

WIU Graduate Research Conference

Friday March 6, 2015.

Poster Presentations

1. **Title: Probing the shape of high dimensional data**

Principal presenter: Moha Aghdam

Major: Mathematics

Faculty mentor: Doug LaFountain, and Mokhtar Aouina

Abstract: Data exhibiting cyclic behavior is important in many disciplines within the natural and social sciences, as it points to the presence of periodic phenomena. For data sets plotted in one, two, or even three dimensions, many methods have been developed to support the visual identification of cycles within the data [Alpha shape, The crust, and the beta-skeleton]. For data sets of arbitrarily high dimensions, however, these methods prove to be insufficient; recently, however, a method of data analysis arising from pure mathematics, in particular the subfield of algebraic topology, has made it easy to identify cyclic behavior in arbitrarily high dimensions. This method, termed persistent homology and developed by mathematicians such as Harer, Carlsson and Zomorodian, takes as input a point cloud data set and gives as output a barcode, which itself is a plot in two dimensions by which the researcher can then see what cycles exist, and also how important each of these cycles is in determining the global shape of the data [References]. In our work we strengthen an existing algorithm for calculating the distance between two barcodes, and hence for two different data sets; we also implement a new way of filtering a data set to produce a barcode, which cleanly differentiates between microscopic and macroscopic features of this data set. Finally, we apply this in new ways to economic data, specifically labor and workforce data, in order to identify cyclic trends in which multiple predictors are allowed to vary simultaneously.

2. **Title: From the Dance Floor to the Swimming Pool: Belly Dance as a Intervention Training Method for the Dolphin Kick**

Principal presenter: Anne Dixon

Major: Kinesiology

Faculty mentor: Dr. Chris Kovacs

Abstract: The dolphin kick is a challenging swim skill to learn. This kick is not an instinctive human movement and is challenging for new learners who generally find the chest to toe, full body undulation movement awkward and difficult to transfer from deck to water. No other kick is similar enough to create an effective learning transfer when training swimmers in butterfly stroke. Perhaps an alternative training method could be obtained from an unrelated motor performance area such as belly dance. The purpose of this study was to apply a unique motor skill intervention, belly dance, in addition to a standard dolphin kick training, to determine if a positive learning transfer occurs, and if it does, would it provide an easier and more efficient teaching technique? Volunteers were recruited from two KIN 102 swim classes, between the ages of 18 and 25 yrs. who self reported as being able to swim at least 50 yards continuously, and with little or no experience performing dolphin kick. The Wed./Fri. section was designated as the control group (CG) and the Tue./Thurs. section was the intervention group (IG.) All of the training and testing occurred at the Brophy Hall pool. A Garmin Forerunner 310 XT GPS submersible watch with heart rate monitor was attached to each participant as they performed dolphin kick for the pre-study and post-study test. This device records an individual's heart rate as well as performance time per distance. The research assistant recorded the data registered by the GPS device while the researcher/instructor recorded the visual assessment of kick cycles for each subject. In the first week the instructor pre-tested all students (50 yrd. dolphin kick/glide arms) and recorded each individual's kick cycles, heart rate, and performance times. During second period the instructor presented a video and live demo of the American Red Cross dolphin kick instruction to both classes. The IG received an additional live demo of the belly dance undulation. Both classes had 20 mins. of practice; 5 minutes of vertical, undulation drills on deck (IG practiced with music) followed by 15 mins. of dolphin kick in the pool. In the second week each group performed dolphin kick swimming drills for 20 mins. The IG practiced with mid-eastern music playing in the background. By week three each group had 20 mins. of practice doing dolphin kick/glide arms, only the IG performed a 5 min. vertical undulation in water (with music) prior to the 50 yrd. kick drill. In the last class both groups performed a post-study skill retention test of 50 yds of dolphin kick (no music.) The participants' working heart rates, kick cycles, and performance times were recorded and the data was run through a repeated measures MANOVA program (<.05 level of significance.) Results indicated no difference between groups, but there were notable indicators of enhanced performance in the IG when comparing the mean scores of the performance times and kick cycles.

3. **Title: The Impact of Beaver Herbivory on Late Successional Upper Mississippi River (Pool 13) Floodplain Forest Communities**

Principal presenter: Payal Shah

Major: Biology

Faculty mentor: Dr. Susan Romano

Abstract: The current floodplain forest of the Upper Mississippi River System is predominately composed of shade intolerance species such as silver maple. Within floodplain forest ecosystems ecological succession typically begins with willow and cottonwood and changes slowly over the years to form a forest most often dominated by silver maple. Disturbances such as flooding, tree disease, and animal activities, modify the expected successional species composition by removing and incorporating other species. These disturbances may increase diversity and health of ecosystem, but may also remove tree species that provide important habitat values. Sustaining the health and diversity of the floodplain forest is important because floodplains are regarded as the link between the upland and riverine ecosystems which provide many ecological benefits. Beavers (*Castor Canadensis*) are biological community architects that bring about changes in floodplain forests by mechanical means such as removal or girdling of trees, or building dams with harvested saplings producing ponded areas. The objective of this research is to determine the disturbance effect of beaver herbivory that alters the succession, structure, and diversity of the floodplain forest along the Upper Mississippi River. This study will identify the current composition of canopy trees within the floodplain forest, the effect of beaver herbivory on composition of the tree canopy and tree species favored by beaver for food and building supplies. We hypothesize that (1) Beaver occupancy is strongly subjective to woody vegetation in the province. (2) Beavers will select canopy species of higher food value such as pin oak and green ash, and reduce the diversity of the floodplain forest canopy species which is significantly different from area without beaver herbivory. (3) Mortality and tree density will significantly differ from beaver affected and non-affected areas. Beaver population density will be estimated using occupancy modeling, where motion-activated cameras are situated along established beaver travel routes throughout the study area. Occupancy will be simulated using MARK software. All canopy trees will be observed within the area of beaver activity. Tree location will be identified using a Garmin GPS unit, and will be used to illustrate the spatial distribution of herbivory. Differences between the Shannon Diversity of canopy trees without beaver herbivory and those with herbivory will be tested using a t-test, SAS software. Live and dead trees will be identified to species, tree diameter data will be collected, and presence/absence of beaver herbivory noted. Current forest structure will be summarized using tree diameter. This study will address the question of the impacts of herbivory by beavers on the composition and structure of the floodplain forest. Moreover, research findings would be an asset to land managers of Upper Mississippi National Wildlife and Fish Refuge to manage beaver populations, and provide information for the Upper Mississippi River Systemic Forest Stewardship Plan, conducted by U.S. Army Corps of Engineers. Sustainable management

of the forest is necessary to ensure species diversity within this important ecosystem. Restoration of the floodplain forest can be generated as a support for climate change effects and carbon offset projects. Restoration of floodplain forest, investigation and analysis of beaver impact on the forest communities must be known for conservation of floodplain forest biodiversity.

