLUSION: High-intensity exercise during pregnancy resulted in improvements in several mood categories; thus, high-intensity exercise may be an effective, feasible, and time-efficient option for prescribing exercise in pregnant women.

Funding: FUSE 17-SP213; NIH NIGMS IDeA Grant 5P20GM103436

Keith, Andrew "Analysis of Large-Scale Forcings that Led to the April 22, 2011 Tornado in St. Louis, Missouri" (Joshua Durkee)

On April 22, 2011 a EF4-rated tornado struck the metropolitan area of St. Louis, Missouri. The tornado traveled 21 miles before it hit the Lambert–St. Louis International Airport and crossed the Mississippi river. This tornado caused an estimated \$250 million in damage and resulted in 5 injuries. The purpose of this study is to analyze the regional-to-local scale forcing that influenced this event. The data gathered in this study were collected from climate case studies and various weather observations in and around the St. Louis area. Initial results indicate that this devastating tornado resulted from the conglomerate of frontal lifting, anomalous lower-atmospheric moisture, upper-air instability, and shearing wind forces that were present in the area.

Kendrick, Alissa "Pepe the Frog: How a Popular Meme Turned into a Symbol of Minority Injustice" (Anthony Harkins)

My paper argues that the internet meme of Pepe the Frog, in its most recent form, should be classified as a hate symbol – as the Anti-Defamation League has recently done. Drawing on careful readings of primary evidence from blogs and internet sites as well as scholarly and journalistic articles, I conclude that when even a small group of people transform even the simplest thing into a representation of hate and injustice, it can potentially outweigh all previous uses of the image and have deeply negative social consequences. Despite its more benign original intent and uses, the green frog now represents a symbol of social and racial injustice. Online memes and tweets by white supremacists, anonymous twitter handles, dark web users, and politicians including Donald Trump himself show how it is used to spread bigotry, recruit followers, and further the injustice faced by minorities. I conclude by considering why and how society can respond to this injustice, a topic that is especially timely and relevant during a year of political upheaval where social justice and freedom of speech are being widely challenged.

Khan, Nadia "Some Economic Implications of Repealing the Affordable Care Act" (Dr. Gregory Ellis-Griffith)

In the recent months there have been much discussion about the Affordable Care Act (ACA), or Obamacare, being repealed and replaced. While the elections and its results had most Americans shocked, the damaging effects of repealing Obamacare is likely to put the healthcare industry in massive turmoil in the coming years. Since the passage of ACA in 2010, Republican politicians have vowed to repeal and replace Obamacare. The results of the elections have enabled them to make that attempt. The ACA has enable millions of Americans to afford healthcare. Various mandates have made it is easier for Americans to gain access to better health. The repeal of ACA not only threatens to take those privileges away from Americans, but poses a high risk for a massive economic downturn in the coming years. This study will address the economic impacts of repealing the ACA on various industries, with emphasis on the insurance industry. The study will be conducted on

economic assumptions based on pre-ACA conditions in the industry.

Khan, Sherafghan "X-Ray Crystallography Analyses of an Antithyroid Compound: 1-methyl-2-mercaptoimidazole" (Edwin Stevens)

Hyperthyroidism is a medical condition resulting from over activity of the thyroid gland, producing an excess of thyroid hormones. Current methods for treating hyperthyroidism involve administering an antithyroid drug such as the title compound (MMI). This compound blocks the production of thyroid peroxidase (TPO), an enzyme involved in the synthesis of thyroid hormones. The structure and experimental electron density distribution of MMI have been determined from 87466 high-resolution x-ray intensity measurements collected from a single crystal of MMI cooled to 120 K using instrumentation at the WKU Advanced Materials Institute ARTP Center. MMI crystallizes in a triclinic structure with two independent molecules in the asymmetric unit, yielding two determinations of the electron distribution of the molecule in very similar, but not identical, crystal environments. Multipole refinement of the x-ray data yields very similar static deformation densities for both molecules, and topological analysis of the density using the Quantum Theory of Atoms in Molecules show clear evidence of bond paths corresponding to N-H ... S and weaker C-H...S hydrogen bonds. Our goal is to use the electron distribution of MMI to better understand its binding to TPO, which may lead to design of safer and more effective drugs for hyperthyroidism.

Kholikov, Khomidkhodzha; Seyitliyev, Dovletgeldi; Smith, Skyler; Thomas, Zachary; "Graphene Quantum Dot Synthesis Using Nanosecond Laser Pulses" (Ali Oguz Er)

A biocompatible photodynamic therapy agent that generates a high amount of singlet oxygen with high water dispersibility and excellent photostability is desirable. In this work, a graphene-based biomaterial which is a promising alternative to standard photosensitizers was produced. Methylene blue was used as a reference photosensitizer. Bacteria deactivation by methylene blue was shown to be inhibited inside human blood due to protein binding.

Graphene quantum dots (GQD) were synthesized by irradiating benzene and nickel oxide mixture using nanosecond laser pulses. High resolution transmission electron microscopy (HR-TEM), scanning electron microscopy (SEM), atomic force microscopy (AFM), Fourier transform infrared (FTIR) spectroscopy, and nuclear magnetic resonance (NMR) were used for characterization of GQDs. Initial results show graphene quantum dots whose size less than 10 nm were successfully obtained. UV-VIS spectra shows absorption peak around 310 nm. The results of these studies can potentially be used to develop therapies for the eradication of pathogens in open wounds, burns, or skin cancers. New therapies for these conditions are particularly needed when antibiotic-resistant infections are present.

Kim, Barnabas; Kim, Do Hyun; "Engineered Zinc Finger Proteins Immobilized On Beads as a Novel Diagnostic Application for Detection of Pathogen-Specific DNA Sequences" (Moon Soo Kim)

Using zinc finger proteins (ZFPs) that bind to the specific DNA sequence, one can be able to develop a simple point-of-care diagnostics that can detect specific pathogens. Here, one pair of ZFPs was engineered, consisting of the capture and detection probes to binds to the specific DNA sequence in the seb gene that encodes for staphylococcal enterotoxin B in *Staphylococcus Aureus*. Magnetic beads were used to immobilize the capture probe ZFP,

which allows a high surface area to volume ratio leading to immobilization of greater amount of ZFP molecules. The detection probe ZFP was fluorescently labeled to allow for generating fluorescent signal, indicating the ZFP binding to the cy-5 labeled target DNA. The capture probe ZFP was immobilized on beads capturing the cy-5 target DNA, which was confirmed by the high red fluorescence signal intensity. As the Alexa-labeled ZFP was added to the bound complex of the capture probe ZFP and DNA on the beads, high fluorescence signal was detected under both the cy-5 and GFP filters.

Knight, Joshua; Lasley, Scott; Stinnett, Brad; "Attitudes of WKU Faculty on Intercollegiate Athletics" (Scott Lasley)

This research project explores faculty attitudes towards intercollegiate athletics and the role they play at WKU. While the topic of faculty attitudes on athletics exists in the literature, this study attempts to extend the understanding of faculty attitudes on athletics in a number of ways. First, faculty attitudes on intercollegiate athletics and related issues are compared with those of university staff. While an imperfect proxy, staff should more closely reflect the attitudes of those in the broader community and serve as a point of comparison for faculty responses. Second, this study explores how faculty and staff evaluate the role of intercollegiate athletics in shaping an institution's identity and how college sports influence the university's reputation. Third, how faculty and staff assess the impact of a series of decisions made by the WKU administration regarding the department of athletics and the institution is examined. Data for this study comes from a recently conducted survey of WKU Faculty and Staff. Preliminary analysis supports the idea that faculty view intercollegiate athletics differently than do university staff. This is reflected across a range of topics including factors that shape WKU's identity and reputation and whether too much emphasis is placed on athletics.

Knipp, Alexandria "Measuring Economic Wellbeing from an Islamic Perspective" (Brian Strow)

As Gross Domestic Product presents itself as less and less reliable for measuring life in regard to a number of facets of economics, the need arises to develop more methods of determining overall wellbeing in a country. Notable methods are explored in this paper, such as the Organization for Economic Co-operation and Development (OECD) Better-Life Index, and the Human Development Index. Yet, a significant populace is not included in these studies: majority Muslim states. In an effort to research the aspects of wellbeing deemed important to Islam in the Qur'an, this paper explores a number of metrics based on Qur'anic sources. Furthermore, this paper defines a comprehensive index to compare thirty majority Muslim countries on aspects of economic life in determining wellbeing. Using the index created, Turkmenistan ranked first among the study set while Gambia ranked last.

Knowles, Bryan "The Working Part - Brevities" (Dale Rigby)

Drawing inspiration from rock opera, queer/feminist texts, and repair manuals, I write a short collection of brevities connected to the motif, "If you replace the working part, you get a different machine." As my subject, I explore moments when constants in life are proven false and/or variable and the resulting adaptations of the "body."

Knowles, Bryan "John Robo Milton - Selected Poems" (Gillian Knoll)

In recent literary news, Marlowe has been credited with co-authorship of Shakespearean dramas and Shakespeare has been credited with co-authorship of previously anonymous works. These conclusions were reached by "feeding" large corpuses of works to algorithms which would calculate "statistical fingerprints," such as the likelihood of using certain phrases, that can be used to uniquely identify or strongly suggest possible authors for contested passages. In a similar vein, Andrej Karpathy has released a recurrent neural network (RNN) suited for training at the character-level and discussed this, along with his labmate, extensively in his personal research blog. Their research is based on the growing computer science machine learning scholarship, and their RNN code has been rewritten by Justin Johnson to be "1.9x faster" and use "up to 7x less memory." The purpose of these RNNs is to automate the creation of a "virtual machine" that outputs characters, one at a time like an author at the keyboard, with the same statistical fingerprint as the given training data. In this project, we share a collection of our favorite poems "written" by Johnson's RNN, emailed to us daily over the past year and trained on the ~200kb text of Milton's Paradise Lost, and we discuss what this project demonstrates about Milton's own "fingerprint."

Krawec, Jessica "The Tanuki's A-meiji-ing Transformation: An Examination of Role-swapping in a Meiji Era Folktale" (Ann Ferrell)

During Japan's period of modernization in the Meiji era (1868-1912), a new folktale emerged that depicts a supernatural creature, the "raccoon-dog" (tanuki), going head to head against a steam train (with predictable results). Recent scholarship by Michael Dylan Foster and R. Keller Kimbrough have argued different interpretations of this story, with Foster positing that this tale represents the Japanese people's anxiety over modernity. This scholarship has neglected a swapping of roles that takes place within these tales. By comparing how the tanuki is depicted in earlier, pre-Meiji era folktales with this newer folktale, we see that the tanuki has lost whatever power it had over humans and is now completely dominated by the people it once played pranks on. While the tanuki does frequently end up dead in pre-Meiji tales just as it does here, I would argue that the way in which these deaths are framed and dealt with in their respective tales differ in important ways and further highlight the reversal of roles between supernatural and humans. Examining this role-swapping in the context of the Meiji era's sweeping changes within Japan adds another layer to the anxiety of entering modernity.

Krempel, Mara; Moss, Hayley; Khouryieh, Hanna; Griffin, Kristen; "Impact of Ionic Strength on the Physical and Creaming Stability of Whey Protein Stabilized Fish Oil-in-Water Emulsions" (Hanna Khouryieh)

The addition of polysaccharide and protein combinations into emulsions has become a widespread practice due to the instability of emulsions. This research investigated the effect of ionic strength (NaCl) on the physical and creaming stability of oil-in-water (O/W) emulsions containing complexes of whey protein isolate (WPI) with xanthan gum (XG)-locust bean gum (LBG) mixtures. Emulsions containing the mixture of XG-LBG were compared to emulsions containing XG and LBG individually, as well as control emulsions with only WPI. At both 24 hours and 14 days after the emulsions were made, the creaming stability of the emulsions was tested by measuring creaming index, while the physical stability was tested by droplet particle size, viscosity, and optical microscopy. After 14 days, creaming stability results for 0 and 5mM NaCl showed the emulsions containing the XG-

LBG mixture as being the most stable; however, at 50mM NaCl, XG emulsions were most stable. The droplet particle sizes displayed no differences between the salt types for each gum. Emulsions containing XG-LBG at 0mM NaCl resulted in the highest viscosity. As the ionic strength increased, and as time elapsed, the viscosity of all emulsions decreased. These results will prove beneficial in the development of biopolymer-based emulsion delivery systems.

Krueger, Merry; Jenkins, Andrea; Green, Skyler; Krueger, Hannah; Spillman, Kirstin; Coleman, Hollie; Goldener, Lauren; "Male Sexuality and Gender Conformation on the Drive for Thinness And Muscularity" (Frederick Grieve)

Discussions on body image dissatisfaction have primarily focused on the female experience. Recent research, however, has implied that male body dissatisfaction is more prevalent than previously thought and manifests as a drive for thinness and/or a drive for muscularity. Previous efforts to elucidate the factors behind these drives have explored the concepts of gender norm conformation (masculinity/femininity) and sexuality, but not the interplay of the two. This study explores the effects of sexuality on the drive for thinness and drive for muscularity with conformation to feminine or masculine gender roles as a mediator. Participants completed a written survey including the Sell Assessment of Sexual Orientation, the Conformation to Masculine Norms Inventory - 46, the Conformation to Feminine Norms Inventory - 45, the Drive for Thinness sub-scale of the Eating Disorder Inventory, and the Drive for Muscularity Scale. The data will undergo mediational analysis to examine the correlations of sexuality and drive for thinness/muscularity and the mediational nature of gender conformation. Results from this study will have significant implications in identifying populations at risk for male eating disorders and muscle dysmorphia.

Kwan, Henry "Searching for New Blazars" (Michael Carini)

Blazars are extremely energetic phenomenon whose emission is dominated by a relativistic jet powered by the accretion of material onto a supermassive blackhole at the center. Despite over 50 years of study, many questions remain unanswered concerning fundamental aspects of these jets such as their creation, the acceleration of particles in the jet, and the matter content of the jet. My study involved monitoring the optical brightness of a sample of candidate blazars using WKU's Robotically Controlled Telescope, looking for brightness changes (variability) consistent in amplitude and character with what is typically seen in blazars in order to determine if they are blazars or another class of object. These observations were analyzed using the Image Reduction and Analysis Facility (IRAF) program. Images of the sample of objects were taken every night they were observable from 2014 to 2016 and analyzed to construct the light curve (plot of brightness vs time) to determine the variability of each object over time. In addition, spectroscopic observations were obtained by international collaborators in order to confirm the classification based on variability and to determine redshifts. I will report on my role in the project, which was the reduction and analysis of the brightness variations.

Lamb, Ryan "Use of Surface Enhanced Raman Spectroscopy in Monitoring Photocatalytic Reactions" (Matthew Nee)

Recent studies show an increase in the concentration of harmful organic compounds in wastewater, such as pesticides from farm runoff. Since common methods for treating

wastewater are mainly focused on removing biological contaminants, these organic compounds pass into drinking water. A potential method for removing these organic contaminants involves the use of photocatalytic degradation. Photocatalytic degradation uses UV radiation and catalysts to degrade organic compounds in water. The mechanisms, or steps, of the reaction are not always completely understood. To address this problem, surface enhanced Raman spectroscopy (SERS), which uses roughened metal nanoparticles to enhance the Raman signal of molecules that would otherwise be undetected, can be utilized to obtain real-time data about changes in the solution. A disadvantage to SERS is the nanoparticles inevitably aggregate, or form large clusters, and precipitate to the bottom of the solution, resulting in signal diminishment and requiring them to be “capped.” Capping nanoparticles by coating them in a long-chained molecule stabilizes them to maintain signal intensity for longer time periods, but too interferes with the Raman enhancement. This project aims to find the amount of sodium dodecyl sulfate, the capping agent, that results in the best signal stability without sacrificing intensity enhancement.

Larkin, Grant "A Synoptic Reanalysis Of The April 10th, 2009 Tornado Outbreak Across Middle Tennessee" (Joshua Durkee)

On April 10th, 2009, a tornado outbreak occurred across Middle Tennessee during the late morning and early afternoon hours. The outbreak produced nine tornadoes in under four hours, including an EF-4 that struck Murfreesboro, leading to two fatalities. The large-scale reanalysis of such historic events is important to operational meteorology, and forecasting. The focus of this study was to analyze the large-scale atmospheric features that led to this tornado outbreak. This was done subjectively through examinations of surface observations and weather forecast model reanalysis of the various atmospheric variables that took place that day. Initial findings suggest that there was considerable large-scale forcing from the mid and upper-level atmospheric circulation features. These features fostered an anomalous wind shear environment and aided in the flux of a particularly warm, unstable airmass prior to and during the event. The combination of these large-scale features ultimately led to the development of multiple, semi-discrete rotating thunderstorms, ultimately resulting in this severe weather outbreak.

Lasley, Nathan "Comparing Building Modeling Software to the Energy Record of a Preexisting Structure" (Robert Choate)

The WKU Office of Sustainability located at 503 Regents Ave. in Bowling Green KY is a residential structure constructed in 1931. In 2014 a proposal was made outlining improvements to make the building LEED certified with a goal of making the building Net0 in its energy consumption. To generate electricity for the structure an array of photovoltaic panels were installed on the roof. For future experimentation a variety of energy rated windows were installed in the building envelope along with honeycombed blinds to further insulate. The weak areas of the envelope were also insulated to minimize air leakage and heat transfer. Finally the existing appliances were replaced with energy star certified counterparts. The hot water heater was replaced with a tank less unit and the gas appliances were replaced with electric. Using records kept on the building during the implementation of these improvements a post analysis was conducted with the aid of building modeling software. For this analysis BEopt powered by EnergyPlus was used.

Lasley, Troy "Worship and Refuge" (Neal Downing)

The objective for the AMS 490 Senior Research course is for students to thoroughly demonstrate their knowledge of the research, design, and construction phases of a piece of architecture. The previously selected topic for this course is a religious assembly building, or church, to be located in the poverty-stricken outskirts of Detroit, Michigan. The goal for this building is to welcome all of the citizens with various backgrounds of the city by providing them a "shelter" for comfort, protection, and worship, while giving them a break from the hardships of their daily lives. This building is needed in an area such as this because of the historical and current status of those living outside of the metropolitan Detroit, where a lower economy has taken its toll on these families. The image of this piece of architecture is to greet these citizens upon first sight and provide them total comfort once in the building, where the circulation allows them to navigate easily between the sanctuary, prayer garden, and parish hall. To convey this information to its best potential, the senior project will be displayed through the use of a presentation board.

Latham, Kate "Integrating Art into the Classroom: A Necessary Component of a Well-Rounded Education" (Janet Tassell)

Integrating visual art into the general education classroom is useful for differentiating instruction in order to expose students to a variety of educational benefits. Not only does this practice allow students to gain those educational benefits, but it is also necessary to introduce art to students who could excel in the subject, possibly leading them to their future careers. Not all students will go into the art profession, but everyone will use the creativity and problem solving skills gained from art education throughout their lifetime. Because integration can be used to strengthen existing teaching practices and engage students in the learning process, it is beneficial for all classrooms. This presentation will show research about the benefits of integration, which, along with a selection of lessons, can be used by a variety of teachers (with little to no art experience) in order to integrate art into their classroom.

Lawrence, Keely; Luna, Catherine; "Predictive Learning of Stimuli Using Dot Probe Task" (Sharon Mutter)

Prior research has shown that learning when a stimulus predicts an important outcome, we devote more attention to that stimulus than to one that is non-predictive (Le Pelley, Vadillo, & Luque, 2013). This experiment was designed to determine whether there are age differences in this attentional capture effect in predictive learning. Young (YA) and older adult (OA) participants learned predictive relationships between cues and outcomes in a category learning task that were interspersed by a dot probe attention task designed to determine the attentional capture by the cues. Predictive and non-predictive cues were presented to the left and right of a fixation point within the participant's central visual field then proceeded by trials with a small white dot appeared briefly on either the predictive or non-predictive cue. Participants were asked to respond quickly to the location of the dot without moving their eyes from the fixation point. There was no difference in reaction time to the dot location originally, but as they learned more about the stimuli, they responded quicker to predictive cues than non-predictive cues. Importantly, both YA and OA participants exhibited this attentional capture effect, showing that adult aging is not associated with a deficit in learned attention.

Lee, Ngo Fung; Ranburger, Davis; "Multiple Oxidation Pathways Observed for Manganese(v)-oxo Corroles Generated by Visible Light" (Rui Zhang)

Metallocorroles have attracted considerable interest in view of their rich oxidation properties. In this work, a new photochemical method to produce and study high-valent manganese(V)-oxo corrole will be presented. Visible light irradiation of the corresponding highly photolabile manganese(IV) bromates complexes efficiently generates manganese(V)-oxo intermediates in two different corrole systems, 5,10,15-tris(pentafluorophenyl)corrole (TPFC) and 5,10,15-triphenylcorrole (TPC). The kinetic and spectral studies of oxygen transfer atom reactions between organic reductants and manganese(V)-oxo corroles suggest multiple oxidation pathways, where manganese(V)-oxo corroles may serve as a direct two-electron oxidant or undergo a disproportionation reaction to form a manganese(VI)-oxo corrole as the true oxidant. The choice of pathways is strongly dependent on the nature of the solvent and the corrole ligand.

Leibman, Noemi; Hahn, Lance; "Impact of Deception on Writing Style" (Lance Hahn)
Deception and persuasion are common elements of many everyday conversations. Thus, detecting linguistic patterns related to deception could impact how we process persuasive text. While many have studied how dishonesty alters verbal patterns in face-to-face communication, the impact of technology should not be overlooked. In recent years, research has begun to focus on how deceptive interactions influence online written communication. Using a simple scenario, this study considers linguistic features associated with deceptive text (Hancock et al., 2008). Participants were asked to generate persuasive text, either to deceive their partner, or to collaborate with them. We hypothesized that when compared to collaborative text, competitive text would have more total words, fewer first-person pronouns, more third-person pronouns, fewer positive emotion words and more negative emotion words. Paired t-test analyses revealed no difference in total word count, third-person pronouns, or negative words, but the text produced in the collaborative condition contained significantly more first-person pronouns and positive words than that produced in the competitive condition. These results make it clear that deception leads to unique linguistic patterns. Even using a simple prompt, we were able to detect significant differences between the collaborative and competitive text samples.