4. **Title: "Protect Your Life while Saving Lives": Ebola and Healthcare Professionals Safety**

Principal presenter: Omotola Ashafa

Major: Health Sciences

Other presenters or co-authors: Co-presenter- Henry Onyia, graduate program- Health Sciences. Co-author- Dr. Mei Wen, Health Sciences and Social Work Department

Faculty mentor: Dr. Mei Wen

Abstract: The recent Ebola Virus Disease outbreak cast a devastating effect around the world, especially in African countries. Nigeria is one of the countries affected. World Health organization (WHO) declared the Ebola Virus Disease outbreak as an international health emergency on August 8th, 2014 (WHO, 2014). As of September 24, 2014, 19 laboratory-confirmed Ebola cases and one probable case were reported in two states in Nigeria, with 894 contacts identified and followed during the response. This resulted in the death of eight patients, which included healthcare workers providing care to Ebola Virus Disease patients. This virus has claimed the lives of more than 120 health workers and infected more than 240 as of August 25, 2014 (WHO, 2014). This has made health staff recruitment for the outbreak difficult with the potential life threat. This study aims to explore the benefit of possible personal protective equipment for healthcare professionals treating Ebola virus infected patients. The study examines the recent epidemic of Ebola virus in Nigeria and the role of health workers in preventing and fighting against the spread and contamination of Ebola virus infection. The personal protective equipment includes gloves, gowns, shoe covers, head covers, masks, respirators, eye protection, face shields, and goggles. Secondary data is collected from mass media reports from Nigeria and other countries. A timeline of the major events and responses in Ebola epidemic in Nigeria is depicted to understand the role of the protective equipment and the magnitude of the disease. Several recommendations are provided from this study. Firstly, Adequate National preparedness efforts are needed to ensure resources can be quickly accessible to fund the early stage of the epidemic. Secondly, there were discrepancies among the levels of political leadership in fully appreciating the enormous consequences that even a small Ebola outbreak could have on civil institutions such as hospitals, airports, and public gatherings. Targeted education about the urgent need to fund, staff, and supply a response effort will be provided to political leaders and should be considered for preparedness efforts elsewhere. Similarly, there should be specific information about Ebola from the health authorities, to reduce inaccurate information that may be passed through the press or individuals which can create a nationwide scare. Health professionals should be protected

while they are making efforts saving lives. References World Health Organization. (September 2014). Ebola news. Retrieved from <http://www.who.int/mediacentre/news/ebola/25-august-2014/en/> World Health Organization. (2014). Ebola virus disease outbreak response in West Africa World health organization and the Government of Guinea, Liberia and Sierra Leone. Retrieved from "http://www.who.int/csr/disease/ebola/evd outbreak-response-plan west africa 2014.pdf?ua=1&ua=1---"

5. **Title: Effect of legalization of abortion in Nepal: A Literature Review**

Principal presenter: Tara Bhandari

Major: Health Sciences

Other presenters or co-authors: Dr. Mei Wen

Faculty mentor: Dr. Mei Wen

Abstract: Background: According to World Health Organization (WHO), unsafe abortion resulted in high maternal mortality rate especially in developing countries. Induced abortion was considered a crime and punished with imprisonment in Nepal. In March 2002, abortion was legalized in Nepal. This law permits women to request abortion up to 12 weeks gestation, 18 weeks for rape or incest, and with a physician's approval at any stage of pregnancy to protect mental or physical health and in cases of fetal anomaly. Besides, sex selective abortion is prohibited, and adult consent is required for girls less than 16 years. Followed by the legalization, the first certified abortion clinic was opened in 2004. The Government of Nepal in partnership with non-governmental organizations started a nationwide program to train abortion providers, and regulate the safety and feasibility of service. Initially, only physicians were offered training in Manual Vacuum Aspiration (MVA). Later, in 2008 staff nurses and midwives became eligible to perform MVA up to 8 weeks. Second trimester abortion training and certification for physicians began in 2007, and in 2009 medication abortion was added to the safe abortion program in the country. Aim/Objective: The main objective of this study is to assess whether the legalization of abortion has led to a decline in maternal morbidity and mortality related to unsafe abortion in the country. Method: A literature review will be conducted on effects of legalization of abortion in Nepal. Conclusion: Although abortion is legalized in the country, many women are still not aware of it and the conditions in which it is permitted. But the change in legalization allowed nearly 500,000 women to obtain safe and legal abortion care by 2011. Due to the limitation in the data available to estimate change in women's health status, more approaches for assessing the role of abortion legalization in women's health are needed. It is found that abortion related complications cannot be reduced with legalization of abortion alone in the country. Public education and advocacy campaigns are crucial to create awareness about the legalization of abortion, to change society's attitude towards abortion and to prevent unsafe and illegal practices. This study will review the existing data and literature to provide some baseline knowledge and evidence for further advocacy and dissemination to promote maternal and child health in Nepal.

6. **Title: Smoking Cessation Intervention among Campus Students**

Principal presenter: Akinwale Stephen Akingbule

Major: Health Science

Faculty mentor: Dr. Fetene Gebrewold

Abstract: Smoking tobacco is a public health issue. It is common among campus students who are mostly youths. In many occasions, the detrimental effect of smoking is on the long term hence, many campus students that engage in it do not see urgent reasons to quit the habit. The health risk associated with smoking is huge. If smoking tobacco continues at the current rate, 5.6 million of today's American youths, younger than 18 years of age are projected to die prematurely from smoking related illness. This represents one in every 13 Americans aged 17 years or younger today (CDC, 2014). There is need for intervention to achieve smoking cessation among campus students. The objectives of this research work are to: increase the awareness of the dangers associated with smoking among campus students, encourage the willingness of individuals addicted to smoking to seeking help and to make the help needed easily available and accessible to them. The transtheoretical model is an appropriate model to apply. This research aims at multiple approaches to effecting smoking cessation among campus students. The transtheoretical model is a staged interventional behavioral model that is applied to help in the changing process of smoking cessation. The model consists of six stages which are: 1. Precontemplation 2. Contemplation 3. Preparation 4. Action 5. Maintenance 6. Termination stage. Tobacco use is the leading preventable cause of disease and premature death in the United States and it contains more than 7000 toxic chemicals that can cause cancers and diseases. (CDC, 2011). In effecting tobacco cessation using transtheoretical model, there is need to increase the awareness of the inherent dangers associated with smoking among youths. This will help to move the smokers that are at the precontemplation stage of the model to the contemplation stage hence seeking help on how to quit. Furthermore, the long-term plan is to set up a student group that will have regular seminars and flyers to spell out the dangers in smoking. This group will serve as a support group on campus. This will be a resource point to help people at the action stage of the model to be able to take right steps in quitting. We will also work with health educators, former smokers, current smokers and other volunteers. This will enable students that smoke to take action and stop while the ones that have stopped will be able to move from maintenance stage to the level of termination in the model. This will ultimately make it possible for students to have the desired help in quitting smoking. This multistaged model will help in achieving this desired change thereby reducing this deadly habit to the barest minimum on WIU campus.

7. **Title: Synthesis of Palladium Diphosphine Complexes for X-ray Absorption Spectroscopy Analysis**

Principal presenter: Chelsie Forrest

Major: Chemistry

Faculty mentor: Chemistry

Abstract: Ligand K-edge X-ray spectroscopy (XAS) is an analytical tool that can be utilized to quantify how electrons are shared between two atoms. While the technique itself can be quite difficult to comprehend, the information obtained, being the amount of electron sharing, is not. One of the newest elements now being examined by XAS is phosphorus. One reason that phosphorus is being examined is due to the versatility of compounds that contain phosphorus. Compounds containing phosphorus can be used as catalysts in many different areas of chemistry. It is for this reason that focusing on the development of new catalysts containing phosphorus is so important, and it is for this reason that there has been particular focus on synthesizing new catalysts to test in order to determine which work best. My particular focus has been on synthesizing eight different palladium-phosphorus complexes so that they may be analyzed by XAS. Because none of these compounds have been examined by XAS before, correct synthesis has been a crucial part of my research. For the synthesis of these compounds, the Schlenk technique was utilized. This was due to the air sensitivity of the compound; to ensure pure compounds, the reactions were done while under nitrogen gas. The reactions were heated during this time to make sure the solids were completely dissolved. Once this process was completed, the solutions were left to cool so that the solids would form and could be collected. In order to determine that the correct compounds were synthesized, characterization was done by first finding the melting point and then by ^{31}P NMR. By examining these compounds via the XAS method, the understanding of how these molecules behave as catalysts will be determined.

8. **Title: Gene Expression in White-tailed deer (*Odocoileus virginianus*) with Chronic Wasting Disease**

Principal presenter: Emma Trone

Major: Biology

Other presenters or co-authors: Christopher N. Jacques¹, James T. Lamer¹ Paige Zick¹, Guoqing Lu², and Paul A. Shelton³ 1.Biological Sciences, Western Illinois University, Macomb, IL, USA 2.Department of Biology, University of Nebraska-Omaha, Omaha, NE, USA 3.Illinois Department of Natural Resources, One Natural Resources Way, Springfield, IL 62702, USA

Faculty mentor: Dr. Christopher Jacques

Abstract: Chronic wasting disease (CWD) is a type of transmissible spongiform encephalopathy (TSE) which affects cervid species throughout North America. As a prion disease, CWD is caused by the misfolding of the prion protein. The disease is both communicable and transmissible and there is no treatment currently available. In Illinois, CWD was first discovered in 2002 in Boone County near the Wisconsin border. As of 1

July 2013 there have been 408 cases of CWD in Illinois. This research will evaluate gene-expression in CWD-infected and non-infected white-tailed deer collected by Illinois Department of Natural Resource game managers during annual population reduction (e.g., sharpshooting) and disease monitoring efforts throughout the CWD-endemic area of northcentral Illinois as well as establish a timeline for RNA viability. We collected tissue (brainstem, liver, spleen, retropharyngeal lymph nodes) samples from 26 hunter-harvested deer during the 2015 annual firearm season to estimate RNA stability; tissue samples have been sent to the University of Chicago for analyses. We will use next generation sequencing (NGS) to analyze tissue samples from CWD-infected deer euthanized by IDNR sharpshooters during winter 2015 (February - March 2015). Specifically, we will use the Illumina HiSeq 2000 Sequencing System (Illumina Inc., San Diego, CA, USA) to quantify and map the transcriptome, and identify novel and known genes from CWD-infected (n=10) and non-infected (n=10) deer. Identification of differentially expressed genes involved in the pathogenesis of CWD may enable researchers and game managers throughout Illinois to predict the infectious status of harvested deer using gene expression (transcriptome) profiles developed from this study. Results of this study also will be used to evaluate the feasibility of genetic profiling as an alternative method for CWD-testing across northern Illinois.

9. **Title: The Negative Relationship Between IQ and Sleep Among Women**

Principal presenter: Natalia Kazakova

Major: General Experimental Psychology

Other presenters or co-authors: David J. Lane and Brandon M. Wright

Faculty mentor: David J. Lane

Abstract: Mental health among college students is an issue of concern (Hunt & Eisenberg, 2009), as one in ten students have seriously contemplated suicide in the past year (American College Health Association, 2008). Females are more sensitive to stress than males and are more likely to develop stress-related disorders, such as insomnia (Bangasser et al., 2010; Zhang & Wing, 2006), which in turn, leads to increased stress in the form of depression and anxiety (Seeman, 1997). Coplan et al. (2012) found that high anxiety was positively correlated with high IQ in individuals with a diagnosis of generalized anxiety disorder (GAD), while in healthy individuals, there was an inverse relationship between anxiety and IQ. Because of women's increased susceptibility to stress and the link between anxiety and IQ, we hypothesized that females with higher IQs would sleep less and experience more stress than males. D. Procedure: Thirty-two males and 54 females from a Midwestern university were recruited for the study. Subjects completed the Perceived Stress Scale (Cohen, 1983), the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 2004) and answered health-related questions (e.g., sleep, stress). E. Results: Data were analyzed using a linear regression model, which found that sex and IQ interacted to predict sleep, $b = -.009$; $p = 0.01$. The findings indicated that females with a higher IQ sleep less than females with a lower IQ. Conversely, males with a higher IQ sleep more than males with a

lower IQ. Additional t-tests indicated that males reported less stress and fewer cold symptoms in the past year than females, $t(73) = -2.38$, $t(73) = -2.20$, $p's < 0.05$. F. Conclusion and Implications: One explanation of these results is that high levels of perceived stress among high IQ women led to short sleep duration. The negative relationship between sleep and IQ in females could be due to females' increased sensitivity to stress and the ensuing likelihood of experiencing symptoms of insomnia. The relationship could further be explained by the different methods, which males and females utilize to deal with stress (American Psychological Association, 2012). These findings could be helpful in educating college women about efficient ways of managing their stress.

10. **Title: Isolation and Molecular Characterization of Heavy Metal Tolerant Fungi**

Principal presenter: Terry Torres

Major: Biology

Other presenters or co-authors: Dr. Cherryl Kuske and Dr. Andrea Porras-Alfaro

Faculty mentor: Dr. Andrea Porras-Alfaro

Abstract: The release of heavy metals in the environment has increased continuously due to technological development and industrial activities. Several technologies have been developed to clean heavy metal contaminated soils but they tend to be inefficient and expensive. Heavy metal tolerant fungi have been described in contaminated soils and water but it is unknown how abundant and diverse they are in natural ecosystems. The objective of this project is to isolate and identify heavy metal tolerant fungi from Duke Forest soil samples, and determine their potential role for mycoremediation. Samples were collected from Duke Forest in North Carolina from an N-fertilized (11.2 g of N m⁻² yr⁻¹) and an unfertilized quadrant within an ambient CO₂ FACE plot. Serial dilutions of up to 10⁻³ of horizon X (5.4-9.7 cm deep) and horizon C (9.7-15 cm deep) samples were inoculated on MEA supplemented with streptomycin (0.05 mg/l) and tetracyclin (0.05 mg/l) with metal concentrations between 100 ppm and 1000 ppm of FeSO₄, ZnSO₄, CuSO₄, Al₂(SO₄)₃, Pb(NO₃)₂, Cr(NO₃)₃, NiCl₂, CdCl₂ and K₂Cr₂O₇. Incubation was conducted at 25°C. A total of 430 pure cultures have been isolated. From which 25 morphotypes have been determined for Zn, 16 for Cu, 22 for Fe, 3 for Cr, 12 for Pb, 4 for Al, 7 for Ni, and 9 for Cd. The most common taxa include Trichoderma sp and Aspergillus sp. Trichoderma has showed tolerance to all the heavy metals except for lead, and it has been isolated from both soil horizons and fertilization treatments. The most common morphotypes for each metal will be studied to determine the tolerance index and minimum inhibitory concentrations. All fungal isolates will be sequenced and further analyzed using BLAST and UNITE databases for identification. Phylogenetic analysis will also be performed.