Leigh, Taylor; Hall, Aaron; Budlove, Daniel; Ryle, Luke; "Stuppworks: Girder Grinder" (Chris Byrne)

Stupp Bridge Company is a steel girder engineering and fabrication facility located in Bowling Green, Kentucky. The steel girders that Stupp Bridge manufactures are used in a variety of expansion bridge applications. One process of production, plasma cutting, creates sharp, jagged edges that are not optimal for the girder design. To eliminate these imperfections, Stupp employees manually grind a chamfer on the edges on the flanges. Stupp Bridge Company believes that this grinding process can be automated and have consulted the help of Western Kentucky University and the Department of Engineering. Our team has been given a robotic prototype grinder that had been designed by a previous senior design team. Our task was to extensively test this device and design strategic upgrades that will bring this device to industry readiness. A set of design parameters have been given to us by our industry contact, Derek Clemons, who conceived the idea for the device. Some of those

parameters include; weight restrictions, speed requirements, chamfer dimensional requirements, and an overall cost requirement. By using engineering techniques and design approaches, Team STUPPworks have created an updated version of the grinding system that will meet all requirements and expectations of Stupp Bridge Company.

Lewis, Stevon; Morss, Steelman; Wulff, Andrew; "Petrogenesis of Chilean Lava Flows"
(Andrew Wulff)

The overall purpose of this study is to observe and analyze lava samples from the Descabezado Grande-Cerro Azul (DGCA) volcanic complex in the Chilean Andes. Differences in the mineralogy, textures, and whole-rock geochemical composition of the flows have been analyzed and observed. Digital photographs were taken for archiving, in addition to high-resolution photos using photo montage software. Polished thin sections were made for analysis using PLM and SEM. Samples were crushed and powdered, and the powders were used for smear mounts to be analyzed using XRD. Polarized Light Microscopy was used to identify modal percentages of minerals for all the flows, which ranged from olivine (8-15%), biotite (5-12%) and feldspars (8-20%). The groundmass (60%-65%) was aphanitic, although samples as a whole were sparsely porphyritic, and slightly vesicular. These observations suggest that the lavas cooled rapidly with generally high nucleation and low growth. Powders were fused into glass discs to obtain whole-rock geochemical compositions. These data will be compared with other flows from the DGCA complex and used to determine the petrogenesis of these flows.

Linder, Ellen "Reassessing Post-Apartheid South Africa: An Analysis of the Truth and Reconciliation Commission and Reparations" (Patricia Minter)

During the South African Apartheid regime, racial segregation was legally established in all aspects of society. The end of apartheid was the finale in a 30-year battle by internal and external activists. In an effort to unify society along racial boundaries, the newly elected government initiated the Truth and Reconciliation Commission in 1996. The commission gathered the testimonies of thousands in attempt to address past wrongs to begin a new future. "Truth" is a popular form of reparation which many scholars find appealing because it unifies society under the same historical narrative to shape the future. Despite these initial positive race-based reparations, inequalities and racial divides continue to plague South African society. This project attempts to assess the ability of truth and reparations commissions to mend society using South Africa as a case study. Based on archival research completed at the Library of Congress, this paper will address the question of how different forms of reparations, or the absence of, alter the state of international and domestic relations. It also addresses the role of justice in the execution of successful race reparations, and how its absence from truth commissions creates lasting effects within a society.

Losekamp, Katherine; Wulff, Andrew; "Geochemical and Mineralogic Characteristics of Lava Flows from the DGCA Volcanic Complex" (Andrew Wulff)

Individual lava flows sampled in chronological (or stratigraphic) order can tell a lot about the petrogenetic processes responsible for developing them in the mantle and lower lithosphere. Because lava flows record each eruption and the mineralogical and geochemical composition of the magma in the magma chamber below the volcano at the time, they can be very useful in determining the way the magma is altered over time. For this project, lava flows were

sampled in stratigraphic order at the Descabezado Grande-Cerro Azul (DGCA) volcanic complex in the Chilean Southern Volcanic Zone, and lavas from one eruptive event were further characterized. Each sample from the lava flows was photographed both in hand sample and using a digital camera with Photo Montage software. Polished thin sections were made from each of the samples and analyzed using Polarized Light Microscopy. Olivine, pyroxene, and feldspars were identified as phenocrysts in a primarily aphanitic groundmass. Compositional zoning and peritectic textures were identified, both indicating that slow cooling occurred. These mineralogical data were corroborated using SEM techniques, and XRD analyses using powdered sample. Whole-rock geochemical analyses of the samples were combined with the mineralogical data to help determine the petrogenesis of these lavas.

Love, Katherine "Assessing the Biological and Economic Impact of Ash Trees at the Baker Arboretum using Geographic Information Systems" (Martin Stone)

Agrilus planipennis, commonly known as Emerald Ash Borer, is a small insect spreading across the Eastern United States killing ash trees, which are found in the genus *Fraxinus*. WKU's Baker Arboretum in Bowling Green, Kentucky, like other places, has many ash trees that will likely be affected by the infestation of this insect. A significant but unknown portion of the tree canopy at the arboretum is comprised of ash species. These provide shelter for a diverse and valuable collection of woody plants that would suffer or be killed without the over story cover provided by the ashes. Through the use of geospatial data and Geographic Information Systems technology the impact on the plants underneath of the ash trees will be assessed. Remote sensing, such as aerial photographs, will be used to measure the canopy cover of the ash trees. ArcGIS for desktop is the primary software used to process and analyze the data. The percentage of the canopy that each ash tree accounts for, as well as the amount and value of the plants that rely on the tree for protection will be used by Baker Arboretum to understand the financial and horticulture liability from the Emerald Ash Borer threat.

Luna, Katie; Lawrence, Keely; Cundiff, Meredith; Luecke, Kyle; "Ambiguity Leads to Context Processing in Predictive Learning" (Sharon Mutter)

Learning always occurs in context. Information that is learned can become context-specific when one attends to this context. Context-specificity is evident when performance varies when information is presented in the same context as learned, than in a different context. We hypothesized that ambiguity during learning would increase attention to context, causing learned information to become context-specific. We adapted Callejas-Aguilera and Rosas' (2010) restaurant and food-illness procedure to examine this issue. Participants learned to associate a food with the occurrence or non-occurrence of illness in three learning conditions with varying levels of ambiguity. In ambiguous trials, foods led to illness and no illness equally often. In non-ambiguous trials, foods were always followed by the same outcome. Half the food-illness associations were learned in one restaurant context; the other half were learned in a second restaurant context. At the end of training, participants were tested on target foods in the same context in which they were learned or in the other context. With a sample of forty-eight college undergraduates, we found that participants showed significant context-specificity in the conditions with ambiguity, but not in the condition without ambiguity. Our results support the idea that ambiguity during learning induces attention to context.

Mahmood, Towhid "Improving Water Quality through Land Retirement: Evidence from Green River Conservation Reserve Enhancement Program (CREP)" (Stephen Locke)
The main purpose of introduction of the Conservation Reserve Enhancement Program (CREP) in Kentucky was to mitigate the level of sediment, nutrients, pesticides and pathogens to save seven endangered species in the Green River system. By using historic data on CREP enrollment, specific Water Quality Indices for Green River and non-agricultural industry disposal of toxic elements in the streams of Green river, I estimated the impact of land retirement on improving Green River's water quality. Findings from the analysis show that though retirement of land surrounding the specific streams have significant impact on improving the indices, it is undermined by the impact of toxic element disposal by non-agricultural industries.

Mahoney, Rachel "There's No One I'd Rather Be than Me: An Analysis of Positive Minority Representation in *Wreck It Ralph*" (Jerod Hollyfield)
Though acclaimed for its story and technical elements, Disney's *Wreck it Ralph* (2012) has received almost no discussion on the positive portrayals of minorities central to the film. In fact, positive representation of minorities is often left under-discussed—especially in blockbusters—despite the issue's importance. Mozam Baig states in his paper *The problematic all: Media minority, visible Majority*, "The misrepresentation of visible minorities in mainstream media creates, over time, a deeply entrenched way of thinking about others...These perceptions of others develop and become legitimated by media discourse, what they see must also be real; the end result is marginalization, oppression." This insightful observation succinctly expresses the importance of positive media representation of minorities. Clearly, bypassing the study of negative representation is dangerous, but so is ignoring all the good positive representation provides. This paper will study the positive representation of minorities in one specific under-discussed blockbuster, *Wreck it Ralph*, by analyzing Ralph's role as stand in for multiple minority groups, Vanellope's portrayal as a disabled lead, and the minority issues played out in secondary characters. I will also discuss the importance of minority representation specifically in children's media and bring the film into conversation with ethnic and disabilities film studies.

Manuel, Karly "Bridging the Pacific" (Marilee Salvator)
As an artist, I am constantly looking for ways to portray the themes I am passionate about. My body of work mainly concentrates around the idea that we are connected to nature and have a fluid relationship with our natural surroundings. My hope is that people will relate and develop their own opinions about how nature relates to them when they look at my work. Last fall I was awarded a FUSE grant that allowed me to travel to Hilo, Hawaii and participate in a printmaking symposium called *Bridging the Pacific*. To prepare for my trip I created a print edition to trade with other artist from around the country. While I was in Hawaii I learned new printmaking techniques, participated in an open portfolio, and presented my body of work to an audience of prestigious artists. During REACH week, I will give a similar presentation, and explain what I learned during my trip and how it has influenced my recent work.

Mathews, Rilee "The Effects of Bingocize® on Cognitive Aging: A Health Promotion

Intervention" (Matthew Shake)

Health promotion programs can help maintain or improve quality of life for older adults; however, the majority of older adults in the United States do not adhere to such programs. We designed a novel technological app that combines Bingo, Exercise, and Health Education. We recruited older adults (N=38) from nearby independent living senior communities and randomly assigned them to either a Bingocize (exercise) group or a non-exercise Control group; both groups used the app twice weekly for 10-weeks. We collected pre- and post-intervention data on fluid cognition, functional performance, and physical health. The Bingocize group did not show differential improvement on the cognitive tasks, which examined inhibition, shifting, updating, and fluency, all $F(1,35)$, $p>.05$. However, they did differentially improve in some aspects of health and functional performance (e.g. they improved in arm curl repetitions, $F(1,35)=4.38$, p

Matsumoto, Mandy; Brown, Reagan; "An Investigation in the Accuracy of Parallel Analysis for Determining the Number of Factors in a Factor Analysis" (Reagan Brown)

There are several components that will affect the accuracy of factor extraction when using parallel analysis (PA): the choice of the 50th percentile, the 95th or 99th percentile, the strength of the factor loadings, the number of variables, and the sample size of the study. Although PA is the most accurate method to date to determine which factors are valid, there is still room for improvement. One area of PA not yet examined concerns the degree to which the actual eigenvalue exceeds the random data-based eigenvalue. All methods to date accept that any amount of difference, regardless of how trivial, between the two eigenvalues is enough to satisfy the criterion for a meaningful eigenvalue. However, a more prudent course may be the use of a greater margin than a simple absolute difference between the two eigenvalues. In our research, we examine the accuracy of the simple difference versus the 10% standards. We also examine the efficacy of this rule in conjunction with the 50th, 90th, and 95th percentiles. Our hypothesis is that a 10% standard may provide greater accuracy, potentially reducing the likelihood of Type II errors in research conclusions.

Mauch, Jordan; French, Carrie; Wininger, Steven; "Impact of Attempting to Multi-Task on Self-Selected Exercise Intensity" (Steven Wininger)

The primary purpose was to determine the effect of varying levels of cognitive load (CL) on self-selected intensity. A secondary purpose was to examine the effect of distance versus time goals. Hypothesis #1 was the control group will cycle at the highest intensity, then low CL, and finally high CL. Hypothesis #2 was the distance goal trial will result in higher intensities than time. 108 undergraduates completed the study (71 females, 37 males). In session one participants completed a 3-minute step test, working memory tests, and demographics. In session two participants completed two cycling bouts: one distance (3 miles) and one time (10 minutes). Participants were randomly assigned to a CL condition: no task (control), addition/subtraction (low CL) or multiplication/division (high CL). Significant differences were found in perceived CL across conditions for both the time and distance trials. A repeated measures ANOVA revealed the control condition performed best, followed by low CL. Participants performed better during distance trial compared to time trial. There was a significant interaction between self-selected intensity for time versus distance with no CL. CL diminished the impact of time vs. distance. Engaging in exercise and cognitive tasks simultaneously lowers self-selected exercise intensity.

Mayer, Matthew "The Future of Accredited Zoos and Aquariums: Embracing Strategic Adaptation through Social Innovation and Sustainability" (Jane Olmsted)

This presentation explores how zoos and aquariums can survive the tides of change and stave off institutional extinction by undertaking wide-scale, systemic, and adaptive change. Venues accredited by the Association of Zoos and Aquariums (AZA) welcome more than 180 million people annually and achieve timely and meaningful conservation and animal welfare outcomes. Yet, this social institution faces well-documented and mounting unfavorable social, political, and economic conditions. By harmonizing a misalignment between the societal role of accredited zoos and aquariums and the needs of people and communities and strategically designing its institutional climate, which includes leadership standards and organizational cultures, the industry can pursue simultaneous and interrelated organizational and community change outcomes not otherwise available under its current construct and the way it does business. A new social arrangement subsequently emerges where the societal role of accredited zoos and aquariums is aligned with and driven by the needs of people and communities, informed by a sustainability ethics, and enabled through strategically designed institutional climates. Accredited zoos and aquariums evolve into an equitable and resilient social institution that creates conditions for the ethical treatment of all Animalia and the intra-and multi-generational well-being for all.

McDaniel, Christopher; Nugent, Jesse; "ACE Gene Methylation and Hypertension in a Cohort of East Africans" (Nancy Rice)

Chronic non-communicable diseases, particularly cardiovascular disease (CVD), are the leading cause of death worldwide. One of the leading risk factors for CVD is essential hypertension (EH), high blood pressure from undetermined causes. It has been suggested that epigenetic control by methylation of gene promoter regions may contribute to this complex disease. The angiotensin-converting enzyme (ACE) is the gene of focus and it functions to convert the hormone angiotensin I to the active vasoconstrictor angiotensin II, thus increasing blood pressure. The promoter region of the ACE includes a CpG island, making it a prime target for methylation driven regulation. In this study, we have investigated the methylation pattern of ACE from genomic DNA isolated from a population of rural Kenyans known to have a high percentage of EH. DNA, isolated from buccal cells, was bisulfite converted and subsequently, the promoter region of ACE was amplified by a PCR and sequenced to identify patterns of cytosine methylation. My results suggest that while preliminary, gene-environment interactions may be playing a role in the high prevalence of hypertension observed in our population. This work was supported by a WKU FUSE to C.M.

McDonald, Benjamin; Wulff, Andrew; "Analysis of a South-West U.S. Pluton" (Andrew Wulff)

The southwest US is widely known for its past igneous activity (both intrusive and volcanic) and the structures it left behind. Among these are large granitoid plutons that, during the last stage of cooling, are subject to changes in composition by autointrusions that are formed either with or without volatiles. This study means to compare the mineralogical and geochemical compositional changes found between veins of pegmatite (coarse-grained) and aplite (very fine-grained) intrusions within one such pluton, located near the Fry Mountains. These are compared to the overall composition of the pluton itself. Polished thin sections

were prepared for PLM and SEM mineral analyses, and samples were crushed and powdered to be used in XRD and XRF analyses of the whole-rock mineralogy and whole-rock geochemistry. These data are compared with published geochemical and mineralogical data from other small intrusions throughout the Mojave, and a general petrogenetic model was developed to explain their origin.

McElroy, Eli "Praised Paradise" (Neal Downing)

The elderly is the wealthiest of knowledge and wisdom. They deserve to not only be accepted by the community, but be praised by those around them. Praised Paradise is a retirement village that includes five different living classifications including skilled nursing, special need, basic need, visitor's stay, and a separate Alzheimer's unit. A playful ramp that winds through an indoor garden creates a fun and exciting atmosphere that is rarely found within other retirement facilities. This comfortable and welcoming environment is provided to not just the residents and workers, but also to the public. This retirement village incorporates a strong sense of community; connections will be made between residential neighbors as well as residents and the public. The market, cafeteria, general commons area, and theater room will all be accessible to the public. The visitor rooms will provide friends and family from far away a comfortable stay. It is especially healthy and beneficial for younger generations to mingle with today's senior citizens. There is infinite wisdom to learn from our older generations, and connecting with today's youth brings them better health and more happiness. "The best classroom in the world is at the feet of an elderly person." –Andy Rooney

McGill, Jacqueline; Oregon, Evie; "Senior Woman Administrator: Barriers, Challenges, and Opportunities" (Evie Oregon)

Diversity efforts implemented by the NCAA hope to improve the Association through the addition of multiple voices in athletics. Notably, the Senior Woman Administrator (SWA) designation is intended to encourage and promote the involvement of female administrators in meaningful ways in the decision-making process in intercollegiate athletics. This role, created under Article 4.02.4 of the NCAA constitution, is to be filled by the highest ranking female in each NCAA athletic department or member conference (Levick, 2002; Raphaely, 2003). The purpose of the SWA position is to bring diverse voices to the table, but is the definition being fulfilled in reality? While the definition suggests the SWA is an athletics administrator, there are three lingering questions regarding the SWA's actual role in the department. One, does the designee perform decision making functions in the department? Two, does the designee perform tasks primarily on behalf of programs that are gender-focused or gender-neutral? Three, are the roles and tasks performed congruent with gendered norms? (Tiell & Dixon, 2008). The authors interviewed 10 Senior Woman Administrators at Division I institutions to explore their roles, perspectives, perceptions, and responsibilities. Within these interviews, there were some notable concerns highlighting barriers, struggles, challenges, and lack of opportunities.

McRoberts, Jordan; Jent, Morgan; "Colors in the World of Healing" (Shelia Flener)

Color has many places in the world. The human body and mind react to color in a way that is hard to explain. It is sometimes so subtle we may not even notice it. In this physician office's design, color is picked out and placed to promote health and wellness. The research

conducted shows that color alters mood and promotes health in the human body. The colors selected are blue, green, and white. The calming color, blue, is believed to reduce migraines, nervousness, and high blood pressure. Earthy greens are believed to be stress reducing and have a positive effect on tremors and muscle spasms. Cool colors, such as white, calm agitation and hypertension, as well as give a sense of sterility. We believe these colors will promote a healthy environment for both the mind and the body. This design will promote healing within the patients it encounters.

McShane, Kelli "Large-Scale Atmospheric Contributions to the Historic Winter Storm on January 31-February 2, 2011 across Northern Illinois" (Joshua Durkee)

From January 31-February 2, 2011, a powerful winter storm produced nearly two feet of snow across northern Illinois. Along with record snowfall amounts, wind gusts exceeded 60 miles per hour and blizzard conditions persisted across the region. The city of Chicago observed its third snowiest winter since record keeping began in 1950. Even more noteworthy, this storm produced hail, lightning, and thunder in some locations due to strong updrafts. This system took a total of 11 lives, schools and businesses were shut down for two days, and produced nearly one billion dollars in damage. The purpose of this study is to analyze large-scale atmospheric circulation processes that contributed to the formation of this historic winter weather system. Data used in this research included surface weather observations and upper-air weather forecast model reanalysis. These data were plotted and subjectively analyzed. Initial results of this study indicate that mid-level atmospheric circulation features were connected to sufficient moisture and forced lift, which produced record snowfall over the region.

Menix, Jacob "Using Computational Bayesian Statistics to Analyze Parameters in a Differential Equations Model" (Richard Schugart)

The purpose of this project is to use Bayesian statistics to analyze values of parameters for a previously developed system of differential equations which describes the healing process of diabetic foot ulcers. The model describes the relationships between matrix metalloproteinases, their inhibitors, and extracellular matrix. A Bayesian approach is used when the availability of data is sparse, as it is in this case. Delayed Rejection Adaptive Metropolis (DRAM), a MATLAB implementation of a Metropolis-Hastings algorithm, is used to estimate parameters. This approach with the individual patient data allows us to refine the parameters, find associated confidence intervals using parameter distributions, and compare pairwise plots of parameters. This will help improve the wound-healing model in order to better predict wound-healing outcomes for individual patients.

Meyers, Jon "For Now We See in a Mirror Darkly: Cultural Reflections Found in the Films of Busby Berkeley" (Jerod Hollyfield)

What is it about the Busby Berkeley-style dance scenes of the past that gave them their cultural resonance? Film historian James Sanders states that Berkeley's films provide escape from reality by distracting the audience with "backstage thrills...by giving us a glimpse of the hidden world of the theater" (107). Dance critic Marcia Siegel goes even further, when she states Berkeley's films show a complete disconnect from reality turning film into "a medium for hallucinatory visions" for audiences (106). Although these critics, and others, point to the spectacle of Berkeley's films as a escapism vehicle from the troubled times of the

1930s/1940s in which they were released, it is more accurate to argue this position: Busby Berkeley's films actually were not designed as escapism vehicles; rather they accurately reflect the culture of the times in which they were released. By piecing together evidence from previous scholarly journals, as well as from the films themselves, I will prove this thesis; and, I will set the stage for further academic discussion. Although the case has been made in the past for escapism through his films, I argue the stronger case is made for accurate societal representation.

Millay, Matthew; Patty, Blaine; Smith, Michael; Monroe, Jerry; "Investigating the Synergistic Effects of Two Curcuminoids and Cisplatin on Cancer Cell Migration and Auditory Tissue" (Michael Smith)

Cisplatin is an anticancer drug which can release reactive oxygen species (ROS) that damage auditory tissue and cause hearing loss. Curcumin is an anti-oxidant compound that can enhance the activity of cisplatin against cancer but exhibits poor bioavailability. We decided to investigate whether two synthetic curcumin analogs (curcuminoids), EF24 and CLEFMA, with improved bioavailability, increase the effect of cisplatin against cancer migration and reduce ROS release. We used a cell migration assay to test if the curcuminoids enhanced the activity of cisplatin against cancer cell motility using the lung cancer cell line, A549. Cancer cell monolayers were scratched and then incubated in media with control or experimental treatments. Cell migration distance was measured at two different time points (0 and 24 hours). Our results suggest that both the EF24 and CLEFMA treatments reduce cancer cell migration with the effect of EF24 in combination with cisplatin producing the greatest reduction. In the near future, we will test the effect of the curcuminoids on ROS release in cancer cells and zebrafish (*Danio rerio*) auditory tissue.