11. **Title: Observed Outcomes and Case Formulation Quality**

Principal presenter: Phillip Berg

Major: General Experimental Psychology

Other presenters or co-authors: Dr. Kristy Keefe and Dr. Jonathan Hammersley

Faculty mentor: Dr. Kristy Keefe

Abstract: Problem or Purpose: Therapist competency is a relatively neglected but potentiality salient variable in psychotherapy outcomes (Weinberger, 1995; Bell, Marcus, & Goodlad, 2013). One competency is individualized case formulation (Okiishi, Lambert, Neilson, & Ogles, 2003). Little empirical research has been conducted on development of case formulation competency and its relationship to psychotherapy outcomes (Hallman, 2012). Beginning work on case formulation quality has been able to reliably discriminate novice from experienced clinicians (Kendjelic & Eells, 2007). Although there are few empirical studies on psychotherapy outcomes in training clinics, previous meta-analyses on general psychotherapy outcome identifies general therapist competence as a variable that predicts client outcomes (Crits-Christoph et al., 2001; Wampold, 2001). Procedure: A retrospective analysis of data from a master's of psychology training clinic was conducted. Client files for cases seen from 2012-2014, by 10 therapists of varying experience levels, were reviewed for inclusion and exclusion criteria, and 50 were included in analyses. Two independent raters, trained on Case Formulation Content Coding Method (Eells et al., 2005) and categorizing treatment outcome/presenting problem, each coded and rated 10 files to establish Inter-rater reliability. Inter-rater reliability was calculated for overall comprehensiveness, elaboration, and complexity through Spearman's Rho correlations ($r = .89$; $r = .91$; $r = .67$, respectively). Multirater kappa coefficients ranging from .60 to .79 were obtained for codes within the presenting problem and progress categories, reflecting adequate to good agreement beyond chance. The remaining 40 files were coded and analyzed. Results: Preliminary analyses were conducted on client demographics, treatment factors, and psychotherapy outcome. Non-parametric binary correlations were performed to find relationships between predicting variables and outcome variables. The most important outcome variable was identified as total progress score, which was a totaling of scores on progress of presenting problem, progress on symptoms, and progress on level of function. Number of sessions, case formulation (CF) comprehensiveness, CF language, CF elaboration, CF complexity, and CF coherence were all found to be significantly positively correlated with total progress score. An ordinal logit regression was performed to find the effects of these predicting variables on total progress score. The model was statistically $\chi^2(6) = 51.90$, $p < .001$ and explained 72.2% (Nagelkerke R^2) of the variance in total progress scores. Number of sessions ($p < .01$), CF coherence ($p = .01$), CF elaboration ($p < .01$), and CF language ($p < .01$) were found to be significantly associated with total progress score. However, CF complexity ($p = .055$) and CF comprehension ($p = .07$) were not found to be significantly associated with total progress score. All predictors other than language were found to be positively associated with total progress score. Conclusions and implications: Many elements of CF were found to be significantly associated with total progress score, which was used to measure the therapist's perceived amount of progress in a client. This suggests that training in CF could improve therapist performance. Although therapist experience was not significantly correlated with the outcome measures, this could be due to the small size of the experienced group.

12. **Title: Evaluation Of Synthetic Thiosemicarbazone Containing ...**

Principal presenter: Amanda Ellison

Major: Chemistry

Faculty mentor: Lisa Wen

Abstract: Cathepsin K is a lysosomal cysteine protease that is predominantly expressed in osteoclasts. It has also been found in elevated levels in people with rheumatoid arthritis, prostate cancer, and breast cancer. Due to its strong collagenase activity, cathepsin K has been described as a major enzyme responsible for the turnover of extracellular matrix proteins and plays a fundamental role in bone resorption. Cathepsin K is a novel drug target for osteoporosis, osteoarthritis, and bone metastasis. Here, we report screening and evaluation of five new synthetic inhibitors against recombinant cathepsin K. The recombinant human procathepsin K was overexpressed in *E. coli*, purified from inclusion bodies, and activated by pepsin treatment. Cathepsin K inhibition assay was performed spectrophotometrically with N-Carbobenzoxy-L-Phenylalanyl-Arginine-4-nitroanilide hydrochloride as the chromogenic substrate. Upon the kinetic studies of the inhibitors 3-2, 3-3 and 3-4 it was determined that inhibitor 3-4 exhibited the properties of an uncompetitive inhibitor. The other inhibitors were deemed mixed mode inhibitors but still highly effective as an inhibitor. Data analysis of the effectiveness of these inhibitors will be used to foster future development of newer effective inhibitors for the treatment of osteoporosis, possibly rheumatoid arthritis and cancer.

13. **Title: Exercise Science Students' Perceptions on the Value of Sleep and Exercise**

Principal presenter: Katie Hosteng

Major: Kinesiology

Faculty mentor: Cynthia Piletic

Abstract: Research has shown that it is imperative to understand the relationship of sleep quality to overall rating of daily life in healthy, young adults (Pilcher & Ott, 1998). Quality of sleep is consistently shown to relate to the quality of daily health and wellness. The combination of chronic sleep difficulties, sleep disorders, and one limited awareness reveals a need to improve sleep resulting in improved overall health. The general population, health care professionals, and policy makers appear to have a limited awareness of the impact of sleep, or lack of it, on one's health. (Healthy People, 2020). Researchers believe that it is time to have discussions about potential health concerns that may result from poor sleep quality (Pilcher & Ott, 1998). One's quality of sleep affects individuals of all ages. Specifically college students appear to experience many factors affecting one's sleep quality. College students are very susceptible to poor sleeping habits, and have been reported as being the most sleep-deprived groups in the United States (Forquer et al., 2008). Additionally, Jones et al., (1998), reported that only 39% of men, and 35% of women, ages 18-24, are meeting the CDCP-ACSM recommended guidelines for physical activity. Researchers also determined that as the amount of daily sleep decreases, complaints about

psychological and physical health complaints increased (Pilcher & Ott, 1998). In other words, as individuals increase their amount of sleep, their overall perception of health and well-being will also increase. Students working towards their bachelor degree in Exercise Science are learning about the body and its response to physical activity and exercise (physically, physiologically, and psychologically). These same students are working to develop their skills as future professionals in Kinesiology and thus becoming role models and advocates for living a healthy lifestyle. Therefore, one would expect Exercise Science students to understand how important proper sleep and exercise to live a healthy lifestyle. The purpose of this study was to provide a descriptive analysis of undergraduate Exercise Science students' value of sleep and exercise. The foremost question was to determine how undergraduate Exercise Science students value sleep and exercise, and how their values parallel their chosen field of study. The nine participants were interviewed using open ended questions. The grand tour questions included (a) why students chose the field of exercise science, (b) how students would describe a professional in the Exercise Science field, (c) how important is quality sleep hygiene in students' daily life, and (d) how important are good exercise habits in students' daily life. Participants completed a sequence of four interviews over the course of a 16 week semester. Interviews were conducted during the 2nd, 5th, 9th, and 13th week of the Fall 2014 semester. Participants also complete a weekly log to record their exercise and sleep habits. Data collected is currently being analyzed provide a picture of how Exercise Students value exercise and sleep overall, but also how those values may be impacted by the stressors of college and being a full time student.

14. **Title: Investigating the Interactome of *Helicoverpa zea* and *Zea mays***

Principal presenter: Andrew J. Englund

Major: Biology

Faculty mentor: Richard O. Musser

Abstract: This experiment was designed to examine the interactome of *Helicoverpa zea* (corn earworm) with *Zea mays* (maize). In order to study these interactions, maize was fed on by the corn earworm for 24 hours. Not only is one interested in the effects of the feeding on the caterpillar, but one is also interested in the effects that the feeding has on the maize. The experiment was set up with having three treatments with the maize: 1) a non-wounded control plant (not fed on by caterpillars), 2) a plant fed on by mock-ablated caterpillars (caterpillars that have undergone surgery but have intact salivary glands), and 3) a plant fed on by ablated caterpillars (caterpillars that have undergone surgery and have had their salivary glands removed). Following the feeding, the leaves of the plant were removed and the tissue was prepared for RNA purification. The caterpillars were also prepared for RNA purification. Following the RNA purification, cDNA was synthesized to be used in quantitative-Real-Time-PCR (qRT-PCR) gene analysis. Both the caterpillar and maize tissue were analyzed by qRT-PCR in order to determine which genes were altered both as a result of the feeding and as a result of the surgery. The primary genes of interest for the

maize were various defensive genes, both of the salicylic acid and jasmonic acid pathways. The primary genes of interest for the caterpillars were various digestive genes.

15. **Title: Analysis of Local Water Contents by Direct Analysis in Real Time, DART, and Mass Spectrometry**

Principal presenter: Shelby Crawford

Major: Chemistry

Faculty mentor: Dr. Brian Bellott

Abstract: Local lakes and rivers contain fresh water sources that may have chemicals and analytes we are not aware of. An ongoing project of collecting local water samples for analysis has been proven as an invaluable research material. Discovering what exactly is in the water can be a tedious task without a starting point. There is an instrument in analytical chemistry that can convert the water sample into a graph denoting the contents. This instrument is called a mass spectrometer. It identifies chemicals and presents the data as a defining property called molecular weight. A mass spectrometer analyzes the mass-to-charge-ratio and abundance of ions. Mass-to-charge ratio can be denoted as m/z where "m" refers to an atomic mass number and "z" is the charge number of the ion. This is a unit of mass directly related to molecular weight in atomic mass units, amu. For example, NaCl, or common table salt, has an exact mass of 57.958623 amu. The problem with a mass spectrometer though, is that the sample must be ionized before it is introduced. Direct Analysis in Real Time, or DART, is the first ion source in chemistry history that can ionize liquids, solids, or gases and instantaneously supply them to the detector, or mass spectrometer. DART works under ambient conditions and requires no sample preparation such as extraction, purification, or derivatization. Once the sample, solid, liquid, or gas, is introduced into the gas stream of the instrument, data appears within seconds. A carrier gas, usually nitrogen, neon, or helium, carries the sample. A process called ionization occurs when the analyte and the excited gas molecule interact causing the analyte to lose an electron and gain a positive charge. Once ionized, the sample travels directly to the mass spectrometer. Bellott Research Lab team members traveled to Bradley University in Peoria, Illinois to collaborate with Dr. Remsen and his students to analyze our water samples using DART. The simple and quick method of ionization and detection provided a blueprint of information regarding each water sample. The data is analyzed to discover contents such as pesticides or benzodiazepines. Further quantitation will be completed utilizing instrumentation available at Western Illinois University such as high performance liquid chromatography and gas chromatography. As we progress through the information, we plan on forming new methods of analytical quantitation chemistry in the department.

16. **Title: The Effect of Prenatal Acetaminophen Use During Development on the Prevalence of ADHD-like Behavior in Rodent Offspring**

Principal presenter: Samuel J. Duesman

Major: General Experimental Psychology

Other presenters or co-authors: Natalia Kazakova and Denis Chapan

Faculty mentor: Dr. Russell E. Morgan

Abstract: Attention deficit hyperactivity disorder (ADHD) is the most common neurobehavioral disorder diagnosed in children (Visser et al., 2010), and is characterized by hyperactivity, impulsivity, and attention problems (Freitag et al., 2010). The National Survey of Children's Health reported an increase in parent reported ADHD diagnoses from 7.8% in 2003 to 9.5% in 2007 (Visser et al., 2010). Furthermore, the increased prevalence of ADHD is not thought to be due to increased parental awareness or changes in diagnosis, therefore many are looking toward environmental causes (Liew et al., 2014). Recent studies (Brandlistuen et al., 2013; Liew et al., 2014) have found a correlational link between acetaminophen (Tylenol) use during pregnancy and ADHD-like behaviors in exposed children. However the aforementioned studies utilized large cohorts and were subject to a variety of confounding variables, thus no causal statements can be made regarding the effect prenatal consumption of acetaminophen has on exposed offspring. The present study used an experimental design in which rats were randomly assigned to treatment conditions, thus causal conclusions can be made regarding the effect that prenatal acetaminophen consumption had on exposed offspring and their attentional capacity. Forty-eight female rats (dams) were bred in the Western Illinois University animal colony and their offspring served as the subjects for the experiment. Of the 48 dams, 32 served in the experimental (acetaminophen) conditions, while 16 served as controls. Experimental dams were exposed to acetaminophen through their drinking water. Immediately following birth, experimental offspring were randomly split into either gestational exposure (GE) or gestational and lactational exposure (G+L) conditions. Dams in the GE (n = 16) group abstained from acetaminophen after giving birth and received ad-lib access to tap water throughout lactation. Dams in the G+L (n = 16) group continued to receive ad-lib access to the acetaminophen/water mixture until postnatal day (PND) 10, therefore pups were continuously exposed to acetaminophen via breast milk for the first 10 days of lactation. Studies suggest that PNDs 1-10 in rodents corresponds to the human third trimester (Romijn et al., 1991), therefore a pup brain is as developed at PND 10 as an human brain at birth. Control dams received ad-lib access to tap water throughout breeding, gestation, and lactation. Once rodents reached young adulthood (PND 55), one male from each litter was randomly selected for behavioral testing. The behavioral task that was chosen, the 3-Choice Serial Reaction Time Task (3CSRTT), has been used extensively in both human and animal studies to measure sustained attention, selective attention, hyperactivity, and impulsivity. Due to the existing body of research, we expect that rodents exposed to acetaminophen during development will exhibit ADHD-like behaviors including impulsivity, hyperactivity, and impaired attention. Data collection ended in December of 2014 and statistical analysis is expected to conclude shortly. We hope the results of this study will shed some light on the underlying factors contributing to the increased prevalence of ADHD in young adults.