Mills, Morgan; Tinius, Rachel; Olenick, Alyssa; Pearson, Regis; Shaker, Nuha; Oregon, Evie; Hoover, Don; "Sedentary Behavior Influence on Metabolism" (Jill Maples)

There is a high prevalence of metabolic disease and time spent in sedentary behaviors in the US. However, the impact that a sedentary lifestyle has on metabolism is not completely understood. The purpose of this study is to investigate the association between a sedentary lifestyle and metabolism. Methods: 19 women had their baseline-resting metabolism measured to estimate fat and carbohydrate metabolism, consumed a high-fat smoothie, and then had a subsequent metabolic rate measured at 2 and 3 hours post- high-fat smoothie consumption. To estimate time spent in sedentary behaviors, the participants wore a physical activity monitor for 3 days, and were classified into categories of sedentary or non-sedentary. Results: There were no significant differences in age, weight status, or cardiorespiratory fitness between the sedentary and non-sedentary women. Between subject comparisons revealed a significant (p

Mills, Tori "Indie Darlings: The Significance of the Female Coming-of-Age Story in Independent Cinema" (Ted Hovet)

Independent cinema presents alternative storylines that mainstream cinema does not often explore. Characters in independent cinema, as Michael Z. Newman points out in *Indie: An American Film Culture*, are often emblematic so that they represent a larger group or social type, especially those we do not usually see on the big screen. Independent films like these require a particular venue, such as the Sundance film festival, to encourage such

unconventional perspectives. This includes the female adolescent coming-of-age story, a narrative that male protagonists generally dominate. In the book *Sugar, Spice, and Everything Nice: The Cinemas of Girlhood*, Mary Celeste Kearney gives a brief explanation of how the female coming-of-age genre has developed over time, and how these evolving narratives reflect the feminist movements occurring during the time period of each film's respective creation. Using Kearney's studies, I will explore the correlation between independent cinema venues and films about female adolescents by analyzing images and storylines from contemporary films with these stories, such as the 2017 Sundance premiere film *Novitiate*. This will provide an insight to the continued struggle to present films about adolescent girls with meaningful depth.

Minto, Kelsey; Bowman, Sarah; "Summer Feeding Programs: An Approach to Decrease Childhood Food Insecurity" (Whitney Harper)

In 1966, the Richard B. Russell National School Lunch Act created the program that allowed for the creation of free and reduced price school meals. Many families are eligible for and utilize these programs, providing adequate nutrition for their children while they are in school. The Healthy Hunger Free Kids Act was passed by the 111th Congress in 2010 and is the basis for programs which focus on school nutrition and other food programs for children. These policies have benefitted millions of children in poor economic areas by providing access to nutritious meals during the summer months. Food insecurity, defined as being unable to acquire adequate food for one or more household members due to insufficient funds and/or other resources, is a prevalent issue among these poor economic areas (Coleman-Jensen et al., 2016). Summer Feeding Programs are helpful to those who qualify. However, there are ways in which they could be improved to benefit more children. These improvements including lowering the eligibility threshold from 50% of children with free and reduced lunches to 40%, utilizing various forms of transportation to distribute the meals, increasing awareness of these programs, and using different methods to reduce food waste. Social workers need to advocate for improvements in legislature in an effort to secure aid for those in need.

Mitchell, Cody "Adjusting Animation: Animated Films for the Modern Era" (Jerod Hollyfield)

From 1928 to 1972, the American film industry experienced an influx of popular animated films and television cartoons. Dubbed "the Golden Age of American Animation," this period bred the likes of *Gertie the Dinosaur*, *Betty Boop*, *Looney Tunes*, *Mickey Mouse*, and countless successful animated features from Walt Disney. However, the integrity and popularity of the animated film had calmed down since, with most animation holding roots in cable television in the form of cartoons. Yet, within recent decades, animation as an art form and element of the cinematic universe has undergone a prosperous revival. Films such as *Kubo and the Two Strings* and *Anomalisa*, among others, have garnered critical attention, separating themselves from the continuous success of Disney productions. Animation is no longer an exclusive cinematic form heralded by a few important figures, but has now branched out into a diverse style of filmmaking accessible to all. With assistance from television cartoons, online shorts, and even Internet memes, animation and all elements therein have expanded and modified, allowing for additional creativity and exploration in this modern world of animated films. I intend to explore the reasoning behind this surge in

popularity as it coincides with changes in culture and technology.

Mitchell, Logan; McClanahan, Kegan; "An Analysis of the Lost River Karst Aquifer's Hydrometeorological Response to Storm Events" (Jason Polk)

The purpose of this research was to examine storm-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 drainage basin were compared to discharge totals from Lost River Rise (LRR) and Blue Hole Four (BHF). Both daily and monthly resolutions were used so that individual storm events could be analyzed, while also focusing on comparison of the larger hydrometeorological responses by comparing those to the baseflow regime. SigmaPlot was used for further statistical analysis of 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. In order to explain this, the geochemical makeup of both sites are being compared so that the potential source regions of this false discharge signal can be found. 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.

Moledina, Zaiba; Farrell, Colin; Ellis-Griffith, Gregory; "Effect of Health Insurance Status on Receiving Healthcare" (Colin Farrell)

Abstract Introduction: High quality healthcare services and purchasing health insurance in America can be very expensive. This study tested the effect of an individual's health insurance status on receiving healthcare in the past 12 months, while controlling for age, gender, race, annual family income, education level of adults, and general health condition. Methods: Data was obtained from National Health and Nutrition Examination Surveys – 2013-2014. A binary logistic regression was run using SPSS version 24 to determine the relationship between Receiving Healthcare in the past year and status of Health insurance. Results: Individuals covered by health insurance were 4.34 times more likely to receive healthcare than individuals who were not covered by health insurance. Increasing age, female gender, being Non-Hispanic Whites, deterioration in general health condition, higher education level of adults, and higher annual family income also result in greater likelihood of receiving healthcare. Discussion: Receiving health care is significantly determined by health insurance status of individuals. The Affordable Care Act has reduced the rate of uninsured significantly, thus making access to healthcare much easier than it used to be for many. ACA also explains how important and crucial it is to have health insurance coverage in this country.

Moll, Sabrina; Menke, Brenna; ; White, Mason; McDermott, Weston; Crandall, Jason; "Effects of Spine Align for Improving Flexibility in Male College Students: A Pilot Study" (Scott Arnett)

Back pain and poor posture, widespread afflictions in the United States, have been linked to sedentary life styles. Adjusting flexibility, via increasing range of motion, is thought to improve poor posture and relieve back pain. Therefore, the purpose of this study was to investigate the effectiveness of the Spine-Align on flexibility. The Spine Align is a new style of foam roller designed to improve thoracic mobility. A pilot study was designed utilizing

male, college students (n=10, 20.5 ± 2.27 years). Participants completed informed consent and were screened for a history of back problems using the NASM questionnaire. Protocols for using the Spine Align were followed and pre and post measures were collected to assess flexibility using the sit-and-reach test. To analyze the data collected, SPSS software was used to assess reliability and conduct a dependent t-test to determine pre and post differences in flexibility. There were significant improvements in flexibility after using the Spine Align (p < 0.001). Our results suggest the Spine Align roller is an effective modality for improving flexibility related to posture. Future experiments are needed to confirm these results and to compare the Spine Align to existing modalities.

Moore, Brittney "Bedrock Collapse Sinkhole Analysis in Bowling Green, 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, southcentral Kentucky has the highest density. The most common type of sinkhole in Kentucky is the cover (or sediment) collapse which occurs in the soil or other loose material that overlies soluble bedrock. A second type of sinkhole is called a bedrock collapse, which occurs 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 the risk of bedrock collapse sinkholes as a geohazard in Bowling Green, Kentucky. Methods include the use of remote-sensing, GIS, cave data and maps to interpret areas in Bowling Green that pose the greatest risk of bedrock collapse and, thus, damage and loss of infrastructure. There are over 350 cave entrances in Warren County and more than 30 km of cave passages and among those bedrock collapse sinkholes are relatively rare. However, preliminary results indicate that bedrock collapse sinkholes can be induced by anthropogenic activities.

Moore, Lindsey "Standing in the Way: Criminalizing Homelessness" (Whitney Harper)

Homelessness continues to be a major social issue in the United States, affecting an estimated 2.5 to 3.5 million Americans annually. Cities are struggling to alleviate this issue and are increasingly using criminalization to address homelessness, as homeless individuals are seen as, literally, standing in the way of city improvement efforts. Rather than offering constructive solutions, cities are enacting ordinances which target and criminalize homeless behaviors, such as sleeping in public and pan-handling. These city ordinances, known as anti-homeless legislation, effectively make it illegal to be homeless, and furthermore, they are an unjust and ineffective response to homelessness. This study seeks to further understand the civil rights implications of this anti-homeless legislation, specifically how these ordinances are infringing upon the civil rights of homeless individuals. This study will follow a cross-sectional survey design, and data will be collected via surveys given to a group of individuals experiencing homelessness. The data will provide information regarding how public policies restricting homeless behavior are burdening the lives of homeless individuals and violating their civil rights. It is expected that this study's results will indicate that anti-homeless legislation causes homeless individuals' civil rights to be violated, further emphasizing the social injustice of these policies.

Morris, Julius "Destruction to Development" (Neal Downing)

My research project is the design of a high performance athletic center in the Caribbean island of Montserrat. The presented main elements will display a warm and comfortable location for athletes to train and develop their athletic abilities. The project will house 20 athletes to provide the optimum training and living experience. The project will also display the central training facilities to give an authentic overview of connection to Montserrat the host country. To tie these together, the relationship between all of the central needed elements will be displayed to show how smooth efficient and welcoming the design of this center really is adding to the advantage of its already unsightly beautiful environment.

Morton, Tevan "Black Sun Shines Light on Racism and Cultural Dissonance: An Analysis on Racism against African Americans in Film" (Jerod Holyfield)

Commentary on racism against African American portrayed in film have varied throughout the years. However the perspective is only from America. Erica F. Berry writes "It is well known that whites controlled the dominant ideologies throughout the Civil Rights movement, and is still the dominating power over American society." But one film portrays racism from a perspective outside of America. In 1964, Japanese director Koreyoshi Kurahara's released the film *Black Sun*, centering around the growing bond of a jazz obsessed Japanese drifter and an African American GI who's gone AWOL in Tokyo. This film's approach to address racial issues not only portrays Japan's own views but are self reflexive of western culture's treatment of African Americans at the time, as well as some controversies that still exist today. In this paper I will argue that the film's relevance is underappreciated as it addresses racism portrayed against African Americans in film. I will examine themes of racial relations and representation of African Americans as it's presented in Japan and analyze how these issues reflect and translate themes portrayed in western films that have tackled race as well as how it approaches issues differently that makes itself stand out amongst other contemporaries.

Mota, Steven "Nashville's Rewind Museum" (Neal Downing)

The concept of time is no new phenomenon, but in recent years it seems as though it has stagnated to the point of little interest. Because of this, recent generations have learned to accept its existence without fully understanding the importance it plays in the daily lives of millions of people. For this reason, a new museum – the first of its kind – was designed to deliver a unique, entertaining experience. Nashville's Rewind Museum is based on capturing, displaying, and teaching the concept of time through cultural, historical, astronomical, and physical elements. The idea behind a museum that specifically focuses on horology, or the study of time, is to spread the wonders and complicated interactions that we as humans have been so enticed by since the early recordings of civilization. This museum is meant to create an environment where everyone is welcome to discover the mysteries of time, and all of the ingenious solutions that different societies have created in an attempt to establish historical records.

Muller, Chloe "The Failing Fight For Universal Paid Family Leave" (Molly Kerby)

The United States is one of only two countries without a national mandate for some form of paid family leave. A policy for paid leave ensures individuals can care for their loved ones and maintain financial independence. The researcher examines past and current U.S. family leave policies and the development and content of the Family and Medical Leave Act

(FMLA) through a queer feminist lens, revealing insufficient and exclusionary standards. Queer feminism demands radical transformation of systems so the most vulnerable citizens are protected and opposes patriarchy and binary systems because such positions marginalize non-conforming gender identities. By analyzing US policies on family leave as well as the formation of the FMLA, it becomes apparent that these statutes and debates fail to align with queer feminist goals and ideology. This failure contributes to the unavailing campaign for universal paid family leave in the United States of America. The questions left to consider after this analysis are: a) what legal or social reforms are necessary to achieve the goal of systematic change and b) what processes and policies can meet the demands of queer feminism and address the needs of all citizens?

Musgrave, Nicole "Engaging National Resources Locally: How Folklorists Can Leverage Federal Grants for Place-Based Advocacy Projects" (Brent Björkman)

The work of public folklorists has been criticized for not extending beyond the realm of celebration, for failing to meaningfully alleviate social and cultural tensions —yet folklorists are well suited for the type of collaborative, place-based projects that engage community members in cross-sector dialogue as a platform for transformation. The federal government offers a variety of resources that support such work. In this paper, I will examine two federal grant programs – the NEA’s “Our Town” and the NEH’s “Community Conversations”– and the ways in which folklorists can engage these resources for community-based advocacy. Through research with representatives from the agencies and with other sources, I will describe the programs, looking at how they have the potential to navigate social challenges and bolster community development. I will also explore research on the field of creative placemaking – specifically as it relates to the Our Town grant – as an opportunity for folklorists to apply their training towards social issues. I will then review several projects from each program to consider their effectiveness in increasing livability for community stakeholders. Finally, I will explore the role of the folklorist in each program, determining how training in folklore can be applied to help such projects succeed.

Na-Yemeh, Dolly "Geoprofiles and Data about Data" (Rezaul Mahmood)

In climatological studies, it’s been long understood that it is not only crucial in documenting characteristics of the proximate landscapes for determining climate instrument exposures, but also doing so in such a way that those characteristics can be readily communicated to users of climatological data (Mahmood et al. 2006). Geoprofiles, a model for visualizing spatial metadata, do just that by including layers of elevation, land use and land cover. For this project, Geoprofiles for selected weather and climate monitoring stations of Kentucky Mesonet (www.kymesonet.org) were created using geographic information system (GIS) software. GIS processed Digital Elevation Models (DEMs), aerial photographs, and Land Use and Land Cover data available from the Kentucky Geoportal and the U. S. Geological Survey. Quantitative summary statistics concerning these layers were also produced to further characterize and to provide additional information on exposure of Kentucky Mesonet stations.

Nauert, Jr., Kenneth "Redefining the Roles of Women and Sexual Ethics in the Roman Catholic Church" (Elizabeth Gish)

The Second Vatican Council was one of the most seminal councils in the history of the Roman Catholic Church, and had far reaching and engaging effects on the wider universal institution. One of the most important outcomes of Vatican II was not the reforming of orthopraxy, but the dialogue that developed within the Church regarding specific issues, two of which are the transforming dynamic of women's roles in Church life and of Catholic sexual ethics. The decades following Vatican II became a new era of religious dialogue amongst Catholic scholars and theologians, which established new discussions on women ordination and sexual ethics in the contemporary world. This paper discusses dialogue concerning women's ordination into the priesthood and/or permanent diaconate, as well as the dialogue that developed from Pope John Paul II's moral teachings in his Theology of the Body. This paper explores the dialogue amongst Catholic scholars and theologians on the changing role and opinion of women in ministerial positions, as well as the shifting of understanding of sexual morality in the contemporary Church that developed due to the broadening emphasis on discussion established by Vatican II.

Nellans, Lillian "Patriarchy Weaponized: Sexual Violence amidst Armed Conflict" (Patricia Minter)

International law exists at the intersection of law, international relations, and human rights. Historians have traced the classification and prosecution of war crimes, crimes against humanity and genocide, revealing what shapes international judicial processes and behavior during conflict. Sexual violence has only recently become part of this conversation. My paper asks why sexual violence occurs during armed conflict and why it has only recently been criminalized. To answer this question, I analyze warfare and its aims and strategies through a gendered lens. Specifically, I argue rape has become a more prevalent, and useful, war tactic. In response, feminists have agitated for its criminalization. I use World War II, the wars in the former Yugoslavia and the Rwandan genocide as case studies. Wartime rape has increased during the 20th century because warfare has become asymmetrical and new conceptions of gender have made war rape more acceptable. Sexual violence humiliates the enemy, weakens familial connections and strengthens the perpetrator's population. Feminist progress has led to the formal criminalization of wartime rape under international law, but predominantly white, anti-rape activists in the US have prioritized their own struggle over the struggle of women of color being raped in wars around the world.

Noel, Paige "A Case Study of the Severe Weather Outbreak in Knoxville, Tennessee on April 27th, 2011" (Josh Durkee)

The tornado outbreak on April 27, 2011 was the most historic tornado outbreaks since the widely known April 1974 tornado outbreak. More specifically, Knoxville, Tennessee experienced baseball-size hail that damaged roofs and cars, along with multiple tornadoes. The purpose of this study is to analyze the large-scale features that contributed to the severe weather event in Knoxville, Tennessee on this day. Upper air model data, surface observations, satellite and radar were employed for the analysis of this event. These data were subjectively analyzed in order to diagnose the most influential large-scale processes. Results show that large-scale upward vertical motion, coupled with strong instability and wind shear were the main contributors to this severe weather outbreak.

O'Connor, Brent "The Irie: Cultural Center and Cafe" (Neal Downing)

Even though South Florida has the 2nd largest Jamaican population in the world, there are no facilities that promote Jamaican culture and arts. My proposed project is a Jamaican cultural center and café offering an interactive experience celebrating Jamaican influences on the region as well as chronicling the historical mass migration of the 1960s. The facility seeks to provide learning experiences for guests to take virtual tours, a theatre to view live or recorded performances, and a café where visitors can enjoy traditional Jamaican cuisine. My ultimate goal for this project is to establish a community resource that will broaden our understanding of the Jamaican experience.

Olenick, Alyssa; Pearson, Regis; Shaker, Nuha; Oregon, Evie; Tinius, Rachel; Blankenship, Maire; Maples, Jill; "Metabolic Flexibility among Women in Response to a Single High Fat Meal" (Jill Maples)

Purpose: African-American (AA) women have higher rates of metabolic disease compared to Caucasian (CA). Metabolic inflexibility is the inability to increase fat metabolism in response to a high fat meal; potentially leading to weight gain and development of metabolic disease, with higher incidences among AA women. Methods: Baseline, fasting glucose, resting energy expenditure and lipid oxidation, and percent body fat (BF) were assessed for CA (n= 15; Age=26.26±5.65 yrs; BMI=30.72±11.92; BF=28.09±9.03%) and AA (n= 11; Age=27.36±6.61 yrs; BMI=29.11±6.68; BF=29.43±9.30%) women. Participants consumed a high fat shake. Glucose, REE, and lipid oxidation measurements were taken at 120 minutes post shake. Results: There were no significant group differences in age, BMI, or BF. There was a significant time effect for lipid oxidation among all women. Significance in lipid oxidation between CA lean, CA obese, and AA obese, but not AA lean women. Significant increases in fat oxidation were seen between CA and AA lean, and CA lean and CA obese. There was a significant BMI and BMI x Ethnicity interaction seen for carbohydrate oxidation. Conclusions: Metabolic inflexibility in response to a high fat meal may not in the increased metabolic disease prevalence among AA women.

Palavra, Sanida; Huskey, Steve; Smith, Michael; "How do Chameleons Sense Vibrations? Microscopic Examination of Possible Sensory Structures" (Michael Smith)

Numerous animals across diverse taxonomic groups communicate using substrate-borne vibrations, but reptiles have been understudied in terms of vibrational communication. The veiled chameleon (*Chamaeleo calyptratus*) was recorded producing vibratory signals in courtship and disturbance contexts (Barnett et. al. 1999). This phenomenon, however, has not been further examined. We hypothesize that chameleons, which do not hear very well (Wever 1968), detect these low-frequency vibrations through tactile sensation. In order to better understand the mechanism of detecting vibratory signals, differences were examined in skin specializations in the tail and plantar and dorsal surfaces of the feet of the following chameleon species: *Chamaeleo gracilis*, *Chamaeleo senegalensis*, *Chamaeleo calyptratus*, and *Trioceros jacksonii*. This was accomplished by examining skin tissue via scanning electron microscopy (SEM) to identify potential mechanoreceptors on the surface of the skin. There were noticeable differences in setae groupings and length on the surface of skin between different species with average setae length from $6.3 \pm 0.8 \mu\text{m}$ in *T. jacksonii* to $10 \pm 1 \mu\text{m}$ in *C. gracilis*. Also, chameleon skin sections were stained with toluidine blue or hematoxylin and eosin to identify potential mechanoreceptors in the skin, such as lamellated corpuscles.

Park, Jeyun "Communication Issues in Multinational Organizations" (Kumi Ishii)

Nowadays we see a lot of multinational organizations (MNO) in a global society. MNO employees may face challenges among fellow workers in the office. For example, although MNOs need to understand the local market in a host country to do business, it would be hard to interact with local people due to different languages. Also employees in an MNO could misunderstand each other due to different cultural backgrounds. The purpose of this paper is to investigate what challenges MNO members are facing. Based on the literature review, the following communication-related issues are identified: (a) cross-cultural adaptation to the host environment, (b) different communication styles among multicultural members, (c) managing the conflict in different cultures, and (d) lack of language skills. Finally, I suggest three trainings to overcome these challenges. One is a training program to help employees extend their knowledge about cultural differences. Another training program is to give them opportunities to interact with each other in order to develop personal relationships. The last training program is using "off-line talk," talking with people who might disagree with them before the meeting to avoid a confrontation. Through these suggestions, I will also discuss the significance of mind set of understanding others.

Patel, Dharmesh; Malone, Jonathan; Kwong, Ka Wai; "Photochemical Generation and Kinetic Studies of High-Valent Iron-Oxo Porphyrins" (Rui Zhang)

Metalloporphyrins and metallocorroles provide a versatile synthetic base for a variety of material applications. Over past decades metalloporphyrins and metallocorroles assemblies have been increasingly explored for different applications. This has been inspired by the promising properties of a heme-containing enzyme, namely cytochrome P450 enzymes (CYP450s), which activate molecular oxygen and transfers one oxygen atom into a substrate and reduces the second to water under mild conditions. In this work, a new photochemical access to high-valent iron-oxo model derivatives will be presented. Our spectral and kinetic studies suggest that the photochemical reactions involve a heterolytic cleavage of O-Br in precursors 2 to give a putative iron(V)-oxo intermediate, which might relax to Compound I through electron transfer from porphyrin to the iron or undergo rapid comproportionation reaction with residual iron(III) to afford the Compound II derivative.

Pearson, Joanna; Lickenbrock, Diane; "Associations between Parent Mind-Mindedness, Parent-Infant Affect, and Infant Emotion Regulation with Mothers" (Diane Lickenbrock)

Emotion regulation is a critical skill acquired in infancy and develops within the parent-child relationship (Sroufe, 2000). Previous studies have found aspects of parenting (e.g., parent sensitivity) to predict infant emotion regulation (Fox & Carlson, 2003); however, the results are mixed. Some studies have found infant emotion regulation might be adaptive (e.g., Braungart-Rieker et al., 1998), while other studies have found these infants' use of regulatory behaviors is not always adaptive (Braungart-Rieker et al., 2014). Parent mind-mindedness, or the ability to view the infant as a separate mental agent, might explain the gap between parent sensitivity and infant socioemotional outcomes (Meins, 2013). The present study aims to examine how the associations between parent mind-mindedness and parent affect in early infancy predicts infant emotion regulation with mother-infant dyads at 4 months. Preliminary analyses from a subset of the sample (n=40) revealed that when mothers were low in negative affect, infant distraction decreased as infant negative affect increased (B=-.63,

SE=.30, $p < .05$). Subsequent analyses will examine these associations with additional dyads. Additional analyses will also include parent mind-mindedness in order to examine whether it is a better predictor of infant emotion regulation than parent sensitivity with mothers.