17. **Title: Detecting Deception Using Drawings**

Principal presenter: Anthony DeCicco

Major: Law Enforcement and Justice Administration

Faculty mentor: John R. Schafer

Abstract: Cultural diversity and the lack of a common language represent one of the biggest challenges facing the intelligence and law enforcement communities. Detecting deception remains a difficult task when the interviewer and the interviewee do not share a common language. The current literature indicates that when lying participants are asked to draw a picture of a predetermined task, many inconsistencies appear, which could lead the interviewer to discover the truth. Also, drawing sketches may provide an additional technique that transcends the need for a common language. Drawing sketches relies on cognitive load, which is a process that does not rely on a common language. This research uses techniques established in the deception literature and incorporates new variables that test the participant's attentiveness to detail and challenges cognitive flexibility. Participants will be told they are participating in a memory study where they may be asked to lie. Participants will receive a copy of informed consent upon completion of the research study. After participants sign the consent form, they will be asked to complete a demographics questionnaire. Upon completion, participants will receive written instructions to complete three tasks in a designated room. The first task will be to move a stack of books from the red table to the green table. The second task will be to write their name on a pad of paper located on the red table. After the two tasks have been completed, a confederate (the confederate in the room will be a student unaffiliated with the study with prior instruction to complete his/her given assignment) in the room will hand each participant a sealed envelope. The participants will be instructed to secure the envelope on their person so that no one will know they have the envelope. The researchers predict the participants will have increased cognitive load due to the reminder of the envelope on their persons. For example, if the participant secures the envelope in their front pocket, the constant feeling of the perceived threat (the object of the lie) will increase cognitive load. The participants will then be instructed to select a questionnaire (The participant will be able to choose to answer their questions on a smaller piece of paper or a regular sized piece of paper) to write truthful or deceptive narratives describing the tasks they completed and to draw a sketch of the room wherein they completed the two activities and received the sealed envelope. Not only do the researchers predict the liars (experimental group) will have increased cognitive demand; thus, be more likely to have inconsistencies in their drawings in comparison to the truth-tellers (control group), but these techniques would transcend language barriers.

18. **Title: Effect of Host Glass on the Optical Absorption of Dy³⁺ ions in Borate Glasses**

Principal presenter: Hio Giap Ooi

Major: Physics

Other presenters or co-authors: Dr. P K Babu and Dr. Saisudha Mallur

Faculty mentor: Dr. Saisudha Mallur

Abstract: The optical properties of Dy³⁺ in bismuth borate and lead borate glasses were analyzed using Judd-Ofelt theory as a function of the glass composition. We varied Bi₂O₃ from 29.5 to 59.5mol% in bismuth borate glasses and PbO from 29.5 to 69.5mol% in lead borate glasses. The intensity of an absorption band can be expressed in terms of the oscillator strength. Absorption coefficient at each wavelength was obtained from the optical absorption spectrum of a glass sample and number density of rare-earth ions was calculated from the measurement of the glass density. We then used these two parameters in Judd-Ofelt theory to calculate the oscillator strength of the glass and repeated our calculations for the entire series of lead and bismuth borate glasses. The variation of the oscillator strength with PbO/ Bi₂O₃ compositions has been observed.

19. **Title: Enhanced Electrotransformation of *Leuconostoc citreum***

Principal presenter: Teresa Sartore

Major: Biology

Other presenters or co-authors: Joseph Lucas and Dr. Scott Holt

Faculty mentor: Dr. Scott Holt

Abstract: *Leuconostoc citreum* can synthesize a variety of α -glucan exopolymers and polymer-derivatives from agricultural residues such as sucrose that are both widely available and inexpensive to obtain. The chemical properties of the α -glucans and their derivatives instill these carbohydrates with properties that make them useful for many applications. The development of an efficient and inexpensive electrotransformation (gene-transfer) protocol for *L. citreum* is important for understanding the genetics of α -glucan synthesis and to enhance the biotechnology potential of these microorganisms. *L. citreum*, however, has been found to be resistant to electrotransformation since published protocols result in low transformation frequencies. Low transformation efficiency of *L. citreum* may be due largely attributed to the thick peptidoglycan cell wall. The goal of this study was to improve the electrotransformation frequency in *L. citreum* by optimizing plasmid vector concentration and using treatments that weaken and permeabilize the cell wall to allow for enhanced transfer of genetic material into the host cell. Using a standard protocol, *L. citreum* was electrotransformed using varying concentrations of pGK12 and transformants were selected on MRS-chloramphenicol agar; which was then repeated in triplicate. In general, the transformation efficiency improved as less plasmid DNA was used decreasing from 1.0 μ g to 0.1 μ g. High plasmid DNA concentrations reduced electrotransformation frequency. The treatments that were used to enhance the permeability of the cell wall were glycine, penicillin, lysozyme, or threonine. Each of these treatments were tested in varying concentrations. After treating the *L. citreum* cells, they were then electrotransformed with pGK12 (0.25-0.1 μ g). Statistically significant increases in electrotransformation frequencies were obtained when *L. citreum* was treated with optimal concentrations of glycine, penicillin, or lysozyme when compared to the control (no treatments). The treatment with threonine did not result in any statistically improved transformation frequencies. These results were repeatable with two *L. citreum* strains. In summary, electrotransformation

frequencies of *L. citreum* were improved by reducing plasmid DNA concentration and using treatments that permeabilized the thick peptidoglycan bacteria cell wall. The enhanced electrotransformation protocol can be used to help understand the genetics of *Leuconostoc* as well as improve future biotechnological applications."

20. **Title: Evaluation of Potential Cathepsin D Inhibitors**

Principal presenter: David VanDerway

Major: Chemistry

Other presenters or co-authors: Dr. Lisa Wen, Dr. Jenq-Kuen Huang, and Dr. Rose McConnell

Faculty mentor: Dr. Lisa Wen

Abstract: Cathepsin D is an aspartyl protease responsible for the degradation of proteins within most eukaryotic cells. When a mutation occurs in the gene encoding cathepsin D, the protease may be over-expressed, disrupting homeostasis in the cell due to the increased amount of cathepsin D. The over-expression of cathepsin D has been implicated in a variety of clinical conditions, most notably Alzheimer's disease and breast cancer. Consequently, cathepsin D is a novel drug target for the treatment of such diseases and the evaluation of synthetic inhibitors that have the potential to inhibit cathepsin D protease activity is of the utmost importance. The goal of our research is to contribute valuable information to researchers involved in the development of drugs that may treat or cure disease. Herein, the screening of five tripeptide inhibitors against cathepsin D is reported, along with the IC₅₀ value (concentration of the inhibitor at which 50% of cathepsin D activity is lost) of the most potent inhibitor. In order to monitor the effectiveness of an inhibitor, an inhibition assay was completed in a fluorescence microplate reader. The substrate, MOAc-Gly-Lys-Pro-Ile-Leu-Phe-Phe-Arg-Leu-Lys(Dnp)-NH₂, was used as the substrate for cathepsin D in the assay. Cathepsin D will cleave between the two phenylalanine residues, causing the MOAc portion of the substrate to fluoresce, and the absorbance is read from the microplate reader at an excitation wavelength of 328 nm and an emission wavelength of 393 nm. Future kinetic studies will be performed in order to elucidate the binding mode of the inhibitor to Cathepsin D. This research was supported by National Cancer Institute at NIH (3R15CA08933-04 and 3R15CA86933-04A2S1) and Western Illinois University.

21. **Title: Research**

Principal presenter: Archana Pasupulety

Major: Chemistry

Other presenters or co-authors: Thirupathi Vodnala

Faculty mentor: T. K. Vinod

Abstract: The current project focuses on synthesizing pentafluorosulfonyl group (SF₅) appended hypervalent iodine oxidizing agents and subsequently investigating the oxidative properties of those reagents. We hypothesized that the presence of a strong electron withdrawing group (-SF₅) on the arene ring of the hypervalent iodine reagent will enhance

its potential as an oxidizing agent. Commercially available p-tolylsulfur pentafluoride, was chosen as a convenient starting material for the synthesis of the new reagents. The multi-step synthesis of the reagents and their oxidation behavior will be presented in the poster along with the full characterization of the intermediates and the final derivatives using ^1H NMR, ^{13}C NMR, IR and ^{19}F NMR spectroscopic techniques.