Pease, Jacob "Safeguard Democracy: An Institutional Reform to Promote Republican Liberty" (Edward Yager)

American society has been exposed to an abuse of arbitrary power by its government, groups, and other individuals throughout recent decades because the values of republican liberty have decayed. The country has skewed towards classic and modern liberal values and away from the ideals of republican liberty that was implemented into our nation's foundation by our founding fathers. This has resulted in the loss of transparency within our government and the neglect of the separation of powers by the federal branches. Thus, allowing for the threat of arbitrary interference into an individual's life. To combat these problems, the United States must develop a way to restore the values of republican liberty implemented by our founding fathers. One of the ways to accomplish this goal is to implement a limited franchise of direct democracy into the federal system. This would help ensure that the American populace would be protected from the abuse of arbitrary powers by government, various groups, and other individuals. My presentation would give a description of republican liberty, how it differs from liberalism, its historical development, and propose my model of how to implement republican liberty into our federal system through direct democracy. Giving same presentation at KPSA.

Pendergrass, Stetson "Brentwood Cutters" (Neal Downing)

Brentwood Cutters will be a top notch facility where the whole equestrian community will want to participate. This facility is not just any ordinary facility; the principle features involve professional cutting horse trainers coming to this facility to train young talented cutting horses while residing at the facility. Horses from the surrounding communities are welcome to be boarded as well. The location of this twenty stall facility will be in Brentwood, Tennessee. Housing is integral in this project. This project will have five separate dwelling units, which will house the five trainers. This facility will also provide above average veterinary services which will improve this equestrian facility. The rationale behind this project decision is to better my understanding of equine facilities for potential future designs.

Penner, Matthew; Ramsey, Haley; McCray, Elizabeth; Powers, Jeff; Wichman, Aaron; "Insecurity and Threat" (Aaron Wichman)

This study looked into the effects of feeling insecure on an individual's feelings of threat from other groups. Participants were tasked with writing a short response regarding an interaction that made them feel either secure or insecure. After this, they were asked to indicate their attitudes towards Americans from northern states (Northerners) and Muslims settling in Kentucky. Participants indicated both the extent to which they thought both groups were a physical threat (e.g. would take jobs, might pose a terror attack risk) and also the extent to which the two groups posed a symbolic threat (e.g. wouldn't understand Kentucky values, wouldn't support our way of life). Results showed that while the writing task had no effect on physical threat perceptions, writing about insecurity changed perceptions of threat from these groups in interesting ways. Specifically, writing about insecurity made

participants believe that Northerners better understood and would fit in better with Kentucky values. It also made participants believe that Muslims as a group understood less and would not fit in as well with Kentucky values. This study demonstrates how perceptions of threat can either improve or diminish attitudes toward others, depending on the nature of the groups to which they belong.

Perez, Meghan; Curry, Caleb; King, Rodney; "Exploring Viral Diversity through the Comparison of Mycobacteriophages Squiggle and Trufflatree" (Rodney King)

A bacteriophage is a virus that infects a bacterial host cell in order to replicate. In a world with an estimated 10^{31} phage particles, only around 3,000 phages have been characterized. In an effort to expand our knowledge about these ubiquitous biological entities, we isolated and characterized bacteriophages that grow on *Mycobacterium smegmatis*, a common soil bacterium. Mycobacteriophages Squiggle and TruffulaTree were recovered from two different environmental soil samples, both of which were compost piles found in the city of Bowling Green, and purified to homogeneity. Although these phages were grown on the same bacterial host, the plaque morphology differed. Mycobacteriophage Squiggle formed clear, 1-2mm plaques, while Mycobacteriophage TruffulaTree formed turbid, 3mm plaques. Further examination of purified phage particles by electron microscopy and restriction endonuclease digestion of purified genomic DNA, showed that Squiggle and TruffulaTree also vary in morphology and restriction digest patterns. Despite the fact that these phages were collected in close proximity to each other, our evidence suggests that they are not closely related and that even a fairly localized viral population can be diverse.

Peveler, Kayla "The Molecular Evolution of the HEXA Gene in Regards to Tay-Sachs Disease" (Chandrakanth Emani)

The purpose of my study is to examine the molecular evolution of the HEXA gene and its implications to Tay-Sachs disease. Also, this study intends to compare and contrast the mutations that occur within the various populations at high-risk of developing this disease. My central concept is population genetics in which populations are compared among each other to identify patterns or possible causes of a particular phenomenon. Numerous research studies have been conducted to study specific populations for Tay-Sachs, such as the Ashkenazi Jewish population and the Indian community. In my study, I intend to compare and contrast the mutations occurring within these populations to possibly identify genetic relationships among the populations.

Phelps -Birdwhistell, Christy "Is Alcohol Abuse More Prevalent in Combat Veterans with PTSD Compared to Non-Combat Veterans?" (Whitney Harper)

Many soldiers fight substance addiction. Research indicates a link between stressful events soldier's encounter, alcohol use, and PTSD (Jakupcak,2010). Veterans are a vulnerable population, returning from deployment with PTSD, adjustment issues, or other problems. Seeking treatment can be difficult because usually veterans must go to a VA establishment. One veteran waited a year for a mental evaluation appointment at a VA hospital (Kime, 2016). With the rise in deployments more soldiers are encountering this problem. A survey was developed to determine if combat veterans diagnosed with PTSD were more likely to experience an alcohol use disorder (AUD) and what factors are considered when seeking treatment. Social workers play a key role in finding soldiers the resources and treatment

options they need for civilian re-entry.

Phillips, Mallory; Cooper, Matthew; Zaleski, Ian; Ellis, Blake; "ME 412 Berry Plastics Acoustics" (Robert Choate)

The scope of this project is to design, build and run a system to quantify the silencing effect of adhesive tapes used in the interior of a vehicle for Berry Plastics. This is done by measuring the difference between the noise of an unwrapped and a wrapped steel bar being dropped on an impact plate. This test is intended to determine if the tape meets or exceeds a BMW spec. The issue with the current tester is twofold. First, ambient noise is prevalent, skewing the data. Forklifts are used throughout the plant, making a lot of noise, and the room is used for other noisy activities. Second, the measuring portion of the device is slow and tedious, increasing the risk of errors. Our approach on reducing ambient noise and facilitating the use of the device has included research on sound mitigation products to enclose the device, as well as automating the device. The device is intended to automatically start, calibrate, and collect data using National Instruments LabVIEW. This project is to be completed by May 2017.

Plummer, Erica; Thayer, Dominique; Ashley, Noah; "Effects of Chemical Sympathectomy on Inflammatory Response to Sleep Loss in Mice" (Noah Ashley)

The intent of this research project is to understand the changes in pro-inflammatory cytokine gene expression in the periphery and brain of a mouse model that has been exposed to 24 hours of sleep fragmentation after having their sympathetic nervous system suppressed. Groups of mice were put under different conditions and their peripheral organs (liver, spleen, and fat) and brains (hypothalamus, hippocampus, and prefrontal cortex) were harvested in order to analyze the levels of pro-inflammatory cytokines under each condition. As this is an ongoing project, results have not been completely collected. However, it is expected for pro-inflammatory cytokines to be at higher levels in mice whose sympathetic nervous systems are intact and who've undergone sleep fragmentation. In conditions where mice have undergone chemical sympathectomy and sleep fragmentation, it is hypothesized that there will be no pro-inflammatory cytokine gene expression.

Polapally, Mamatha "Synthesis, Structure and Properties of Metal Organic Frameworks" (Yan Bangbo)

Metal organic frameworks have attracted great attention from chemists because of their broad applications such as hydrogen storage, ion exchange, and catalysis. Ruthenium polypyridyl complexes have been broadly studied as photosensitizers for the solar energy conversion. With this aspect, we have synthesized several new metal-organic framework materials ($[\text{Ru}(\text{BPC})_4\text{M}]\cdot x\text{H}_2\text{O}$) from ruthenium(III) chloride and BPC (BPC=2,2'-bipyridine-4,4'-dicarboxylic acid; M = Cu(II), Fe(II), Ni(II)). These hybrids were synthesized under solvothermal conditions by using water, ethanol as solvents.

Powers, Jeffrey "The Association between Nonsuicidal Self-Injury, Suicide Attempts, and Binge-Drinking in College Students" (Amy Brausch)

Self-harm and risk-taking behavior is an important clinical issue (Townsend, 2016), and suicide is notably the second leading cause of death for people aged 15-24 (Drapeau & McIntosh, 2015). Although the link between alcohol misuse and suicidal behavior is robust,

this relationship is very complex. Young people appear to be particularly susceptible to alcohol-associated suicidal behavior, and the pattern of drinking, especially binge-drinking, may be of relevance (Brady, 2006). The current study examined the relationship between binge drinking, nonsuicidal self-injury (NSSI) and suicide attempts in college students. It was expected that individuals who reported NSSI and/or suicide attempts would report more frequent binge drinking than those with no such history. The current study used de-identified data from a sample of 400 patients at the WKU Counseling & Testing Center; participants were 65% women and 71% white. Results indicated that students with NSSI or suicide attempt history did not report more recent binge drinking than those without self-harm history. This result is surprising given that previous studies have found a significant link between the two. The current study's measurement of binge-drinking may have affected results; future studies should include more detailed questions about alcohol consumption and patterns over a longer time period.

Powers, Nathan; Srivastava, Ajay; "Involvement of JAK/STAT Pathway during Air Sac Primordia Development 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*, is 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 *D. melanogaster*, 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 investigated possible roles that JAK/STAT signaling proteins might play in the directed morphogenesis of these structures. Our research, which focuses on altering expression of different components in the JAK/STAT signaling cascade of *D. melanogaster*, suggests that normal ASP development requires tight regulation of this pathway. That is, when any element of this pathway is either overexpressed or underexpressed, we observe ASPs exhibiting stunted growth phenotypes at a substantially higher frequency than seen in wild type specimens. A model based on our findings will be presented.

Price, Carson; French, Rachel; Boyareddygari, Karthik; Schugart, Richard; "Comparing Different Probability Distributions using Latin Hypercube Sampling with a Partial Rank Correlation Coefficient Analysis for a Wound-Healing Model" (Richard Schugart)

The healing of a chronic wound was found to be dependent upon four key biological factors (Muller et al.) An ordinary differential equation model with twelve parameters was formulated (Krishna and Pennington) to study the interactions between these factors and help better understand the healing process. Sensitivity analysis allows us to quantify uncertainty in the output of an ODE model given the uncertainty in the parameter inputs. In our sensitivity analysis technique, parameter values are generated from a probability distribution function (PDF), sampled via Latin hypercube sampling (LHS), and partial rank correlation coefficient values (PRCC) are calculated so that the sensitivity of a parameter in the ODE model can be calculated. We analyze the effect of different distributions in our sensitivity analysis for our mathematical model.

Price, Kassidy "Opportunity for Sex Education in Young Adult Literature" (Ted Hovet)

The insufficiency of sex education in American public schools is glaringly evident, especially when comparing the U.S. to other developed Western nations. Educational leaders and parents desperately need to focus on improving sex education as the outdated attitudes regarding sexuality hold educators back from providing the best education possible. One educational option that has yet to be considered is for parents and schools to utilize young adult literature containing sexual content to more sufficiently educate adolescents on all aspects of sexuality. Encouraging adolescents to read is an effort every school must employ for their students' success, but encouraging adolescents to read something that is enjoyable and examines sexuality is highly advantageous. Public schools have the tendency to censor young adult novels that contain even innocent sexual encounters, especially those that contain unhealthy depictions of sexuality, but exposing students to these novels will allow educators and students to investigate and debate both the healthy and unhealthy ways of dealing with sexuality. If parents and schools work together to stop censorship and instead encourage students to read sexually conscious young adult books, then the sex education of adolescents will be more effective and reliable than other informational sources that adolescents pursue.

Price, Kyle; Creteau, Tyler; Hennion, Ben; Albuhayri, Abdullah; "Alumineers Ingot Wash Station" (Morteza Nurcheshmeh)

Abdullah Albuhayri, Tyler Creteau, Ben Hennion, Kyle Price This project concerned the cleaning of a large aluminum ingots for Logan Aluminum. The ingots are left out in the elements for prolonged periods of time, often becoming covered in ice, dirt, embedded gravel, and other debris. This debris poses as a threat to the machinery at Logan Aluminum. The ingots themselves can be over 26 feet long and weight up to 70,000lbs. Logan's main concern is the ice that coats the ingots in the winter. This coating can grow several inches thick on the ingot faces. Due to the varying size of the ingots, removing this ice can be difficult. The proposed washing station provides a cost effective solution to this problem. Not only does it remove the ice, it does so with the push of a button. The station utilizes many concepts already incorporated at Logan, such as the conveyor system. Using SolidWorks, a virtual model was created. From the model, the station was broken up into several modules. These modules can be added or removed depending on the contents of the coating. This new method removes the need for extra personnel and is overall more efficient than previous methods.

Prince, Jared "Monte Carlo Tree Search for Dots & Boxes" (Uta Ziegler)

The goal of this project is to research, implement, and evaluate a variety of promising approaches found in the literature for their potential to improve the performance of an AI player for dots and boxes. The AI player was designed using a Monte Carlo tree search following a standard algorithm. The advantage of Monte Carlo tree searches is that they can find approximations of optimal moves when the possible sequences of moves are too numerous to calculate and the early game is too difficult to evaluate. This presentation will explain how a Monte Carlo tree search works, then examine several approaches which may improve the search by decreasing the size of the tree, improving the accuracy of evaluating moves, and increasing the speed of computation. The use of artificial intelligence research into simple games allows researchers to evaluate new approaches in clear, well defined, and

perfectly informed ways. The potential benefits from improved performance in a game setting could be translated to other areas of artificial intelligence, which is very prevalent in modern life. Advances in game playing algorithms are often applied to more practical real-life problems.

Pyatt, Susanna "Living by Design, Not by Default': Blogging Modesty & Biblical Femininity in the 21st Century" (Ann Ferrell)

In this presentation, I examine the ways in which conservative Christian women use modest fashion blogs to negotiate their faith and form online communities of like-minded women. Modest fashion for these bloggers is not just about outward dress but is also a spiritual practice that is bound up in their beliefs regarding "biblical femininity." Explicitly anti-feminist, these women view themselves as countercultural, and blogging provides them with a public avenue through which to discuss their faith as well as a safe space in which they find encouragement from others to follow their interpretations of biblical models for womanhood. These conclusions result from my analysis of the public posts and comments on several modest fashion blogs connected in a loose online network and active in the spring of 2016. Examining both recent and archived blog posts provided insight into the theological interpretations underpinning bloggers' personal beliefs and practices as well as the manner in which these women interact in a public online space.

Ramsey, Haley; McCrary, Elizabeth; Wichman, Aaron; "Self-Esteem Moderates Self-Descriptions under Insecurity Threat" (Aaron Wichman)

Uncertainty and insecurity are thought to cause negative emotions (Jonas et al., 2014), which can be reduced by re-establishing self-certainty and identity. Indeed, uncertainty causes people to accept and identify more strongly with groups, regardless group status (Reid & Hogg, 2005). Previous findings show group-based effects on identity following uncertainty. We examined whether an insecurity induction could lead to greater acceptance of bogus personality descriptions. We manipulated insecurity and measured self-esteem and self-clarity (Campbell et al., 1996) to test for moderating effects that could follow from positive self-evaluations or differential reactions to insecurity. After controlling for effects of self-concept-clarity, we found significant self-esteem X insecurity interactions on acceptance of both positive and negative self-description, which suggest that participants sought self-certainty. Of participants made to feel insecure, the low self-esteem participants who are considered to be more self-uncertain (Campbell et al., 1993), showed the highest acceptance of both positive and negative self-descriptions. Results indicate insecurity triggered a striving for self-certainty, rather than self-improvement.

Ramsey, Lydia "Nature Family Community Center" (Neal Downing)

The Nature Family Community Center will be replacing the existing Bowling Green Parks & Recreation building on 225 East 3rd Street. The current building is a one story metal building with minimal windows and is in rough physical condition. The new facility's design is based on the existing programmatic elements including a gymnasium, racquetball courts, fitness center etc; new features will include a rock wall, pool, court yard, roof top community garden and a kid's room. Total building would approximately 55,000 square feet. The main basis of design includes Frank Lloyd Wright's clean horizontal lines and large glazing but also creating a sense of unity by utilizing natural elements. One of the main focuses on the design

is to create an essential environment for the community to learn the significance of nature as well as sustainability. The surrounding low income neighborhoods will greatly benefit from a new community center that not only focuses on a beautiful, safe place to have fun socializing but also on educating through the use of nature. We will be able to show our community how to live with nature and how to be sustainable.

Ranburger, Davis; Lee, Ngo Fung; Kwong, Ka Wai; "Photochemical Studies of High Valent Manganese(III)-oxo Corrole Species" (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, two corrole species were synthesized and characterized. The first species, 5,10,15- trisphenylcorrole (TPC) and the second species, 5,10,15-tris(pentafluorophenyl)corrole (H3TPFC) then underwent a manganese metal insertion, which produced MnIII TPC•(Et₂O)₂ and 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 corroles were investigated through a UV-vis spectroscopic method. In addition, a photochemical approach to the same MnV-oxo corrole was also developed. In conclusion, our spectral and kinetic results provide proof of multiple oxidation pathways, where MnV-oxo corrole functions as a direct two-electron oxidant or go through a disproportionation reaction and form a MnIV-oxo corrole as the real oxidant. Which reaction takes place depends on the corrole itself and the solvent.

Rappaport, Anne "The Village Healer is My Bartender" (Ann Ferrell)

My presentation will focus on my reflections and conclusions drawn from fieldwork and research on traditional medicine in the modern world. The culmination of my research is an online exhibit featuring Sunyatta Amen, a fifth-generation herbalist of Jamaican and Cuban heritage, and tea shop owner in the Shaw neighborhood of Washington DC. The exhibit includes examples of traditional medicine and the process by which Sunyatta learned her skills. In addition, it presents how traditional medicine is being incorporated into the average American citizen's life. I will reflect on the techniques which Sunyatta uses to bring her knowledge to an audience which has been taught to be skeptical of traditional medicine as well as the way she has redefined the idea of the "village healer" to become a trendy tea shop in a busy metropolitan area

Reece, Christopher "A Case Study of the Historic Kentucky Winter Storm of March 4th-5th, 2015" (Joshua Durkee)

On March 4th and 5th of 2015, unseasonably cold air moved into the eastern U.S. as a strengthening region of surface low pressure emerged from the desert southwest, and propagated across the south. While heavy rain began to overspread much of the Ohio Valley, arctic air intruded the region from the north, turning heavy rain to a dangerous snow event. In wake of the storm, historic accumulations upward of two feet were observed across portions of Kentucky, which left highways shut down and motorists stranded, as temperatures fell below zero. The purpose of this study is to diagnose the large-scale atmospheric circulations that contributed to such a historic winter storm through the subjective analysis of surface weather observations, upper air reanalysis data, as well as satellite and radar observations

provided by the National Weather Service and Unisys. Results indicate that middle-atmospheric features were strongly connected to changes in surface conditions that led to considerable warm, moist air overrunning a cooling environment.

Reece, Colin; Weaver, Eric; White, William; "Wood Powered Lawnmower" (Chris Byrne)
With today's issues concerning global warming and an ever decreasing supply of fossil fuels, alternative sources of energy must be found. One of the main concerns is how to power our vehicles. Our senior project team, Byrne Technical Design and Research was tasked with developing a wood gasification system that powers a riding lawnmower. Wood gasification is a process that converts wood into combustible gases capable of powering an internal combustion engine. A significant portion of our work in the fall of 2016 was researching the process of wood gasification and the designs that have been implemented in the past. Our goal is a system, mounted on a riding lawn mower, that will fuel the engine with wood pellets for thirty minutes of normal operation without refueling. This goal required calculating the volumetric flow rate through the engine to properly size various aspects of our design such as fuel storage. Our design must also fit onto the lawnmower and be light enough to minimally impact its operation. Our research and design work has led us to select a stratified downdraft gasifier design that will be accompanied with a cooling and filtration system and interface with the carburetor.

Reed, Sarah "Governmental Trust in Haiti" (Timothy Rich)

This article discusses the relationship of democratic satisfaction to governmental trust for individuals in Haiti. It also examines how democratic satisfaction levels differ based on election outcomes and demographic information. The data in the article is Latin American Public Opinion Project (LAPOP) 2012 Haitian election survey data, accessed through Vanderbilt University.

Reilly, Mary Kirsten; Philips, Keith; Bowen, Jacob; Daniels, Makenzie; Daugherty, Zechariah; "Dung Beetle Diversity in the Costa Rican Cloud Forest" (Keith Philips)
Purpose: The diversity and abundance of dung beetles attracted to two bait types in a Costa Rican primary and secondary cloud forest and an adjacent pastureland were surveyed at Cloudbridge Nature Reserve. Methods: Six traps were set in each habitat. Traps were placed a minimum of 50 meters apart and dung bait types were alternated. Traps consisted of bait suspended over a pitfall cup set flush with the ground surface. Each cup was partially filled with soapy water, so beetles that fell into the cup whilst attempting to reach the dung would sink and drown. Traps were collected forty-eight hours after they were set, and the beetles were sorted to species and counted. Results and conclusions: Contrary to what was hypothesized, the primary forest had the highest beetle diversity and abundance while the pasture had the lowest of both. These results may be due to the higher level of dung competition from the naturally occurring dung in the pasture and possibly the secondary forest. Additionally, over all habitats, there was a higher diversity of beetles found in the human dung baited traps and a higher abundance in bovine dung baited traps.

Renfro, Brooklyn; Rennegarbe, Grayson; Taylor, Logan; Martin, Lucas; "Why You Shouldn't Forgive" (Grayson Hunt)

The definition of forgiveness, given by philosopher Bishop Butler, states: "forgiving

demands that we forswear our negative feelings of resentment towards our wrongdoer.” However, resentment is a positive action, when used as a method of self-defense against interpersonal violence. This situation provides clarity on when it is appropriate to deny a wrongdoer forgiveness. Every individual deserves the right to choose forgiveness on a case-by-case basis, because the moral requirement to forgive in all cases; puts the forgiver at risk. It is a personal duty for one to prevent themselves from further injuries. Expecting the injured to forgive, prohibits the injured from successfully moving forward with their life. Resentment is appropriate when it protects a person’s self-respect, in cases such as interpersonal violence. The characteristics of an abusive person, such as: the lack of empathy, good conscience, and remorse; signify that an abuser cannot truly apologize to the injured. (Characteristics such as these, follow that the apology is misinterpreted or fabricated and falsified; due to the lack of qualities the abuser lacks to properly feel remorse.) Therefore, there cannot be a moral obligation to forgive in the context of an abusive relationship.

Rennegarbe, Grayson "The Difficulty of Forgiveness" (Grayson Hunt)

Forgiveness has been defined as the letting go of resentment associated with a person who has harmed you. This process is considered very personal and requires only that the harmed person let go of the resentment without having to forgive directly the object of those same emotions. I argue that for true forgiveness a person needs to not only let go of resentment personally but also take the action of forgiving directly the person who caused the resentment by making an effort to repair the relationship that was damaged. A concern that needs to be addressed with this theory is that this abstract only deals with what is required to truly forgive someone, it is not claiming that forgiveness is required in all situations, therefore, when great moral harm has been done to the victim, they don’t need to feel obligated to forgive the person who harmed them, only that to forgive them, these are the steps required.

Richey, Jay "Academic Freedom as a Human Right: The Problem of Confucius Institutes" (Patricia Minter)

Academic freedom is the ability to explore, research, and analyze any topic without prohibitions or repercussions. In the Anglo-American tradition, it is both a fundamental aspect of academia and a fundamental human right. Although the United States embraces this core principle of academia within American universities, the People’s Republic of China (PRC) seeks to suppress the acquisition of knowledge through restrictions on topics deemed politically-sensitive to the Chinese government. Although human rights abuses pervade the PRC and academic freedom is suppressed, PRC-funded entities known as Confucius Institutes are widely embraced at American universities and cultivate within non-Chinese youth an interest in Chinese culture and simplified Mandarin Chinese. However, Confucius Institutes inherently jeopardize academic institutions and violate standards of academic freedom. Many questions persist about Confucius Institutes and the Chinese government’s intent on their expansion. Are human rights abuses in the PRC prominent enough to negatively affect its cultural mission abroad? What exactly are Confucius Institutes and why are they located at universities that value academic freedom? This paper seeks to answer these questions by examining and analyzing the PRC's strategy and intent to assert global influence through overseas educational programming at American universities.

Ringenberg, Gabrielle "The Validity of Submaximal Exercise Testing in Obese Women"

(Rachel Tinius)

Submaximal exercise tests use heart rate responses to light intensity activity in order to predict fitness (VO₂max). Currently used tests may be inappropriate for obese populations as obese women have altered heart rate responses to exercise. The purpose of this project is to test the validity of submaximal treadmill testing in obese women. Methods: Normal-weight (NWG) and obese women (OBG) completed the modified Bruce submaximal test (to predict VO₂max using validated equations), and a maximal graded exercise test on a treadmill using the Bruce Protocol (to obtain an actual VO₂max) on two separate occasions. The relationships between actual and predicted VO₂max values were analyzed using correlation coefficients. Results: 9 normal-weight (age: 23.1±8.0 y, body fat: 23.5±4.9%) and 9 obese (age: 22.0±4.8 y, body fat: 36.9±4.4%) women participated. Actual and predicted VO₂max values were not correlated among the OBG (r=0.48, p=0.23) but were positively correlated in the NWG (r=0.71, p=0.03). Conclusions: Protocols for predicting fitness in normal-weight women do not appear to be valid in obese women. Separate equations should be considered in order to maximize the accuracy of exercise testing in obese women, and improve health care providers' ability to evaluate patients and tailor exercise prescriptions.

Rinne, Allison "Age Differences in Top-Down Processing of Emotional Faces Reflected in Early Fronto-Central Neural Activity" (Andrew Mienaltowski)

As we age, extracting positive emotion from our social interactions is important to our health and well-being. Younger and older adults have different motivational goals for social contexts. The current study uses ERP data to look for neurological evidence for age differences in these motivational goals. We measured various electrical scalp potentials at fronto-central electrodes at time points that would allow for one to draw inferences about motivation to process emotional faces. From 160 to 220 ms after face onset, older adults displayed larger potential amplitude differences than younger adults to emotional faces relative to neutral ones. From 220 to 300 ms after face onset, both younger and older adults displayed larger amplitude differences for emotional relative to neutral faces. These findings suggest that age differences in motivation to interpret and use emotional cues for everyday interactions might lead older adults to be more sensitive than younger adults to emotional cues earlier on after their emergence. This supports the possibility that emotional cues are prioritized for top-down processing by adults, and that older adults may discriminate between emotional and non-emotional stimuli sooner than younger adults to implement possible regulatory strategies for minimizing adverse impacts.

Robertson, Hannah; Rouse, Addie; Coffman, Emilee; Robertson, Hannah; "The Practice of Inquiry Instruction in STEM and the Power of Teacher Beliefs" (Lisa Duffin)

In the current education reform, mathematics and science teachers are expected to design and carry out inquiry-based instruction in the classroom. Inquiry-based instruction is a student-centered pedagogy that uses purposeful, extended investigations set in the context of real-life problems as both a means for increasing student capacities and as a feedback loop for increasing teachers' insights into student thought processes (Supovitz, Mayer & Kahle, 2000). Unfortunately, the press for inquiry-based instruction has been met with some resistance more so in mathematics than science due to the stark shift away from more traditional pedagogies such as direct instruction. One indicator of future performance is a teacher's beliefs or personal evaluative judgments (Pajares, 1992). Therefore, the purpose of

this correlational study was to examine two types of beliefs (i.e., beliefs about using inquiry-based instruction and self-efficacy beliefs for designing inquiry-based instruction) from teachers (N = 34) – both mathematics (n = 18) and science (n = 16) -- from 5 rural Kentucky school districts, and to determine the predictive ability of beliefs on intentions to design inquiry-based lessons in the classroom. Detailed findings will be presented and implications for STEM education will be discussed.

Rodriguez, Emily "Born With a Veil: A Supernatural Family History through Oral Tradition" (Ann Ferrell)krawe

The word “caul,” roughly meaning “a close-fitting cap,” is a small portion of the amniotic sack that partially or entirely covers an infant’s head after birth. Others have referred to this bit of skin as a “veil” or a “helm.” The caul is believed to bring extreme fortune, luck, or supernatural capabilities to those born with it. One of these supernatural gifts includes a “second sight,” or the ability to see things that the ordinary eye cannot catch, such as specters, witches and ghosts. Maimey Benefield of Algiers, Louisiana was known to possess such abilities, all of which were attributed to the caul that she was born with. The narratives of her visits from deceased neighbors and family members who had met horrible fates have been passed down to her descendants, myself included, from her daughter Loretta Mae Hughes. In this paper, I discuss how Maimey Benefield’s memorates were used to serve a number of purposes from ensuring her daughters’ good behavior to aiding lost souls whose bodies would otherwise never have been found. Her encounters with otherworldly entities have passed on a tradition of ghost stories and a “second sight” to the following four generations of Maimey’s female descendants.

Roland, Ezekiel; Edens, Kolbi; Reiser, Katie; Saint, Paige; Schafer, Mark; Crandall, Jason; "The Effects of a Sit-Stand Workstation Intervention on Workday Psychological Stress in University Staff" (Jason Crandall)

Excessive workday sitting may contribute to chronic disease morbidity and mortality. Standing during the workday may reduce these risks, while also reducing psychological stress. **PURPOSE:** To evaluate the impact of a sit-stand workstation intervention on workday psychological stress in university staff. **METHODS:** Groups of university staff used an Ergotron WorkFit-T Sit-Stand Workstation during the workday for six weeks. Group 1 (n=10) progressed to 30 min/hour of standing within five weeks. Group 2 (n=10) stood no longer than 20 min/hour and Group 3 (n =10) stood ad libitum. Pre/post psychological stress and physical discomfort were measured using visual analog and the Wong-Baker scales, respectively. Total minutes stood per day was self-reported. Data were analyzed with One-way repeated measure ANOVA ($p < 0.05$). **RESULTS:** No significant main effects/interactions for psychological stress were found. Significant main effects were found for physical discomfort. Groups 1 and 2 increased mean standing time compared to Group 3. **DISCUSSION:** Sit-stand workstations do not appear to reduce workday psychological stress, at least during a short-term intervention. Both six-week progressive interventions increased standing versus ad libitum. All groups reported less physical discomfort, but the ad libitum group’s standing time decreased suggesting a gradual progression is more effective for adherence.

Rone, Justin; Lasley, Nathan; Kercheville, Robb; Steele, Joshua; "Design and

Implementation of a Prototype Motorized Flag Flying System" (Robert Choate)

At the project sponsor's campus, flags are flown prominently at the entrance of each building. Currently the flags are flown 24/7 year round with little attention given to the flag position. The flags remain at the top of the staff and are rarely lowered to half-staff when government officials declare to do so. To correct this problem, it was desired to have a motorized flag flying system that will make raising and lowering the flags much more convenient. To align with the sponsor's vision, the flag system is desired to be powered by renewable energy. ME 412 Senior Project Team FWF has designed and will implement an automated flag flying system. To meet project requirements, the designed system will be controlled by the sponsor's building management software, and will be powered via photovoltaic cells. The system ties together elements of mechanical, electrical, and systems engineering through the subsystems of controls, energy management, and mechanical action.

Ronkainen, Millicent; King, Rodney; Baugh, Kimberly; Hamilton, Courtney;
"Bacteriophage Mutants Capable of Growing On a Non-Permissive *Escherichia coli* Host"
(Rodney King)

RNA polymerase is the central enzyme in all gene expression. The bacterial RNA polymerase core enzyme consists of five subunits; beta, beta prime, omega, and two copies of alpha. A sixth subunit, sigma, directs RNA polymerase to promoter regions. Mutations in the zinc-binding domain of the beta prime subunit of *E. coli* RNA polymerase block the growth of bacteriophages that use RNA-based mechanisms of transcription antitermination (1). Here, we describe the isolation and characterization of two phage mutants that overcome the host zinc-binding mutation, rpoCY75N. Named orc because they overcome the effect of a mutation in the host rpoC gene, orc phages form small plaques on the rpoCY75N host. To identify orc mutation(s), each orc genome was sequenced and compared to the parental phage. This analysis revealed base substitutions that potentially created new promoters. Promoter activity was confirmed by cloning regions from the wild type and orc phages into a promoter probe vector and performing qualitative and quantitative assays of reporter gene activity. We suggest that newly created promoters facilitate expression of phage genes essential for growth on the rpoCY75N host. However, the small plaque phenotype suggests that suppression of the host mutation is incomplete.

Rouse, Addie; Peterson, Paige; Ashley, Noah; "'May the Adaptations Help Your Songbirds Fly in Favorable Conditions!'" (Martha Day)

This poster showcases a problem based unit of instruction developed for high school biology students and taught in Franklin, Kentucky and Barrow, Alaska. Students experienced a unit that complemented the research of a WKU Biology professor's national science foundation research on project on how arctic songbirds have adapted to diminished sleep patterns might help understanding of sleep loss in humans. The instruction allowed students to experience learning with authentic applications in problem solving similar to those that a research scientist would encounter in a laboratory setting. At the conclusion of the unit, the high school students presented scholarly research posters to showcase their efforts at a simulated "research conference". Problem Based Unit Grand Challenge: Scientists in Alaska and Kentucky are collaborating in neurological research on human language acquisition in the brain. The researchers need students to design an animal model of a songbird that is perfectly biologically adapted to both a deciduous forest and tundra biome.

Rouse, Hadley; Kelly, Liza; "tears Breaking On Glass" (Liza Kelly)

Audiences in the United States, and especially in Kentucky, are normally presented with traditional performance styles of art song. This is usually in the form of a recital where the audience sits and observes a vocalist singing various classical pieces. The vocalist usually stands in one spot of the stage, and is generally accompanied by a pianist. To expand on this conventionalized form of vocal arts, a performance will take place that will expose the audience to new ways of interpreting and experiencing vocal art. Therefore, an art song will be presented in its traditional recital form and will then be presented a second time with the added elements of visual theatre. Visual Theatre can be defined as theatre that is being primarily driven by movement. It includes, but is not limited to: puppetry, animation, object theatre, dance, mime, and micro-cinema. The goal of the performance is to layer both song and visual theatre elements into creating a performance that connects strongly with the audience and enhances the ideas and themes the artists are trying to convey. This concept of integrating visual theatre and song is a result of a FUSE Grant research project.

Russell, Jim "Legacy Of The Crusades" (Juan Romero)

LEGACY OF THE CRUSADES IN THE MODERN WORLD James Russell Recently research was done on the legacy and impact of the Crusades. In the modern Middle East the Crusades remain of point of concern any time that Western forces have a presence in that region. This needs to be understood by any agency with intentions for involvement there during the planning stages in order to replicate past successes instead of repeating failures. The pivotal question being researched was, "Can Western nations and those of the Middle East overcome the lingering animosity from past conflicts that started with the Crusades in order to cooperate in mutually beneficial endeavors?" Research has shown that under certain conditions, and when a specific criteria is followed then it is possible. These include the Western nations only offering assistance to a Middle East nation that is in distress, proposing objectives that both nations will gain from once achieved, abstaining from any notion of religious superiority of imposition and avoiding any involvement of favoritism for Israel. If these are not acknowledged then it leads to distortions of differences between believers of Christianity and Islam reemerging in forms of leadership examples and religious doctrine.

Russell, Summer "Retention in Higher Education Institutions: A Comprehensive Examination on SAT Scores, Endowments, and Admissions and their Effect on Institutional Growth" (Claudia Strow)

The relative retention rates of public, four-year universities have become a hot topic due to the increasing amounts of money college students are borrowing to attend college. Research suggests that attending some college without receiving a degree could be worse than not attending at all. Competition for funding between many public state-funded schools has emerged where funding is often determined according to retention rates. However, universities are still at a loss for appropriately considering each of the various factors that contribute to student retention. This study uses The Integrated Postsecondary Education System (IPEDS) data to analyze the impact on retention rates from average of SAT scores, endowment levels, instructor salaries, faculty student ratios, percentage of students with disabilities, and the percentage of students receiving PELL grants. Additionally, policy suggestions are made for increasing retention.

Ryumae, Ken "Computing an Algorithm to Detect Three Dimensional Objects in Space" (Qi Li)

The motivation behind this research is to find a new scheme for data clustering, based on the iterative extraction of control points. A control point is a point used to maximize the overall distance to other existing control points that have already been recursively defined. Previous work on 2D data has been able to theoretically prove the consistency/equivalence between control points and vertices of data shaped in a 2D polygon based on the theory of ellipsis. However, it is hard to derive a theoretical justification of the consistency between control points and vertices given higher-dimensional data. The research consists of two parts. The first part is on the generation of simulated 3D data in a pyramid shape, and then extend to other 3D shapes. We will also add some randomness to ideal point sets in order to test the robustness of control point extraction with respect to noise. The second part is on the implementation of the algorithm for control point extraction and the visual evaluation of the correctness on larger sets. By doing so, we will be able to identify shapes on a 3D scale correctly, and then expand the algorithm to compensate for multidimensional objects and shapes.

Salami, Daniel; Ogonnaya, Caleb; "Software as a Service: Code Cloud" (Michael Galloway)

Cloud computing is a form of using a network of remote servers hosted on the Internet to store, manage and process data, rather than a local server or a personal computer. This provides certain advantages as well as disadvantages. One of the most common advantage is the on demand software that one of the cloud computing layers provides. The architectures provided by cloud computing includes; platform as a service, infrastructure as a service, and software as a service. Code cloud is a project that makes use of the software as a service architecture. It provides an Integrated Development Environment (IDE) where programmers can write their codes, compile it and get a standard output as well as save the codes and come back to them over the Internet. Code Cloud targets specific languages taught in an academic setting, specifically for students. The fact that this software is accessible from any part of the world, makes it on-demand. The primary aim of this project is to compare the efficiency, availability of the software as opposed to Application Service Providers (ASPs). This would provide more insight into the future development of softwares especially in areas where technology is not prevalent.

Scalf, Cassandra "Transcriptomic Response to Immune Challenge in Zebra Finch (*Taeniopygia guttata*) using RNA-seq" (Noah Ashley)

Avian bird flu and West Nile virus are two diseases that have threatened bird populations on a global level. Previous work to assess immune function in birds has relied upon crude measures of immunocompetence. However, with the advent of current technologies in next-generation RNA-sequencing, it is now possible to create a profile of gene expression in response to an immune challenge, which could be used as future biomarkers of disease. In this study, zebra finch (*Taeniopygia guttata*) were challenged with bacterial lipopolysaccharide (2 mg/Kg BW; dissolved in 0.9% saline) to stimulate the immune system or vehicle (0.9% saline). Two hours after injection, hypothalami and spleens were collected, and samples analyzed at the University of Louisville Genomics Core. The RNA seq data

show a number of genes that are up or down-regulated between tissues when the immune system is challenged, some of which are involved in the immune response. These results are important in identification and understanding the spread of diseases such as H5N1 bird flu– a possible national security concern. Sequencing and bioinformatics support for this work was provided by National Institutes of Health (NIH) grants P20GM103536 (Nigel Cooper, PI) and P20GM106396 (Donald Miller, PI).

Scharhag, Shelton "National Populism And The Rise Of The Afd" (Laura McGee)

Paralleling the rise of a new brand of nationalist populism in the Western World, the emergence of the Alternative for Germany (AfD) political party in Germany signals that Europe's foremost economic and political power is itself experiencing a backlash against immigration and globalization. The AfD's party platform of anti-immigration policy, German nationalism, and Euroscepticism will test the de-facto leader of the European Union. This presentation will explore the birth of the AfD, their emergence as a political force in this election year for Germany, what the possible consequences of an AfD-led government or coalition government could be, and how all of this relates to and affects the United States.

Schilling, John "The Emergence of Film Propaganda" (Jerod Hollyfield)

The Emergence of Film Propaganda When the US entered WWII it had to find a way to inspire the population and boost morale; therefore, the US government decided to use the influence of Hollywood and film on the American public to help gain support for the war effort. The government encouraged studios to push what Clayton Koppes calls "blatant morale building" (7) plots and images, which drastically influenced the public's view of the war. In this paper, I argue that the increased use of propaganda through Hollywood films can be seen in Frank Capra's Why We Fight series (1942) was the birth of a new form of propaganda that "provided a weapon uniquely capable of effectively molding the ideology of the masses." (Reeves, 181) Nicholas Reeves continues stating, "[Film propaganda's] effects reach where even the book cannot reach." (4) I argue that the influential power film has over its audience was inappropriately used to sway public opinion during WWII. I will support this argument by showing how those effected by film propaganda react against it in post-war periods through anti-war films like All Quiet on the Western Front (Milestone, 1930), which take a more realistic approach and depict the grueling hardships of war.

Schow, Tori "Analysis of Large-Scale Atmospheric Features for Reported Tornadic Activity near Campo, Colorado" (Josh Durkee)

On May 28, 2015 the WKU Field Methods in Weather Analysis and Forecasting course was on site to provide a real-time forecast for the tornadic/severe weather thunderstorm complex near Campo, Colorado. Fortunately, no deaths were reported; however, light damage, such as fallen tree limbs and light objects tossed, were reported. The purpose of this study is 1) reanalyze this event to diagnose the large-scale features that contributed to this event and 2) attempt to verify undocumented tornadic activity that occurred on this day. While the National Weather Service did not verify a tornado in this area, there was a tornado report in this area for that day. The data for this study includes surface observations, upper-air model reanalysis, upper-air radiosonde data, satellite imagery, and radar data. These data were subjectively analyzed to dissect the large-scale features of this event. The results of this study indicate that the large-scale atmospheric processes were not sufficient enough to support or

verify any tornadoes on this day.

Schulz, Michael "The November 17, 2013 Midwestern and Southern Severe Weather Outbreak" (Joshua Durkee)

The November 17, 2013 severe weather outbreak in the Midwest and southern United States was a very atypical and deadly cold-season event. This event produced 70 total tornadoes, eight total deaths, numerous injuries, and widespread wind damage reports throughout this region. The purpose of this study was to analyze the surface and upper-level atmospheric processes associated with this event, along with its multifaceted surface low-pressure system, to gain a better understanding of the evolution, impacts, and overall anomalous nature of this system. The data used for this study included various Storm Prediction Center, National Weather Service, Weather Prediction Center, National Climatic Data Center, and scholarly event studies and observations. These data were subjectively analyzed to understand the evolving weather pattern that led to this event. The study showed that an abnormal northward displacement in the upper-level wind flow across the U.S. ultimately led to the unexpected magnitude and timing of this event.

Sewalls, Harper; Edwards, Sarah; "Computer Simulations of Conformations of Large Dynamic Proteins" (Sarah Edwards)

The research that we are conducting consists of using the molecular dynamics program AMBER to simulate the motion and different structural conformations of large proteins. These computer simulations are important because X-ray diffraction, which is used to determine the structure of such proteins, is limited in its ability to represent the range of possible protein conformations. Many of the proteins we are studying are very dynamic and have a large number of "moving parts". This dynamic nature is necessary for function. For example, one of the proteins studied is used in the DNA replication of a deep sea vent dwelling organism. The protein's free movement allows it to withstand the heat of its environment and remain functional. Once we have developed a reliable formula for finding different protein conformations, other researchers can use this protocol to study any protein and design future experiments. It is difficult now to obtain structural data about molecules and especially for conformational pairs of proteins. With this computational formula anyone will be able to predict the likelihood of various docking configurations for large proteins. This is the end goal of this phase of the investigation.

Seyitliyev, Dovletgeldi; Kholikov, Khomidkhodzha; Ilhom, Saidjafarzoda; Grant, Byron; Er, Ali; "One-Step Laser-Induced Hydrogen Generation from Coal and Coke Powders in Water" (Ali Er)

A simple way of obtaining hydrogen gas using nanosecond laser pulses and various ranks of coal, coke, and graphite is reported. Powder samples of coal, coke and graphite with and without water were irradiated with 1064 nm and 532 nm pulses from Nd: YAG laser for 45 minutes under air and argon atmosphere. 532 nm laser pulses were shown to be more effective than 1064 nm pulses. Gas chromatography (GC) measurements indicates that mainly hydrogen and carbon monoxide were generated. Hydrogen to carbon monoxide ratio shows that the highest efficiency rank was anthracite, with an average ratio of 1.4. Coal samples were also characterized by SEM and calorimeter and graphite was used as a pure carbon source to study the possible mechanisms of gas generation during irradiation. Amount

of hydrogen gas produced was negligible when graphite powder was irradiated under air and argon atmosphere without water. On the other hand, hydrogen was obtained from irradiation of graphite powder in the water, due to a possible carbon-water reactions. However, when coal powders were irradiated under air and argon atmosphere without water, the amount of hydrogen produced increased drastically compared to graphite. Possible mechanisms of gas generation were proposed by chemical reactions.