22. **Title: Effects of Prescribed Burning and White-Tailed Deer Browsing on the Structure and Diversity of Woodland Plant Communities of Prairie Glen, Illinois**

Principal presenter: Jeffery Woodyatt

Major: Biology

Faculty mentor: Dr. Sean Jenkins

Abstract: Anthropogenic fire was the dominant factor in the formation and maintenance of the oak woodlands and prairie mosaics across the central United States before European settlement. Fire suppression and land use changes over the last century has led to a shift in plant composition, which has favored and promoted the establishment of fire-intolerant and shade-tolerant species. Changes in woody plant structure and diversity have had cascading effects on woodland biodiversity. Modern agriculture and other land use practices have lead to a dramatic increase in white-tailed deer (*Odocoileus virginianus*) densities over much of the species historic range. Browsing by white-tailed deer is influencing plant composition. According to research, deer browsing in the winter months disproportionately damages the above ground portion of woody plants, specifically seedlings and tender meristematic tissue. Studies that address the importance of prescribe burning and deer browsing are critical for determining the long-term effects of these factors on hardwood regeneration, establishment and overall stand health. The findings of this research are of paramount importance to the management of oak-hickory woodlands and associated communities. The goal of this study is to examine how both of these factors affect oak and hardwood regeneration, diversity of herbaceous ground flora, and woodland stand dynamics. This project serves to address three key objectives: 1) determine the effects of prescribed burning on the abundance and viability of oak and other hardwood seedlings, 2) determine if white-tailed deer browsing is significantly influencing oak and hardwood regeneration and 3) ascertain if both factors, are influencing woody and herbaceous groundflora diversity and viability. Using a stratified random sampling method, forty 300-m² circular plots were established into an oak-hickory dominated woodland complex of Prairie Glen at the Alice L. Kibbe Life Science Station. Each 300-m² plots housed a nested 100-m² plot and five 1-m² quadrats, which were used for data collection for all overstory/understory woody and herbaceous species. Effects of white-tailed deer browsing were assessed by the instillation of animal exclosures to prevent the browsing of the enclosed vegetation. In addition, the effect of prescribed burning was assessed by burning twenty of the forty permanent plots in the Spring of 2014. Initial data suggests that fire reduced the abundance of saplings, and increased the number of woody re-sprouts from existing root stocks. In addition, preliminary herbaceous data suggests an increase in annual herbs and grasses. This project

is unique in that both of these factors have not yet been compared together in a long-term monitoring study to ascertain the effects of these two factors on the structure and diversity of woodland plant communities.

23. Title: Level of Anxiety in Starting vs. Non-Starting Athletes

Principal presenter: Alaina DiGiorgio

Major: Sport Management

Faculty mentor: Cynthia Piletic

Abstract: Anxiety type disorders are prevalent in student-athletes; however, if the disorders are debilitating (negative) or facilitating (positive) their performance is important to consider. Examining the differences in level of anxiety between starting and non-starting athletes throughout the course of their competition is the focus of this study. Quantitative survey research was used to calculate data by distributing surveys to all fall season student athletes at three different points throughout the course of the student-athlete's competition season. This study adds to the current research in the empirical knowledge base regarding anxiety in collegiate athletes.

24. Title: The Effects of MRSA Carrier Knowledge on Athletic Trainers' Compliance with Prevention and Management Standards and Recommendations

Principal presenter: Kelsey Michelini

Major: Kinesiology

Faculty mentor: Jennifer Plos

Abstract: Outbreaks of skin and soft tissue infections caused by Community-associated Methicillin-resistant Staphylococcus aureus (CA-MRSA) are becoming more and more prevalent amongst athletes of all ages (Rihn, Michaels, & Harner, 2005). In 2005, the Centers for Disease Control and Prevention (CDC) estimated that there were 94,360 cases of MRSA infection with approximately 18,650 associated fatalities (Montgomery, Ryan, Krause, & Starkey, 2010). Methicillin-resistant Staphylococcus aureus has been reported to have surpassed human immunodeficiency virus (HIV) as the leading cause of healthcare associated infections and related morbidity and mortality in the United States (CDC, 2003b). Methicillin-resistant Staphylococcus aureus (MRSA) is a derivative strain of the Staphylococcus aureus (commonly called staph) bacterium that has developed a resistance to methicillin, penicillin, amoxicillin, oxacillin, and other antibiotics that are commonly used to treat staph infections (Chambers, 2001; CDC, 2013). This resistance to antibiotics makes the infection difficult for athletic trainers and sports medicine physicians to treat, thus causing these infections to be associated with significant morbidity rates (CDC, 2003b). In the general population, approximately 1.5% of people and 4.6% of healthcare workers are asymptomatic nasal carriers of MRSA. More specifically, approximately 3.7% of athletes and 7.9% of ATs have been reported as nasal carriers (Archibald, Shapiro, Pass, Rand, & Southwick, 2008; Lum et al., 2014). Individuals are categorized as a carrier of MRSA if they have an active infection or if they have methicillin-sensitive and methicillin-

resistant strains of *S aureus* present (Harbarth et al., 2000). Many times individuals can be carriers of MRSA and not know they are a carrier. This occurs because no signs or symptoms of infection are displayed (CDC, 2013). Often the signs and symptoms of carriers go undetected until the individual has an active infection (Beam & Buckley, 2006). In the athletic environment, athletic trainers are the first line of defense in helping keep the athletes healthy and in preventing the spread of disease. Athletic trainers are responsible for following guidelines on prevention, recognition, and management of athletes with skin infections. Many times, athletes and coaches rely on the knowledge of the athletic trainer for information in regards to MRSA risk factors. This makes it critical that all athletic trainers are up-to-date MRSA prevention practices and that they are regularly using the practices to prevent MRSA and regularly using their practices in how to prevent (Kahanov et al., 2011). The purpose of this study is to determine the prevalence of male and female collegiate athletes and athletic training staff members that are carriers of MRSA and the effects this knowledge has on athletic trainers' compliance with the National Athletic Trainers' Association prevention and management standards and the Centers for Disease Control and Prevention recommendations. Participants in this study include current student-athletes, current athletic training students, and athletic trainers on the campus of Western Illinois University.

25. **Title: Evaluating nest site selection by southern flying squirrels in northern hardwood forests of west-central Illinois**

Principal presenter: James S Zweep

Major: Biology

Faculty mentor: Christopher N Jacques

Abstract: Southern flying squirrels (*Glaucomys volans*) are nocturnal, tree-dwelling rodents found in hardwood forests throughout the eastern United States. Notable behavior of this species is switching between different snags and other nest trees. The role of prescribed fire and parasite presence on the nest switching behavior of flying squirrels is not well understood. The goal of this research is to evaluate the nest switching behavior of southern flying squirrels across multiple seasons, habitat types, and prescription burn regimes across west-central Illinois. During the fall of 2014, we captured 48 individuals (26 males, 22 females), of which 25 were fitted with radiocollars (Model M1530; Advanced Telemetry Systems, Isanti, Minnesota, USA), and 23 were marked using metal ear tags (Number 1, National Band and Tag Company, Newport, Kentucky, USA). Mean body mass of male and female squirrels was 64.3 (SE = 2.60) and 65.5 g (SE = 2.46), respectively. Mean number of locations gathered from radiocollared squirrels are 24.4 (SE = 0.82; range = 11 - 29). Nest tree suitability metrics (e.g., tree type [live or snag], tree species, decay class, crown condition [broken or intact], diameter-at-breast height [DBH], tree height, mast production) will be quantified on 300 m² (17 m X 17 m) circular plots systematically placed around known nest tree locations of radiocollared squirrels. During fall 2014, we collected and subsequently examined fecal samples from captured flying squirrels for presence of

Strongyloides robustus. Preliminary results indicate the absence of the parasite in 22 fecal samples analyzed, though *Coccidia* spp. was identified in 9 of 22 (41%) samples. Home range estimation and microhabitat analyses are ongoing. This study may provide additional insight on potential effects of prescription burn treatments and parasite loads on nest switching patterns by flying squirrels.