Shaker, Nuha; Maples, Jill; Lyons, Scott; Noel, Christina; "Pharmacogenetics Study Among Children with Autism Spectrum Disorder" (Jill Maples)

Pharmacogenetics is the study of genetic-guided individualized drug prescription that plays an important role in preventing severe adverse effects of the drugs, decreasing the time and cost of therapeutic choices and directing healthcare professionals to choose medications that is effective and safe. It is noteworthy that this approach becomes highly beneficial in patients suffering from chronic diseases or disorders, since these conditions may require multiple and long term pharmacological therapies; as in children with autism spectrum disorder ASD. The purpose of this study is to investigate; among small cohort group of children with ASD, several genetic variance of enzymes that influence the metabolism of commonly prescribed drugs in ASD. Group of 15 school aged children with ASD were recruited for the study, blood samples were collected, and venous blood was drawn to analyze the genotype of enzymes implicated in drug metabolism. Results showed that 66% of our cohort have a mutation to the CYP2C19; similarly 72%, 66%, 40% and 30% have a mutation in the MTHFR, COMT, DRD2 and OPRM1 gene respectively. The last four mentioned mutations were associated with ASD and detected as genes that are involved in drug metabolism as well.

Shelton, Dimond; King, Rodney; "Discovery and Analysis of Mycobacteriophage Wachhund" (Rodney King)

It is estimated that there are 10^{31} bacteriophage particles in existence, but only a few thousand have been characterized. The Science Education Alliance – Phage Hunters Advancing Genomics and Evolutionary Science (SEA-PHAGES) program is dedicated to exploring the diversity of the bacteriophage population. We have contributed to this program by isolating and characterizing phages from soil collected in Cromwell, KY. Bacteriophages specific to *Mycobacterium smegmatis* were amplified by incubating the soil sample in an enrichment media in the presence of *M. smegmatis* cells. Serial dilution of the enrichment culture was performed to obtain isolated plaques. The purified phage, named Wachhund, was grown and examined by transmission electron microscopy. The phage's capsid was 55.27 ± 1.26 nanometers in diameter and the tail was 201.94 ± 4.95 nanometers long. The genomic DNA was isolated and the concentration of the sample was 575.3 nanograms per microliter. The A260/A280 ratio was 1.87, which indicated the DNA preparation was pure. Restriction analysis of the purified DNA showed that it was cut by all of the enzymes that were tested (BamHI, ClaI, EcoRI, HaeIII, and HindIII) and DNA sequencing results revealed that Wachhund belongs to the F cluster of mycobacteriophages.

Skulsillapakorn, Kanyawee "#ReviewBowlingGreen: Food and Attractions Guide for International Students" (Morgan Moran)

Being in a different country, far away from home, surrounded by strangers that speak a

different language than your mother tongue is daunting. Most international students often feel out of place when they arrive in America for the first time. What can we do to change international students' perspective of Bowling Green from one of being a "boring, small town" to a vibrant growing community? This project will use social media platforms such as Facebook, Instagram, and Twitter to promote restaurants and other attractions. Reviews of restaurants, shops, and places to visit in Bowling Green will be culminated on each of the platforms. By including the hashtag #ReviewBowlingGreen on the reviews, people will be able to find more information easier. This will allow people to interact, leave suggestions and questions, and have conversations under the posts. Students will be engaged by including interviews and surveys from both international and domestic students. This project aims to help WKU international students from all over the world feel more comfortable and familiar with the town, making Bowling Green their home away from home.

Sloan, Caleb "National Internment Museum" (Neal Downing)

Little is known about the history of internment in the United States. During World War II, thousands of Americans of Japanese, German, and Italian decent were arrested and relocated to internment facilities across the United States. America needs a place of memorial and reconciliation for those families that were interned in order to prevent history's tendency to repeat itself. I intend to design a National Internment Museum by adaptively re-using a vacant, historic structure that functioned as an internment facility. The museum will be located on Ellis Island, the most ironic of locations for an internment facility. I interned with the Historic American Building Survey, where my job was to document the very structure I am proposing to re-design as a museum. I will use my work from that internship to inform my design. The museum will provoke reflection and reconciliation, as the design will blend the historic and modern, finding balance between the two. The result will be a museum that educates and informs the public on the internment that tore families apart, and left those interned to live with shame and embarrassment. America needs to know our history of internment to inform our future decisions.

Smith, Amelia; Philips, Keith; "Documentation and Analysis of the Camel-Humped Spider Beetle *Dignomus*" (Keith Philips)

Dignomus is a genus of spider beetle (Coleoptera: Ptinidae) with species found in African, the circum-Mediterranean, through to the Middle East. Described as a genus by Wollaston (1862), it was demoted to a subgenus of *Ptinus* Linnaeus by Pic (1912). Bellés reestablished it as a valid genus in 1982. There are currently 60 documented species mostly described from North Africa. This study of sub-Saharan African species documents seven new taxa. Species limits were delineated through analysis of the morphological structure of the pronotum as well as sculpturing, coloration, and setal patterns. An evolutionary tree of the spider beetles has also been hypothesized utilizing morphological and molecular data in order to see the relationships of *Dignomus* within the family. The documentation of new species of *Dignomus* allows a better understanding of the diversity of this poorly studied group as well as providing a step towards better conservation efforts for this and other invertebrates. Additionally, documentation of the diversity and evolutionary history of this group is giving us a better understanding of the evolution of their many relatives that are stored grain and wood pests.

Smith, Isaac "A Case Study of the Large-Scale Features That Contributed to the November 6, 2005 Evansville, Indiana Tornado" (Joshua Durkee)

Research indicates that among the tornado spectrum of events, nocturnal tornadoes are the most dangerous. On November 6, 2005 a supercell thunderstorm tracked across southern Illinois and into the metropolitan area of Evansville, Indiana early in the morning, and produced a devastating F3 tornado. This “nighttime” tornado propagated into an urbanized area and resulted in the deaths of 25 people and injured approximately 230. The purpose of this study is to examine the large-scale features that influenced the formation of this severe thunderstorm event. Data for this study included surface observations, satellite and radar, upper air observations. These data were used to assess the atmospheric components that led to this event. Initial results show that the combination of a strong cold front with warm, moist unstable air allowed for relatively strong lifting to occur, causing strong rotating thunderstorms to develop. The unstable atmosphere along with changes in wind speed and direction up through the atmosphere ultimately enabled the formation of this deadly tornado.

Smith, Madalyn "Prison Programming and Recidivism as a Method of Social Bond Theory: A Meta-Analysis of Research from 2000 to 2015" (Holli Drummond)

Prior research indicates that completion of prison programs significantly decreases recidivism amongst offenders. This research classifies prison programs as an aspect of Social Bond Theory to determine if these types of programs improve the recidivism rate. Social Bond Theory has four elements: commitment (time invested into education or career), attachment (relationships with family and friends), involvement (time spent in activities outside of crime), and belief (agreement with social norms). Research articles were compiled from 2000-2015, published and unpublished, with a three year recidivism rate, and a sample size of greater than 50. A meta-analysis was performed to statistically strengthen the data and prove significance. This research is beneficial in quantifiably showing that social bond oriented prison programs reduce recidivism. Therefore, more programs can follow this model and result in more permanent releases from prison. This can lead to lowered prison populations, less government spending on prisons, and improved community and familial relations.

Smith, Parker "Black Drag" (Jerod Hollyfield) fro

Hollywood filmmakers have portrayed a unique theme over the past several decades; African American comedic actors featuring cross-dressing, with black males being portrayed as women. The phenomenon has happened so frequently that there are more big name black comedic actors that have donned a wig and a dress, than there are ones that have not. It has advanced to a level in which actor, Tyler Perry, has made a career impersonating the opposite sex. Criticism in relation to black comedians cross dressing has not changed much over the years. One can look back as far as Flip Wilson playing the character Geraldine Jones in the 70's. Whether it is Jamie Foxx, Martin Lawrence, The Wayans Brothers, or Eddie Murphy they all receive the same flack for selling out to the “white man” as proposed by critics. There is more behind it than just simply selling out. While there are some white male actors who portray women, the ratio of white to black comedians that have done it has become one sided according to statistics. The demasculinization and humility of the professional actors becomes less existent when “forced” into sporting a wig and dress to gain credibility in the industry.

Smith, Skyler; Kholikov, Khomidkhodza; Seyitliyev, Dovletgeldi; Thomas, Zachary; Er, Ali; "Pulsed Laser Synthesis of Graphene Quantum Dots as Effective Biocompatible Photodynamic Agents" (Ali Er)

Pulsed Laser Synthesis of Graphene Quantum Dots as Effective Biocompatible Photodynamic Agents Photodynamic agents have been used for decades in a wide variety of applications. An effective photodynamic agent should generate a high amount of reactive species, have low biotoxicity, be water soluble, and have a high photostability. In this work, graphene nanoparticles were synthesized which offer promising improvements to photodynamic therapies, biological imaging, and other biomedical areas. Methylene blue was used as a reference photosensitizer. It has been shown that deactivation of bacteria by Methylene blue in human blood is inhibited by protein folding. An improved photodynamic agent is desired for this reason. Graphene quantum dots (GQDs) were produced by irradiating benzene and nickel oxide using nanosecond laser pulses. In order to characterize the GQDs, High resolution transmission electron microscopy (HR-TEM), scanning electron microscopy (SEM), atomic force microscopy (AFM), Fourier transform infrared (FTIR) spectroscopy, and nuclear magnetic resonance (NMR) were used. Using this bottom-up approach, graphene quantum dots less than 5 nm in size were obtained, with UV-VIS absorption peaking at 310 nm. Applications of this study include more efficient therapies for the deactivation of pathogens in wounds, burns, and even cancers.

Smith, Tyler; Banaszak, A.; Gupta, Sanju; "Graphene Quantum Dots Electrochemistry and Development of Sensitive Electrochemical Biosensor" (Sanju Gupta)

Graphene quantum dots (GQDs) are zero-dimensional material derived from graphene derivatives with quantum confinement and edge effects. Intense research activity in GQDs is attributed to their novel physical-chemical phenomena arising from the sp²-bonded carbon core surrounded with edge functional moieties. In this work, GQDs of optimal 5-7 nm size are investigated for their fundamental electrochemical properties and for enzyme-based glucose biosensor. The UV-Vis absorption and fluorescence spectroscopy, electron microscopy, cyclic and differential pulse voltammetry and electrochemical impedance spectroscopy, were used for characterizing the electrochemical biosensor. The well-defined quasi-reversible redox peaks were observed under various electrochemical conditions (pH, concentration, scan rate) to determine diffusion coefficient and heterogeneous electron transfer rate constant. Glucose oxidase (GOx) was immobilized on GQDs modified glassy carbon (GC) and developed biosensor GOx/GQD responds efficiently to glucose presence over the concentration range 10 µM - 3 mM with limit of detection 4.57 µM. The relatively high-performance is attributed to large surface-to-volume ratio, excellent biocompatibility, mesoporous and abundant hydrophilic edges and hydrophobic plane in GQDs that favors the GOx adsorption. We also carried out similar studies with other graphene-based electrodes and biomolecules for comparison opening ways for potential sensing applications in medicine and biotechnology.

Spalding, Shelley "A Quiet Genocide: Female Infanticide and the Case for Inclusion" (Marko Dumančić)

Female infanticide, the intentional killing of infant girls, is one of the largest mass atrocities in international history, resulting in large sex ratio disparities among practicing cultures.

From China's One Child Policy to ancient Hindu traditions in India, multiple cultures today still practice this deeply-embedded fatal custom. This study calls for the inclusion of female infanticide in the genocidal context. As a systematic destruction of a collective group (the female sex), female infanticide qualifies as a genocide, but not under the United Nations definition. The United Nations definition of genocide categorizes victims of genocide as national, ethnic, religious, or racial collectives, excluding gender. Female infanticide occurs on an individual level in that infants are not killed in mass slaughters, but rather quietly in homes and clinics. Therefore, while the murders occur separately, they amount to the proportion of a genocide over time due to their frequency and general acceptance among the perpetrating society. Drawing primarily from secondary sources of various academic disciplines, this study argues that female infanticide is essentially a quiet genocide in that it does not occur en masse, but rather its murders occur in secret which governments and societies choose to ignore.

Sparks, Megan; Duffin, Lisa; "Changing Pre-Service Teachers' Beliefs about 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), 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 examined the prevalence and change in pre-service teachers' (n = 96) beliefs about the four popular brain-based myths as a result of their participation in an intervention that lasted one semester. Data was collected at three time points in the semester and analyzed for change over time. Detailed findings will be presented and implications for reducing the prevalence of brain-based myths in pre-service teacher education will be discussed.

Spears, Kurtis; Wulff, Andrew; "Study of Water Systems and Contamination in South Central Kentucky" (Andrew Wulff)

The Chattanooga Shale is an organic rich, black shale that is prevalent in south central Kentucky. The Chattanooga Shale contains sulfide minerals such as: pyrite, and chalcopyrite; as well as heavy metal ions like uranium, cadmium, and thorium. Heavy metal ions are toxic, and alongside sulfide minerals have potential impacts on the water quality of the area (pH). The area of focus is Burkesville, KY, near the Cumberland River. Both the mineralogy and hydrology of the region will be addressed in the study. Mineralogical samples of the shale will be collected at outcrops near the Cumberland river. The water quality will be tested and compared using 3 categories: groundwater, surface water, and water from the streams/river. Research will also be conducted on the regional geology of the area (i.e. dip, dip direction, limestone units, and closed/open systems) and their effects on the water quality of the area. Instrumentation for this study will include XRD analysis, microscope with photomontage software (for the mineralogy), and the ICP-MS (for the hydrology). This study has implications for water quality in surrounding areas, as well as an opportunity to educate the citizens of Burkesville on the various geologic, and hydrological processes that affect them.

Speer, Allison "Finding The Function Of Alpha Synuclein Protein" (Chandra Emani)
Mutations in the alpha synuclein protein results in the formation of Lewy bodies which are a key in diagnosing patients with Parkinson's disease through a post mortem autopsy. The function of alpha synuclein protein in the healthy brain is not known. Before biological research can proceed with further experimental treatments for Parkinson's, the function of this protein should be fully understood in order to create an appropriate treatment for the target protein. By examining the amino acid sequence and structure for the protein, we can look for proteins that are similar in both structure and sequence. This experimental proposal suggests that by identifying a protein that has a high sequence identity with the alpha synuclein in question, we can determine the function based on the similarities found through sequences and structures, given that the similar protein already has a function that can be well understood. This can be done by performing a bioinformatics search of the alpha synuclein protein using the BLAST algorithm to retrieve a sequence and searching for similar sequences that may already exist similar to that of alpha synuclein. If this approach is successful, the Parkinson's research community will benefit by having a better and comprehensive understanding of the alpha-synuclein protein's function.

Staggs, Chandler; Zieba, Daniela; Lee, Dustin; "BioCloud: Using GPU Architecture for Bioinformatics Tools" (Michael Galloway)
Bioinformatics is an emerging branch of Biology that has joined with the computational power and expertise of Computer Science. This field has grown out of a need to process large data sets and provide significant analyses; a void that is being filled by newly created Bioinformatics software. One such piece of software is called "QIIME," which is an acronym for "Quantitative Insights Into Microbial Ecology". QIIME is a collection of tools that form a pipeline that is capable of producing statistical analyses of DNA sets and classifies those sets into certain nomenclature. Sadly, the current Bioinformatics tools present on the market are inefficient with long processing times. This is primarily because they are single threaded processes running on a single core of the CPU. Fortunately, GPU architectures now outperform CPUs in raw computational power. Our research with the BioCloud project includes utilizing the power of the GPU via a specific language called "CUDA". This language exploits the many processing cores and memory present on modern Nvidia GPUs to perform accelerated processing and parallelization. We are a subgroup of the BioCloud project that is working to potentially convert the QIIME pipeline over to utilizing the CUDA API for significantly increased performance.

Steinmann, Hali "A Geomorphological Investigation of Lithology, Structure, and Their Effects on Speleogenesis in the Pennington Formation, Savage Gulf State Natural Area, Tennessee" (Pat Kambesis)
Karst processes drive landscape evolution on the Cumberland Plateau, a physiographic province spanning from northern Alabama and Georgia through Tennessee into southeastern Kentucky. Situated near the crown of the plateau's stratigraphic sequence is the Pennington Formation, a heterogeneous geologic unit that contains intermittent soluble rock layers such as limestone, along with varying amounts of shale, siltstone, and sandstone. This research will take a geomorphological approach with the goal of understanding solutional processes and structural and lithologic controls on drainage in the Pennington Formation in Tennessee's Savage Gulf State Natural Area. The research questions are: 1) what are the

major controls on speleogenesis in the Pennington Formation, and 2) How do lithology and structure affect recharge to caves in this unit and in what ways are modern and historic drainage patterns reflected in cave morphology? The proposed research will consist of geologic mapping and a karst feature inventory of the Pennington Formation, a detailed survey of caves in the study area, fluorescent dye tracer tests and chemical analysis of the hydrologic system, and spatial analysis using a GIS. Karstification of the Pennington Formation has implications not only for geomorphology, but also for local ecology and biodiversity, water quality, and land management.

Steward, Kayla; Nee, Matthew; "Degradation of Organic Pollutants with Buoyant Photocatalyst (Titanium Dioxide and Zinc Oxide)" (Matthew Nee)

Vast amounts of organic compounds, such as crude oil, pharmaceuticals, and pesticides, are deposited into water resources throughout Kentucky every day. These compounds are some of the most difficult to remove. One approach to remove these compounds is by the use of photocatalyst, which reacts with UV radiation to create an electron-hole pair, beginning the process of breaking down the pollutant into carbon dioxide and water. These photocatalysts are very dense, causing it to sink, while the small particle size makes it difficult to filter. By placing the photocatalyst into a support material, it eliminates those two problems. To optimize the surface area, the photocatalyst (zinc(II) oxide, ZnO) is incorporated into a polydimethylsiloxane (PDMS) bead, giving the photocatalyst the maximum amount of access to light and the pollutant. These PDMS beads have such a high surface-area-to-volume ratio because it is made with an emulsion, which creates a porous structure. In previous experiments, these beads have been made with titanium dioxide (TiO₂) with a large amount of success, so more efficient photocatalyst will be introduced to the beads. Here, we show that ZnO works more effectively in wavelengths closer to the visible light spectrum, and with higher efficiency to degrade pollutants.

Stewart, Hans "Where the Laughs Went" (Jerod Hollyfield)

While the comedic legend, Jim Carrey has flooded out continuous laughter from audiences and has been essential to comedy over the past decades, a surprising crisis has left Jim's presence to be repressed. Varia Fedko-Blake admires Jim for his successful career endeavors through hardships, "when the Golden Globes hit in 2016, Carrey put on a brave face and stepped out into the public eye once more...he showed us all that he'd still got it". Although as Fedko-Blake observes, Carrey deserves appraisal for his courageously invigorating act in hosting the Golden Globes awards, further heeding 2 new features Jim released last year; Varia Fedko-Blake averts the question if Jim Carrey's personal downfalls will have a negative effect on his acting career. In this paper I argue that the personal effects of Jim Carrey's life are in fact culminating to a possible deterioration in his career. Dealing with depression in life, Carrey has taken on scaring challenges. Carrey's comedic films and inspirational moments have captivated many, the turn in genre following life-shattering events suggest an imaginable reflection of his depression. While Jim may be searching for happiness in spirituality, his impulsive efforts may not be enough to propel him back into spotlight.

Stewart, Patrick; Goulet, Christopher; "Embedded System for Transmission of Motion Data Over Long Ranges" (Kyle Moss)

The need for sending sensor data over extended ranges to the Internet is ever increasing with the popularity of wearable technology and constant connectivity of devices to the Internet. The goal of development is to create an embedded system that will transmit sensor data at a mile range, post data to a server, and give the user the ability to program the device to their needs. The device can sample 9 degrees of freedom data at a rate that can recreate the movement or behavior of the device's subject. To connect to the Internet, the system functions with a field module for data collection and a base station for Wifi connectivity in order to post data to the Internet server. This data can be viewed in a web browser live to show the current movement of the subject from anywhere with an internet connection. The design incorporates a compact, custom circuit board design with features that allow the user to easily interface with the board to program the device to their specifications, transmit data to a server, and reliably collect data over a great distance for many uses.

Stryker, Stefan "Numerically Solving a System of PDES Modeling Chronic Wounds Treated with Oxygen Therapy" (Richard Schugart)

Chronic wounds are a medical complication for affected patients, but oxygen therapy can provide aid. Investigating a mathematical model of the wound healing process can provide improvements. Our investigation is using a finite volume approach to numerically solve a system of partial differential equations that represent densities of bacteria, neutrophils, oxygen, and chemoattractant; a flux-limiting approach for the advection term is being used. Incorporation of this work into an optimal control model is the planned future direction of this research.

Tatebayashi, Mizuho "Intercultural Communication among Educators in a Multinational Environment" (Kumi Ishii)

Internationalization has become an important issue in the education field along with an increasing need of well-rounded citizens who can communicate effectively in a global society. Intercultural communication is not only in a classroom, but also for educators who work with international colleagues in their institutions. For example, fifty-four Japanese secondary schools, named as Super Global High School in 2015, have hired international teachers to enhance international education (Japanese Ministry of Education, Culture, Sports, Science, and Technology, 2015). The purpose of this paper is to consider ways to improve intercultural communication among educators who work in the multicultural environment. Utilizing the Anxiety/Uncertainty Management Theory (Gudykunst, 1995) as a theoretical foundation, a lack of knowledge of different cultures and language skills is discussed as the causes that increase an individual's uncertainty and anxiety. The paper also discusses how the high level of uncertainty and anxiety leads to communication avoidance, which limits interaction with colleagues from different cultures. Further, based on the literature review, cultural training is suggested to manage uncertainty and anxiety by fostering cultural sensitivity. In addition, the training program suggests the significance of knowledge of different cultures so that all educators can be competent communicators in the multicultural workplace.

Taylor, Brandon "'The Age Of Distrust': Documentaries For The Pure" (Jerod Hollyfield)

A recent resurgence of one specific film industry has led a shift in how a specific group of

filmmakers are capturing, and sharing the stories of theirs and others with the world. Annie Goldson, author of “Journalism Plus? The Resurgence of Creative Documentary” states that “documentary film takes up political challenges simply because politics are hardwired into its genes.” The goal here is to seek out how and why Documentary film has made a resurgence in organizations such as Sundance, and the Oscars. In an age of tabloid journalism, the role of documentary film is more crucial now than ever before, for it allows humanities pure voice to be heard. In this paper, I argue that documentary film is contemporary societies only truly honest form of media. Through articulate reasoning, documentary filmmakers pride themselves on accurate representation. It is through the research of director Marcel Mettelsiefen’s “Watani: My Homeland” (2016) and Orlando Von Einsiedel’s “The White Helmets” (2016) and their cinematic approach, that I will be able to identify pure and honest approaches to documentary filmmaking.

Taylor, Carly "Mechanochemical Synthesis of Platinum Compounds" (Kevin Williams)

We are studying a more efficient method of synthesizing cisplatin derivatives through mechanochemistry. Rather than combining reactants in a solution and heating or stirring them for extended periods, we may be able to use the energy input by grinding the compounds together in a mortar and pestle to generate the reaction. If we are successful, this will make a variety of platinum compounds much more practical to synthesize and test as drugs against various cancers. When we tried reacting cisplatin with silver nitrate using this method, we observed a notable change in color and solubility which suggests at least some reaction did occur. We are proposing to do a number of different syntheses in this way.

Taylor, Chelsea "The Effects of Sexual Abuse on Body Image of Members of the United States Military" (Rick Grieve)

The effects of sexual abuse on body image of members of the United States military The purpose of this study is to evaluate the effect sexual abuse has on United States service members’ body image perception and distortion. Military service members are faced with difficult challenges daily and physical demands of their bodies; of the challenges faced by service members, sexual assault and harassment is a preventable occupational hazard. We are examining the relationship between sexual abuse experienced by service members and their body image. The study will consist of at least 50 service members who have experienced sexual abuse and 50 who have not experienced abuse. Participations will be given an informed consent document, complete a demographics questionnaire, Combat Experiences Survey, Relationships during Deployment Questionnaire, Body Esteem Scale, and Body Investment Scale. Participants will take the questionnaire through an online link or will contact the researcher for a hard copy. Results and data analysis will be conducted when data collection has completed. Type: Oral paper Subject area: Health and Human Services Presentation: General Session: Podium, projector, computer Primary author-presenter: Chelsea A. Taylor Chelsea.taylor589@topper.wku.edu 412-420-9002 Faculty Mentor: Dr. Rick Grieve Rick.grieve@wku.edu 270-745-4417

Taylor, Erin "Queer Women in Television" (Jerod Hollyfield)

It is clear that there is growing representation of queers in media, so much that we are at the point where queer characters and relationships are becoming more normalized to even the most heterosexual of viewers. This essay will explore how the growth of particularly queer

women representation in recent television shows (such as Gotham, The Walking Dead, Glee, and The 100) can be potentially harmful to the perception of real life queer women. Even though television has helped in normalizing these relationships, it has created a very small box in which queer women must reside, having almost no women of color and often fitting these lesbians in to potentially degrading stereotypes. We will also refer to Bridget Kies' essay, "(Homo)Normalizing". In this work she talks about how making gays in media seem more relatable to their straight counterparts is what allows the normalization of homosexuality in the media; early on in her essay she states, "The success of gay romance on television today is the result of homonormativity, a political position favoring conformity to certain normative social values". We will explore how this concept both is proven within these television shows and how it is also rejected.

Taylor, Logan; Rennegarbe, Grayson; Martin, Lucas; Renfro, Brooklyn; "Moral Resentment" (Grayson Hunt)

We harm and are harmed throughout our lives. This harm provokes the feeling of resentment within us—is this resentment justified? Some philosophers suggest that resentment is morally permissible because this emotion defends self respect. I will defend this view by first distinguishing between moral and malicious resentment, providing examples of the two. I will explain that moral resentment defends self-respect, protects against future harm, and redeems our hurt—resentment is redemptive because it seeks justice. If resentment were purely malicious, it would not function in this way—that is, the general negative connotation of resentment is only exemplary of malicious resentment. Malicious resentment is revenge, like seeking to hurt someone who has hurt you not out of defense for oneself but to inflict further hurt. This resentment does not seek justice because it only seeks to satisfy itself or get even; malicious resentment is always negative and does not have the same defensive and redemptive qualities as moral resentment.

Thapa, Shila; Taylor, Ritchie; Macy, Gretchen; Mac Cann, Charles; Golla, Vijay; Hwang, Joeyeon; "Comparative Exposure Survey Study between Career and Volunteer Firefighter in Northwestern KY" (Jooyeon Hwang)

Objective: Most firefighter exposure studies have tended to focus on departments in big cities. This study is to see the differences in time spent in fire department, running fire apparatus, fire scene between career and volunteer firefighters. Method: A systematic questionnaire was distributed among 271 firefighters at Owensboro Community and Technical College on November 2016. A total of 121 firefighter responded the questionnaire. The questionnaire was divided into four sections: personal information, activities at fire department, at fire scene and personal protective practices. Results: Career firefighter spent nearly six times more time at fire department than volunteer firefighter (57.3 vs 9.8 hours/week). Career firefighter spent twice more time in running fire apparatus (10.1 vs 4.8 hours/week). The percent of time spent per week on fire scene was similar among career and volunteer (11.4 vs 9.8 %). Volunteer firefighter have two times older turnout gear set than career firefighter (2.3 vs 5.4 years). Conclusion: As career firefighter spent more time in fire department, they have more chances of running fire apparatus than volunteer firefighter. Results shows that career firefighter changes their gear suit more frequently than volunteer firefighter. Further detailed studies can be done for the better understanding the difference between career and volunteer firefighter.

Therrell, Grace "'Little Petty Places': Dante's *Inferno* and Complicated Women" (Alison Langdon)

The women of Dante's *Inferno* frankly appear stereotypical. They are punished for sexual sins and are carried away by their emotions and desires. But these assumptions only arise through a casual reading of his text—a deeper reading complicates things. True, Dante's views about gender sometimes reflect the traditional rigid norms of the fourteenth century. However, exploring the portrayal of Dante's women reveals their complexities not just as characters but as models of the female sex. Dante actually reveres the women in Limbo, and he creates a complex female character in Francesca. Although Dante's text and viewpoint are far from perfect, the complexity he develops through *Inferno*'s women forces us to examine not just our opinions of Dante but also of our own society.

Thogaru, Sujaya "Bone Mineral Density among Women in South Central Kentucky" (Matthew Hunt and Grace Lartey)

Osteoporosis is a bone disease that occurs when the body loses too much bone, makes too little bone or both resulting in weak bones prone to fracture from a fall or in severe cases by even sneezing or due to minor bumps. Risk factors for osteoporosis include females, advanced age, history of one fracture, a small thin frame, family history of osteoporosis, removal of ovaries, early menopause, a low calcium diet, lack of exercise, eating disorders, certain medicines, and alcohol and tobacco use. Hypertension, diabetes mellitus and osteoporosis are comorbidities common in postmenopausal women. This is a cross-sectional study of the data collected during the medical outreach programs of The Institute for Rural Health. The purpose of this project is to study the association between Bone Mineral Density and its association with age, gender, race, exercise, tobacco use, fruits/ vegetable consumption, high blood pressure and high blood glucose. The results could be used to increase bone mineral density testing to identify low bone mass at an early stage. Osteoporosis can be prevented by eating a balanced, calcium-rich diet, obtain vitamin D from sunlight, diet, or a multivitamin, engage in exercise and weight-bearing or weight-training.

Todd, Mollie "Functions, Forms, and Accessibility of English as a Second Language Courses in South-Central Kentucky" (Kate Hudepohl)

In the South-Central region of Kentucky there are several facilities that teach English as a Second Language courses. As a part of my honors capstone thesis by the same title, I am examining the structures of these classes as they relate to refugee students, what problems they face in the classroom and functions the classes may serve outside of learning English. For this conference paper, I will concentrate on the methods I have used in research for my CE/T. These are largely anthropological field work methods, including seven semi-structured interviews with local ESL teachers, volunteers, and professionals that work with refugees and participant observation. I will especially focus on the interviews I have conducted; what material has been collected, structure of the interviews, and what questions were asked. I will also reflect on how effective my interview questions have been with collecting the data needed to support my thesis. Ultimately, this paper will demonstrate the importance of using ethnographic field methods to gain perspective of refugee interactions in English as a Second Language classes in the South-Central region of Kentucky.

Tomko, Mason; Simpson, Olivia; King, Rodney; Rinehart, Claire; Staples, Amanda; "Collection, Isolation, and Analysis of Arthrobacter Bacteriophages Birdperson and Djoodi" (Naomi Rowland)

Bacteriophages can be used to solve a variety of problems with bacterial diseases in our world. Out of the 1031 phages on our planet, few have been discovered and even fewer researched. Through the Science Education Alliance-PHAGES program, we worked with Arthrobacter sp. to find and catalogue novel bacteriophages. A sample was collected from the Waffle House on Russellville Road in Bowling Green, Kentucky, and enriched with Arthrobacter to find phage specific to this bacteria. Our two phage, Djoodi and Birdperson, were isolated from the same sample, but contain myriad of morphological differences such as overall size, tail coorientation and width, capsid shape, and neck diameter. Both phages were viewed under a transmission electron microscope to determine morphology of the phages. This revealed that Djoodi's tail was much wider and more corrugated than Birdperson's, and that they differed greatly in overall size. Currently DNA samples from both phages are being sequenced, and genomes will be constructed and analyzed during this semester.

Towey, Charles; Shukla, Devesh; "Medicago Truncatula and the TiO₂ Treatment Test" (Shivendra Sahi and Nilesh Sharma)

Nanotechnology as a field of science has many applications in manufacturing, medicine, diagnostics, water purification, cosmetics, and electronics, among other technologies. In addition, metal nanoparticles are known to cause toxicity in living systems by altering physiology, biochemistry, and genetics. Since of the various nanomaterials, TiO₂NPs are used for a wide variety of applications, such as cosmetics, sunscreens, food and medicine, many of these consumer products are being released in the environment by human use and affecting the ecosystem. In recent years, TiO₂NPs toxicity studies have been carried out in many higher plants including Elm, wheat, barley, tomato and maize. As an extension of this research I propose to devote my project to studying the effect of TiO₂NPs on growth of alfalfa seedlings using physiological, biochemical and molecular approaches. Thus, my objectives are to study, i) changes in the biomass of the seedlings, ii) photosynthetic efficiency of the seedlings, iii) the accumulation of TiO₂NPs in the seedlings, iv) all anti-oxidative enzyme activities in the seedlings, and iv) compare the expression of selected genes in the seedlings grown in the presence and absence of TiO₂NPs.

Trader, Elizabeth; Zhao, Qin; "Cultural Differences in Responses to Self-Doubt" (Qin Zhao)

Previous research with individuals from Western cultures has shown that higher self-doubt is associated with poorer psychological well-being (Hermann, Leonardelli, & Arkin, 2002). However, the effect of self-doubt on individuals from Confucian Asian cultures remains unclear. Some research supported that Confucian Asian students' comparatively higher self-doubt indicates poorer psychological well-being (Stankov, 2010), while others argued that Confucian cultures value humility, modesty, and self-doubt accordingly (Hau, 2010). This study examined the debate with a survey of both American (N = 309) and Chinese (N = 336) college students that measured self-doubt, beliefs about ability, self-doubt mindset, and psychological well-being outcomes. As predicted, Chinese participants reported higher self-doubt, lower self-esteem, but a more positive mindset about self-doubt compared to American participants. We also observed Culture by Self-Doubt interaction effects on well-

being measures after controlling for self-doubt mindset and beliefs about ability. Specifically, although self-doubt negatively impacted participants' affect and self-esteem, such negative effect was significantly smaller in magnitude for the Chinese sample than for the American sample. In all, our findings support our hypotheses that Chinese students have greater self-doubt but perceive self-doubt less negatively, and that culture moderates the self-doubt effects on psychological well-being.

Treumann, Stella "Taiwanese Perceptions of Refugees: Results of an Experimental Survey" (Timothy Rich)

The current Syrian refugee crisis has revealed a high variance in states' willingness to host refugees. Syrian refugees face increasing hostility in many Western countries unwilling to accept them, and therefore may be forced to migrate further to find a willing host country. As one of the first to research the effects of individual-level factors on perceptions of refugees in East Asia, this study investigates the likelihood of Taiwan taking in Syrian refugees. Through an experimental survey, I analyzed how framing of refugees would influence Taiwanese willingness to accept them. 500 Taiwanese respondents were assigned to one of five prompts about Syrian refugees, and then asked to evaluate their willingness to accept those refugees. Some versions indicated the number of refugees, while others specified that the refugees would be Muslim. Analysis of results showed that Taiwanese were far more deterred by the number of refugees than by their religion. This pattern endured even after controlling for factors presumed to influence perceptions, such as demographic variables, experience abroad, or partisan identification. This study brings Taiwan into the broader debates about the Syrian refugee crisis and suggests both the potential for resettlement and challenges to overcome in terms of public opinion there.

Tucker, Lauren "Using Word Boxes to Improve Early Literacy Skills of At-Risk First Grade English Learners" (Susan Keeseey)

The focus of this project is to extend the current research by implementing a Word Box intervention designed to develop phonemic awareness, letter-sound correspondence, and spelling skills in at risk first grade English Learners. Phonemic awareness is the understanding that words are made up of individual sounds, and the ability to manipulate those sounds. It is a foundational skill for reading and writing and therefore critical to students' academic and lifelong success. Using a multiple baseline across skills design, with one-on-one explicit instruction, each of the five students progressed through the skills with the aid of Word Boxes. Each student demonstrated improvements in phonemic awareness, letter-sound knowledge, and spelling. This discussion will share the results of the study while demonstrating how to implement word box instruction to students in individual, small group, and whole class settings.

Tuladhar, Anisha; Polk, Jason; Thorsteinsson, Thorsteinn; "Improving Watershed Understanding In the Arctic through A Comparative Hydrogeochemical Analysis of Icelandic Glacial Meltwater" (Jason Polk)

A detailed comparative geochemical characterization of three different types of Iceland glacial systems was conducted during June (7-9), August (6-8), and October (10-12) 2016 in a total of 11 outlet glaciers draining from the ice caps including Vatnajökull, Eyjafjallajökull, and Mýrdalsjökull. A total of 25 grab samples were collected in a sampling period. The

alkaline pH nature of surface meltwaters of Iceland indicates that they are characteristically well buffered. Total suspended solids, alkalinity, and dissolved oxygen are highly variable between and within the glaciers and indicate possible influences from the bedrock over which the meltwater is flowing and differential erosion. This variability is more pronounced in some of the ice caps than the other. The cation dominance ranges from calcium to sodium and bicarbonate is the dominant anion in the sites. Seasonal variation in ions were seen as they were higher during June but high concentrations of Se, Pb, Sr were found during August. The glacial meltwater draining from Kvíárjökull glacial exhibits highest concentrations of heavy metals such as, Fe and Si during June. The variation in hydrogeochemistry of the sampling sites were found out due to differences in recent volcanic eruptions, distance from the ocean and glacier, and formation.

Turley, Samuel "Illegality Of Incest Based On Morality" (Michael Seidler)

This essay will take a look into the process incest went through from accepted and practiced to its illegality in some cultures nowadays. The goal of this investigation is to figure out when incest became illegal and then look at motivating factors of that law. The methods I use are taking a look throughout history at different cultures and studying the progression of peoples idea's on it. This idea is not even well-defined in legal standards throughout the United States. The law against incest was made before we had the scientific backing against incest. The implications of this is meant to show that laws based off of morality may be wrong and then it opens up a larger question of who's morals are we going to follow.

Turner, Rachel; French, Rachel; "Using Mixed Effects Modeling to Quantify Differences between Patient Groups with Diabetic Foot Ulcers" (Richard Schugart)

Because the medical treatment of diabetic foot ulcers remains a challenge for clinicians, a quantitative approach using de-identified patient data and mathematical modeling can help researchers understand the physiology of the wounds. Previously, an ODE model was developed to illustrate how these wounds heal. In this work, we plan to use nonlinear mixed effects modeling to attribute wound healing variability to either fixed effects, parameters that are more likely to remain constant for all patients, or random effects, parameters that vary from patient to patient. We aim to identify these random effects to make sure these parameters are taken into special consideration when treating patients with chronic wounds, especially diabetic foot ulcers. This approach will help to more accurately represent the complex interactions that occur in the diabetic foot ulcers which will allow us to understand and better heal these wounds.

Upshur, Elizabeth; Haydon, David; "Literary Conjuring: Uncovering, Researching, and Revisualizing the Landscape of Black Women Writers from 1601-1920" (Christopher Lewis)

The year 2019 marks the 400th anniversary of the first African slave ships arriving in the New World. As a future English professor, people ask, "In 400 years, what have Black women written? Is it influential? Does it deserve to be studied in the American or world literary canon?" This project answers those burning questions, demonstrating the validity, depth, and variety of Black women writers. These writers have not only created and contributed, they have been influential in the American literary canon, and their work must be brought to our attention and celebrated. We have combed through the foremost novels, the overlooked poems, the barely legible slave narratives, the harsh and shocking memoirs, and

placed them in historical context with both primary and modern criticism and commentary. We returned personhood to these works by re-imagining the lives and stories of these incredible women by creating sets of photographs that defy the historical caricatures that were used to stereotype and denigrate the humanity of Black people as a whole. The result is this literary and visual project which reveals a complete understanding of these writers, and yields a fascinating discussion on their significance and legacy.

Urso, Olivia; Carroll, Amber; King, Rodney; "Identifying Essential Viral Genes through Genomic Engineering" (Rodney King)

Only a small fraction of bacteriophage genes have known functions. The purpose of this study was to expand our understanding of bacteriophage gene function by identifying genes that are essential for lytic growth of Escherichia coli bacteriophage HK639. Phage HK639 was chosen because it employs RNA-mediated antitermination, a unique and poorly understood mechanism, to control the expression of its early genes. Using recombinering, a powerful genome engineering technique, five HK639 genes and one regulatory sequence located in the left operon of the integrated prophage were individually replaced with a kanamycin resistance gene. The recombinants were selected on kanamycin plates, and polymerase chain reaction was used to confirm the integrity of the gene replacements. To determine if the replaced sequences were essential for lytic growth, the recombinants were tested for phage excision and release. Phage production was unaffected by three of the sequence replacements, indicating that the deleted genes are nonessential for lytic growth. However, replacement of the genes encoding ORF 39 and ORF 40 prevented phage release, indicating these genes perform essential functions. Biochemical analyses of the ORF 39 and ORF 40 gene products will be necessary since bioinformatic analysis did not reveal potential functions.

Von Hagen, R; Schulte, Bruce; Mwangi, Githiru; Simon, Kasaine; Bernard, Amakobe; Urbanus, Mutwiwa; "An Exploration of Chili Pepper (Capsicum Spp.) Fences as a Crop Raiding Deterrent Method to Alleviate Human Elephant Conflict (HEC) in the Kasigau Wildlife Corridor, Kenya" (Bruce Schulte)

Human elephant conflict (HEC) continues to rise across the globe at the intersection of elephant habitats and anthropogenic activities. Crop raiding is the most common and economically detrimental form of HEC, and scientists and conservationists continue to seek innovative ways to mitigate these interactions. Chili pepper fences have recently emerged as a practical mitigation technique, but efficacy varies. My investigation will consist of three components; First, a literature review of all chili peppers fence experiments and techniques. Next, a laboratory experiment to determine the levels of capsaicin (the active ingredient of chili peppers) found on the material used in the fences, and how environmental factors such as time, wind, or rain can affect fence performance. Lastly, a large field trial in the Sasenyi area of Kenya will rank the effectiveness of chili pepper fences, a metal strip fence, and a combination fence of metal + chilies. While various studies have tested more than one deterrent method, none have attempted to rank the aversion of elephants to specific techniques. The three components of this investigation should result in improved efficacy of chili peppers fences as a deterrent measure, which could bring relief to struggling rural farmers.

Vondy, Robert; Schafer, Mark; Crandall, Jason; Lyons, Scott; Olenick, Alyssa; Blankenship, Lydia; Shaker, Nuha; "Evaluation of Sit-Stand Desktop Workstations in Sedentary Office Workers" (Mark Schafer)

Sedentary behaviors (e.g. using the computer) have been associated with increased odds of psychological distress. Sedentary behaviors are characterized by 10+ hours/day sitting compared to non-sedentary at $< .001$. With the use of the visual analogue scales, Focus while sitting increased significantly over the 10 week period for all groups, $F(9, 2074) = 3.815$, $p = < .001$. CONCLUSION: This study revealed that with use of sit-stand workstations, the amount of time standing throughout the 10-week period increased. This contributed to changes in focus while sitting over time.

Waddell, Aaron; Lam, Gavin; Tuttle, Nicholas; "Logan Ingot Cleaning System in Logan Aluminum" (Morteza Nurcheshmeh)

Logan Ingot Cleaning System in Logan Aluminum Team name: Washer Texas Rangers Students: Nick Tuttle, Dakota Waddell, Gavin Lam Mentor: Dr. Morteza Nurcheshmeh This project required the design and testing of an ingot preparation system for Logan Aluminum. The 70,000lb ingots needed snow, ice and gravel removed before they enter the plant. The ice was causing damage to the first stage of the manufacturing process known as the scalper. The solution is to design an automated, roller table to propel the ingot through a cleaning assembly. One operator will be required for this. The cleaning assembly will use high pressure water, a scraper, a rotating brush and a heater to remove the ice. The ice and snow are priority for removal, as they are much more damaging to the scalper than the gravel. The prototype will use all of the cleaning methods on a smaller scale. The purpose of the prototype is to evaluate which cleaning methods will be most effective. It will also evaluate methods for moving the ingot through the system. The design of the full scale is to be completed in March, and the prototype before the end of the semester.

Waite, Aldious "Perception and Attitudes of Unlabeled Genetically Modified Foods of the WKU Faculty and Staff" (John Houryieh)

Genetically modified (GM) foods technology has been widely used for improving food and crop production, but the supposed risks of GM foods, such as possible negative long-term health effects to humans, animals and the environment, has provoked the European Union to create assessment protocols to monitor and regulate the safety of GM foods and crops. This research investigated the perception and attitude of WKU faculty and staff of unlabeled GM foods. A survey was administered via WKU Qualtrics, and chi-square tests were performed to see how the benefits and disadvantages of GM foods may affect the purchasing decisions of an educated consumer, and to see if the WKU faculty and staff wants GM foods to be labeled or not. The survey revealed that approximately 92% of the WKU faculty and staff wants GM foods to have proper labeling and information. The results confirmed that the benefits and disadvantages of GM foods do affect the purchasing decisions of the educated consumer, and some possible trade-off benefits of GM foods were identified as well.

Wallace, Franklyn; Lamb, Ryan; "Modified Aqueous Substrates for Real-Time Reaction Monitoring Using Surface Enhanced Raman Spectroscopy" (Matthew Nee)

Traditional methods for detecting intermediate products of organic reactions in aqueous solution are highly sensitive and selective, but also labor intensive and slow. Slow data

acquisition is undesirable because it allows short-lived intermediate products to remain undetected, resulting in an incomplete understanding of the reaction mechanism. Previous work has identified Raman spectroscopy as a fast complementary tool for reaction monitoring, reducing data acquisition time 100 fold compared to traditional methods and thus identifying more intermediate products. One disadvantage of Raman spectroscopy is low sensitivity, which we address using surface-enhanced Raman spectroscopy (SERS). Additionally, due to aggregation nanoparticles used to initiate SERS are not stable enough to maintain spectral signal for long-term reaction monitoring. Aggregation refers to the clustering of nanoparticles, and if it is not controlled spectral signal diminishes within a few minutes. Here, the introduction of sodium dodecyl sulfate slows aggregation at the level of soft-stabilized-gold-nanoparticle clusters, which are effective for use as water-soluble SERS substrates over extended time periods without significant diminishment of spectral signal intensity. Soft-stabilized-gold-nanoparticle clusters were then used to collect preliminary reaction monitoring data for the photolysis of two cationic organic compounds (rhodamine 6G and paraquat) relevant to wastewater treatment.

Wallace, Sara "Acceptance and Commitment Therapy and the Body Project: A New Combined Intervention for Body Image and Mindfulness" (Rick Grieve)

The purpose of this study is to determine if a new intervention using techniques from Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) in combination with activities from The Body Project (Stice et al., 2009), will be able to reduce negative body image concerns and increase mindfulness skills in college females. Prior to receiving the intervention, participants will complete a pre-test measuring their current body image concerns as well as mindfulness abilities. The intervention will be administered in a large, group setting and will take approximately 25 minutes to administer. After receiving the intervention, participants will complete the same assessment measures as the pre-test, but in a post-test form. This research will contribute to a growing area of eating disorder treatment using ACT, and can help provide evidence for the benefits of using specific ACT and The Body Project activities in this treatment. Results and data analysis will be conducted when data collection has completed.

Wang, Zexuan; Gani, Royhan; "Deep-Marine Sediment Waves in the Northern Gulf of Mexico" (Royhan Gani)

On lands, especially in deserts, large sedimentary bed-waves (e.g., sand dunes) are ubiquitous. These bed waves can also form in deep marine by sediment gravity flows, where they are classified as deepwater sediment waves. However, the recognition of these sediment waves in deepwater is challenging thus quite rare in the literature. Moreover, the formative mechanism of large-scale sediment waves in deep marine environment is a mystery. Here, we recently discovered a large deepwater sediment-wave field on the continental slope of the northern Gulf of Mexico using a 3D seismic dataset covering 635 km². This study characterizes its geomorphology, interprets its formative mechanisms, and analyzes its hydrocarbon reservoir potential. The ~100 m thick sediment-wave succession was deposited during late Pliocene (~3 million years ago). The sediment-wave field covers a minimum of ~200 km² area, with individual sediment wave exhibits up to 500 m in wavelength and up to 15 m in height with asymmetrical geometry. These sediment waves are interpreted to be formed as cyclic steps and antidunes under ultra-fast supercritical sediment gravity flows,

likely triggered by extreme geologic events. The preferential striping of coarser sediments on the up-current flanks of the sediment waves likely has significant reservoir potential.

Ward, Kaitlin "Inclusive Design: An Evidence-Based Approach to Designing Low-Income Housing Communities" (Sheila Flener)

In the field of interior design, functionality and aesthetics are combined to create spaces that are beautiful, but also serve a variety of purposes. Broadly categorized into residential and commercial sectors, interior design considers the health and wellness of users in a space, and strives to improve the standard of living. Quality interior design is often treated as a luxury afforded only to the wealthy, although the field can and should be applied to benefit a wider demographic. Intelligent design and space planning can be used as a tool for community-building, especially among populations often overlooked due to reasons such as financial inequalities. This design revolves around the reuse of a historic building in Bowling Green and its redesign as a living community for low-income members of the public. Public housing projects are often designed as drab, prison-like facilities, which stigmatize and “other” less fortunate community members. This complex is modeled to provide well-designed, fully accessible housing units that provide safe, clean environments for low-income residents who cannot afford the hefty price tag that comes along with “good design”, but who still deserve that same sense of community and wellness.

Weaver, Eric; Stone, Martin; Biddle, Matthew; "Developing A Research Testbed" (Gordon Smith)

A joint project between the Agriculture and Engineering departments was proposed to investigate the effects of increased gravity on plant growth. A mathematical model of a rotating system was developed to understand the various parameters impacting effective gravitation multipliers (g-factors), resulting in a mechanical design capable of sustaining up to five times earth gravity (“5g”) on plants. Modeled after a centrifuge, the project then further expanded to include structural needs of the larger frame, transmission systems, and electrical controls. Additional constraints on the design included a limited budget. The foundational math model and resulting design will be presented.

Wellum, Joshua; Frizzell, Colin; Hudson, Devin; Alolayan, Abdulaziz; "ME 412 Halton Flow Stand Project" (Robert Choate)

The purpose of this project is to continue and improve the design and build from the 2004 Western Kentucky University senior project. The project is to design and build a flow stand that will be retrofitted to accommodate orifice plate air flow measurements in place of the current flow measuring device and possibly relocate to a new location in working order. Additionally, the current data acquisition program is to be modified for more Halton products. This project is sponsored by Halton Company based out of Scottsville, Kentucky, of which will coordinate the system requirements and design specifications.

White, William; Chidurala, Manohar; "Enhancing Student Learning with a Wind Tunnel" (Robert Choate)

A wind tunnel is a marvelous thing. It is a useful qualitative and quantitative experimental tool for student learning. This project utilized an existing wind tunnel at Western Kentucky University to create an external flow testbed. Future students will be able to use this testbed

to observe the performance of airfoils under various conditions. A model airfoil, rendered based on the x-y coordinate profile of a standard NACA airfoil, was 3-D printed. A lift and drag sensor system suspended the airfoil in the wind tunnel such that the angle of attack was variable. The existing wind tunnel allowed variation of airspeed. A Pitot tube coupled with a digital manometer was used to measure the airspeed. Qualitative indicators such as a smoke stream may be incorporated for flow visualization. The primary effort of this project was to develop and verify this system. Until an individual personally invests in doing a physical project, they likely will not realize the extent or nature of the details and difficulties that are involved. By accepting ownership of this hands on project, the first author has learned about real laboratory work. So also future students will learn about flow measurement and actively observe external flow phenomena.

Wilkerson, Phillip; Gibson, Steven; Boyles, Jason; Cantrell, Henry; Hicks, Stacy; Harper, Doug; Carter, Trason; "A Hands-On Radio Telescope for WKU" (Steven Gibson)

In June 2016, the Western Kentucky University Physics and Astronomy Department acquired a 1980s-era satellite television receiver system. By reusing the original 3-meter (10-foot) diameter fiberglass dish and the unit's slew motor system, we are creating a working radio telescope at greatly reduced cost for installation at WKU's Bell Observatory. The instrument uses a modern low-noise block downconverter (LNB) to amplify and convert the radio waves collected by the dish into electrical signals for processing by an open-source software-defined radio (SDR) platform. After its completion, the radio telescope will be used to observe nearby celestial objects, including Jupiter, the Sun, and Earth's moon, as well as distant targets like ionized nebulae and supernovae visible from the Northern hemisphere. The project's long-term goals include implementing remote controls for tracking the sky and recording observations. Support is provided by a grant from the Research and Creative Activities Program.

Wilkins, Katherine "Disdaining Men and Oxygen: Providing Nonbinary Gender Representation in Creative Media" (Christopher Lewis)

As millennials have grown increasingly aware of media and politics' effect on their everyday lives, their input in society is vital in precipitating change to social concepts that have gone largely untested in decades prior. Likewise, the concept of gender is evolving. Though millennials have instigated great change in how the Western world understands gender, biological sex (male or female) is still confused for gender identity. Currently, society sets binary expectations for gender identification, even though identities exist for those who do not adhere to a system that supports only masculine and feminine gender expressions. These non-binary individuals rarely receive attention in the media even though they crave positive representations of their identity in popular culture. In my creative project, Disdaining Men and Oxygen, I created the non-binary character of Juniper "Perry" Mayweather, a genderqueer college graduate. Perry decides to return home to Kentucky upon zir brother Jim's engagement, only to find brewing tension between the Mayweather family. Meanwhile, Perry struggles with the decision to reveal zir gender identity to those who will not understand it. A critique of gender expectations in American society, the story functions as a portrait of a "modern" family spanning a number of generations.

Willenbrink, Elizabeth; Mallinger, Gayle; Kerby, Molly; Musalia, Martha; "Cultivating

Community: Food Insecurity and Community Gardening Among African Refugees in Bowling Green, Kentucky" (Gayle Mallinger)

Past and present, community gardening has been used as a response to poverty, a way to supplement healthy foods, and a mechanism for community involvement. For thirteen refugee families living at the Housing Authority of Bowling Green, community gardening has become a way to recreate their traditional culture. Based on data collected through interviews during the summer of 2016, these refugees identified gardening as a buffer against food insecurity, providing access to both healthy and culturally appropriate foods. Most importantly, the interviewees identified gardening as a mechanism for support and togetherness among the city's refugee population. Most refugees utilize the socialization and community as a response against cultural assimilation. By surrounding themselves with supportive and similar community members, the refugees felt both comforted to practice their own culture and confident to learn the norms of their new home. With an evolving political climate and a possible influx in refugees in the region, understanding the importance of community gardening in refugee communities will help create a climate of acculturation and acceptance. More importantly, sustained opportunities for community gardening will ensure consistent access to culturally appropriate, healthy, and affordable foods for the city's vulnerable refugee population.

Williams, Morganne "Cepheids in Open Clusters" (Mike Carini)

Cepheids are variable stars that pulse at a certain rate that is related to their absolute brightness, making it possible to use them to judge distances. However, to calibrate this relation, i.e, to know their distances, one must know if the variable and surrounding stars being observed are part of the cluster or background stars. By plotting stars within a two-degree region of a Cepheid on a proper motion in right ascension (PMRA) vs proper motion in declination (PMDEC) graph, this study examines the relationships between Cepheids and their surrounding stars, starting with a list of bona fide Cepheids, and using their data in the Gaia, PanSTARRs, and other archives, we have acquired information about each Cepheid (e.g., position, PMRA, PMDEC, parallax, and radial velocities), and compared each against one another in a multi-dimensional analysis using python, astroconda, and GLUE. These graphs will be used to determine possible cluster membership, and ultimately confirm distances in via multiple methods.

Williams, Nicole "Expression of Cellulose-Digesting Enzymes for Plant Wall Degradation in Green Algae" (Sigrid Jacobshagen)

Chlamydomonas reinhardtii is a single cellular photosynthetic green alga that resides in the soil. The relatively small genome of the organism has been sequenced, making it an ideal organism for research. Recent studies have surprisingly revealed that *Chlamydomonas* secretes three different cellulose-digesting enzymes that allow it to feed on plant 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. Experiments are underway to test their expression under daily light/dark cycle conditions. Primers have already been designed, and the native state of the RNA has been confirmed using a bioanalyzer. Experiments to optimize the synthesis of cDNA from the RNA have been successful. Current experiments are testing primers to determine the genes' expression pattern. The overall 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.

Williams, Sydney "LGBT Representation in Independent Cinema" (Ted Hovet)

Throughout the history of independent cinema, it has often been a progressive force for lesbian, gay, bisexual, and transgender (LGBT) representation in film. Due to media's significant influence on the social perspectives of marginalized groups, it is important to examine the ways in which the LGBT community has been represented throughout the history of independent film, and how that representation has shifted as society has become more progressive and accepting of these stories. Through analyzing a few key films and trends throughout LGBT independent films, along with the criticism and controversy, it is possible to observe how the changes in the films represent the changes of society's attitudes, and therefore examine the impact of independent film on the LGBT community itself and the lens through which the community is viewed. In an analysis of the research, one can conclude that the nature of LGBT representation has evolved significantly over time, and will continue to evolve in the future.

Willis, Jennifer; Connor, Victoria; "The Effect of Music Therapy on Stroke Patients Rehabilitation" (Krisstal Clayton)

On average, 795,000 individuals suffer from a stroke each year (American Heart Association, 2015). Music therapy has been shown to mitigate stroke patient's symptoms muscle weakness, and loss of coordination (Sarkamo, 2014). This study intended to investigate the effect of music therapy on a stroke patient's balance and attitudes towards rehabilitation. Over the course of the patient's in-hospital stay, three control patients and three experimental patients, all with a diagnosed acute stroke in the right hemisphere, were observed. Patients were provided with an iPod Shuffle with either personally relevant music (3 patients) or an individualized metronome beat (3 patients) that was rhythmically-paired with their physical therapy exercises. To measure the effect of the interventions on balance performance, physical therapists conducted the Berg Balance Scale (Berg et al., 1995) on the patients' intake day (Baseline) and the day the patient was discharged (Discharge) from the rehabilitation facility. When comparing the patients' Baseline score to their Discharge score, the experimental group showed a greater increase in improvement than the control group. Musically-paired rehabilitation improved the patients' balance during their in-hospital stay. Open-ended feedback from the patients suggests that this improvement is linked to the positive effects of music on motivation.

Wilson, Danielle "Observation Cinema" (Jerod Hollyfield)

Documentary film is a genre of film that is so different than most other kinds. Although there are many different ways to document a documentary, I think there are certain ways to do so best. One of the biggest things to take into consideration is to not interfere with whatever is being documented. With this being said, observational cinema seems to be the best route to go when documenting real life. Anna Grimshaw and Amanda Ravetz wrote one of the first critical history and in-depth appraisal of the observational cinema movement in their book, "Observational Cinema." Their main argument is that this type of cinema, "exemplifies a non-textual anthropology that is both analytically rigorous and epistemologically challenging." These authors bring up interesting arguments, but I believe there seems to be

more to be learned within observational cinema. In order to capture reality to the fullest, there is a major need for the filmmaker to shoot in such a way that he/she is shooting within clear boundaries of what is portraying truth to the audience. This is why I believe observational cinema, otherwise known as cinema verte captures real life best without intruding on what is taking place.

Winchester, Charles "Kinetic Studies of Organic Reductants with an Electron-Deficient Manganese(IV)-oxo Porphyrin" (Rui Zhang)

Catalytic oxidations are among the most important reactions in the petrochemical and pharmaceutical industries. The drive for greener industrial processes encourages the use of biomimetic molecules for synthetic processes. In this work, a porphyrin system possessing electron-withdrawing substituents was evaluated for its usefulness in performing catalytic oxidations through kinetic studies with organic reductants. 5,10,15,20-tetrakis(2,6-difluorophenyl)porphyrinato-manganese(III) chloride was used as precursor molecules to generate manganese (IV)-oxo intermediates through chemical methods by reaction with a mild sacrificial oxidant, iodobenzene diacetate $\text{PhI}(\text{OAc})_2$. The same Mn(IV)-oxo species was also generated by visible light irradiation of a photo-labile Mn(III) precursor. Generated manganese (IV)-oxo species were subsequently reacted with a variety of organic substrates through oxygen transfer reactions, which were monitored by UV-Vis Spectroscopy. Kinetic results for the various reductants will be discussed.

Winklepleck, Tyler "Quality Of Life after Spinal Cord Injury" (Dana Sullivan)

This study sought to answer what extent does a traumatic spinal cord injury in adults affect quality of life. Quality of life can be referred to as one's life satisfaction, and reflect the subjective evaluation of the perceived congruency between one's life expectation and one's life achievements (Dijkers, 2005). Quality of life is operationalized by examining the factors of participation and social integration. Participants were individuals living with a spinal cord injury, which resulted in tetraplegic or paraplegic symptomatology. This study used snowball sampling to recruit participants from relevant social media support groups. The questionnaire was developed by combining items from two different instruments: Quality of Life Neurological Disorders (Neuro-QoL); Facilitators and Barriers Survey/Mobility (FABS/M). Neuro-QoL items were used to evaluate social effects experienced by participants (Ullrich, et al., 2012). FABS/M elements were included to measure facilitators and barriers to participation at the level of individual and community (Ullrich, et al., 2012). The quality of life for individuals living with a traumatic spinal cord injury should be studied to ensure these individuals are a part of the normal human experience. The results of this study are intended to be disseminated to health care providers to advocate for improved services.

Winkler, Adam "America Undressed; Waging War against Systematic Corruption in the Cinema of Oliver Stone" (Jerod Hollyfield)

Following the release of *The Green Berets* in 1968, The Vietnam War has received a wide range of cinematic treatments from acclaimed directors like DePalma and Kubrick, to exploitative actions films starring Chuck Norris. However, there is no filmmaker which has immersed himself in the subject like Oliver Stone. While films like *Platoon* (1986), *Born on the Fourth of July* (1989), *JFK* (1991), *Heaven and Earth* (1993), and *Nixon* (1995) are directly embedded in the context of the Vietnam War whether it be before, during, or

following, the themes of these films remain prominent throughout Stone's filmography. As Randy Roberts writes, "It is this goal, this quest for relevance, that drives Oliver Stone's pursuit of the past, separates his work from that of academic historians, and forces Americans to decide which is more important: a truthful rendition of the facts, or facts rendered in such a way as to illustrate the truth." Though suitable, Roberts overlooks Stone's desire to present an argument illustrating America's continuous cycle of dishonest institutions. In this paper, I argue that the films of Oliver Stone express a correlation of systematic corruption found within the U.S. government during Vietnam to contexts currently plaguing contemporary American society.

Wong, Chi Fai "Synoptic Mesoscale Aspects of a Winter Storm Associated with Soil Moisture" (Joshua Durkee)

A winter storm produced as much as 4 to 7 inches of snow during a 10-hr period across southern Illinois, between 28th and 29th December, 2012. The National Climate Data Center (NCDC) observed that the winter storm developed because of a compact and strong disturbance in the upper atmosphere, which moved east-northeast from Oklahoma to southern Illinois. The disturbance was related to upward vertical motion of water vapor from surface to the upper atmosphere, suggesting that high soil moisture on the surface may have influenced the event. However, 2012 was driest year on record in Illinois. The purpose of this study was to use the North American Mesoscale and Global Forecast System weather forecast models, radar data, and satellite images to investigate various atmospheric processes that led to this event. The potential reasons why this winter storm still developed under the 2012 dry condition is also explored in this study.

Wren, Buddy; Williams, Jamie; Clayton, Krisstal; "What's Gender and Sexual Orientation Got to Do with It? Moral Attributions towards Herpes-Positive Targets" (Krisstal Clayton)

This between-participants study aimed to identify participant moral attributions such as purity, harmfulness, disgust, sluttiness, and respect towards targets in hypothetical relationship situations. Participants were randomly assigned to read about one hypothetical relationship situation, which varied based on the targets' sexual orientation; gender; awareness or unawareness of carrying the genital herpes simplex virus (HSV); and not disclosing their HSV status. After making the moral attributions towards the target, participants were subsequently given a demographics page which asked the participants' sexual orientation, gender, political affiliation, age, and other measures of interest. Results showed an interaction with disgust attributions. Regardless of participant sexual orientation, disgust attributions differed, especially when the targets were heterosexual couples, the target was male or female, and the participants were male or female. Implications of the present study include high gender role expectations and the non-exclusivity of sexism in heterosexual males.

Yang, QiXing "Resort Hotel Design" (Neal Downing)

The purpose of this research is to use my skills to create a concept and design idea for a new resort hotel located in Yubei District, Chongqing, China. The district is the largest municipality in southwest China and has maintained rapid economic development while preserving a wonderful natural environment. My design will consider the skyline connection with surrounding buildings and distinguish itself. It will stand four or five stories and provide

impressive views of the contextual landscape with its semi-circular design. The hotel will include 80 guest rooms. These are divided down as 38 standard rooms, 24 Superior rooms, and 18 deluxe rooms. The public facilities also include two restaurants, underground parking, a game room, a swimming pool, a gym, and a bar.

Yao, Lei "Shopping Center of Jiu Ting Town" (Neal Downing)

In 2015, due to urban planning, the number of residents in Jiuting Town (a developing suburban area in Shanghai) exceed 100,000; This number will still increase in next five years. Large population creates a large demand for daily using products. However, a worse traffic situation can be imagined if too many residents go other place for shopping during rush hour. Furthermore, a new subway station which in city subway network system just set up. Visitors from centre of the city have more opportunities to visit this town. Therefore, creating an iconic shopping space to meet local residents' basic demands, bring marvelous commercial opportunities in this town, and represent local characteristic is important. This project is seeking to solve how to meet local residents' demand, how to inform public about this town, and how to create a unique style which can give deep impression for each visitor. The ultimate goal of this project is to create a characteristic shopping center, on the basis of unique and memorable shopping experience.

Young, Taylor "Synthesis of Copper Vanadate as a Battery Electrode Material" (Bangbo Yan)

Due to the increasing demands for energy storage worldwide, it is important to develop new electrode materials for rechargeable batteries. In this presentation, we report a copper vanadate metal-organic framework as a battery electrode material. The material, [Cu(bpy)V4O10], was synthesized using the solvothermal method. The structure of [Cu(bpy)V4O10] consist of stacked vanadate layers [V4O10]- that are coordinated to interlayer chains of [Cu(bpy)]+. The electrochemical properties of [Cu(bpy)V4O10] were measured and analyzed.

Zieba, Daniela; Goulet, Christopher; "BioCloud Middleware" (Michael Galloway)

BioCloud is a cloud-based bioinformatics service created to serve the growing need for the analysis of DNA sequences. The project uses QIIME 2, an open-sourced bioinformatics pipeline that is only accessible through the command line interface and can take an enormous amount of time to process data that is variable on the computer it runs on. BioCloud solves these issues by providing a web interface that communicates with middleware that then calls QIIME's functions where needed. The main role of this middleware is to manage the communications between the web service and the QIIME 2 process itself. One problem tackled by middleware design is scaling of QIIME 2; instead of calling it on one machine, the approach taken in middleware development will involve the scaling of it across multiple machines to more quickly complete processes. QIIME 2 functions must be accessed with specific files, and another role is to abstract QIIME 2, wrapping functions in a safe way. Another feature that will be researched is the capability of QIIME 2 through BioCloud to read the massive data needed by biologists through a URL, allowing a user to potentially access QIIME for data analysis and finish it completely remotely.