26. **Title: Habitat Preferences of Den Location for the North American River Otter (*Lontra canadensis*)**

Principal presenter: Shanna E David

Major: Biology

Faculty mentor: Dr. Susan Romano

Abstract: The North American River Otter (*Lontra canadensis*) was once abundant throughout the Midwest. Due to over-hunting, trapping, and habitat degradation, river otter populations plummeted, resulting in the near extinction of this species. Recently, re-population efforts have been used to bring the river otter back with some success. The purpose of this research is to identify whether river otters have preferences for choosing den locations, particularly regarding distance from waterways, distance to other dens, elevation requirements in the floodplain, or specific vegetation that may provide cover protection from predators. This research will take place at Spring Lake, Upper Mississippi River National Wildlife and Fish Refuge in Savana, Illinois, where a small river otter population has been documented. The site is adjacent to the Mississippi River and a large wetland area that includes floodplain forest, submersed aquatic, and emergent wetland vegetation. Locations of river otter dens will be determined using snow tracking and scouting throughout the site. Using a handheld GPS unit, the locations will be inserted into ArcGIS to extract land elevation from a Digital Elevation Model (DEM). ArcGIS will also be used to determine distances from den locations to waterways. Vegetative cover and type surrounding the den will be sampled within a 5 meter radius. Principle Component Analysis will be used to determine if river otter prefer locations near water bodies, other dens, and elevation. Vegetation surrounding dens will be tested for similarity between den locations with a similarity ordination, using non-metric multidimensional scaling. These analyses will indicate if river otter have habitat preferences when choosing den locations. Knowledge of habitat preferences will aid future management of this species, and enable further re-establishment of the river otter in the Upper Mississippi River System.

27. **Title: The Influence of Soil Hydrological Properties and Topography on Iowa Corn Production**

Principal presenter: Adam Frantz

Major: Geography

Faculty mentor: Dr. Redina Herman

Abstract: Flooding events due to heavy precipitation can negatively affect the production of corn. The inherent properties of the soils during these precipitation events have a large

influence on whether the corn reaches maturity. Pits located in terrain can facilitate corn loss by not allowing excess water to drain. If the soil is also impermeable, the flood potential is increased. Using data from the USDA and USGS, this study will identify areas of flood potential in the top 30 corn producing counties of Iowa that can influence crop production based on the hydrological properties of the soils and the topography of the land. An impact model will be created for heavy precipitation events based on soil properties and topography. The creation of an impact model for flood potential will aid farmers in identifying threshold precipitation amounts for particular areas that can lead to standing water. This, combined with the growing stage of corn, can negatively influence the production of corn during heavy precipitation events. The impact model will also be used to delineate where crops are at risk using the terrain features found in fields. Iowa corn producers can use this information to avoid crop losses in the future.

28. **Title: Gene Expression of Soybean Plants Glycine Max and Glycine Soja in Response to a Primary and Secondary Infection Period by Bean Pod Mottle Virus (BPMV) and Southern Bean Mosaic Virus (SBMV) and Virus-Vectored Mexican Bean Beetle's Feeding Preference**

Principal presenter: Alanna Griffin

Major: Biology

Other presenters or co-authors: Kayleigh R. Diveley

Faculty mentor: Dr. Richard O Musser

Abstract: When cultivated soybean plants, Glycine max come under attack from external forces, either herbivory or disease, the expression of genes changes to induce defensive chemical (or hormonal) pathways unique to the organism attacking it. To observe this unique change, gene expression will be observed after primary and secondary infection periods by which the plants have had time to induce pathways against two viruses: Bean Pod Mosaic Virus and Southern Bean Mosaic Virus which are naturally transmitted to plants by a natural vector, the Mexican bean beetle (MBB). Leaf RNA will be collected to measure gene expression through Microarray analysis and qPCR. To determine the significantly regulated gene expression a ANOVA will be used, followed by a Tukey's Multiple Comparison test (Post Hoc test) to observed differences among the sample means. We will compare these plant responses to their closest phylogenic relative Glycine soja. There is evidence G. max may be a better equipped crop when it comes to defending itself against these viruses which suggest there may be candidate resistance genes of interest. We are hoping our proposal will lead to novel mechanisms to protect soybeans from both viruses and the vectoring beetle.

29. **Title: Design and Implementation of a Radio Frequency Oscillator**

Principal presenter: Alexander Blanton

Major: Physics

Faculty mentor: Dr. Ryan Gordon

Abstract: The tunnel diode resonator (TDR) circuit is a radio frequency oscillating circuit that is formed by an inductor and a capacitor. The 10 MHz resonance signal is sustained by a properly biased tunnel diode, which produces a quantum mechanical tunneling current that locks onto the resonance frequency. This circuit is a valuable research tool due to its parts-per-billion sensitivity in the ability to detect changes in its resonance frequency. Samples of material are studied by placing them into either the inductor coil or between the conductors of the capacitor. If the sample possesses any physical property that couples to electric or magnetic fields, then it will shift the resonance frequency by interacting with either the magnetic field of the inductor or the electric field of the capacitor. My poster will present the design of the low-temperature TDR circuit that is currently being built in the WIU Physics Department. In addition, I will show how this circuit has been used to make ultra-precise measurements of material properties, such as the London penetration depth in superconductors and the magnetic susceptibility of various specialized magnets. Future plans for measurements at WIU will also be discussed.

30. **Title: Student Polychronicity With Media: Finding Time To Make The Grade In Higher Education**

Principal presenter: Kevin R. Willson

Major: RPTA

Faculty mentor: Dr. Katharine A. Pawelko

Abstract: Introduction/Rationale: Students may be entering college with a media-influenced perception that they are consumers of the higher education product rather than privileged members of academia (Singleton-Jackson, Jackson, & Reinhardt, 2010; Fullerton, 2013). The intent of this study sought to 1) explore whether an individual preference to multitask (polychronicity), particularly with digital media, significantly influences their academic performance, 2) investigate multiple aspects of student media consumption, and 3) generate information that will promote effective student development strategies for university administrations and instructors. Methods: Descriptive statistics, factor reduction, ANOVA, and multiple regression analysis were all used to explore the two instruments administered in this study pertaining to these research questions. Independent variables were demographic characteristics (gender, age, ethnicity, class year in college), digital media use (average daily screen time, entertainment media use, and social media use), and polychronicity scores, and this study explored their correlations to the dependent variable, cumulative GPA. Results: The study discovered a statistically significant negative correlation between heavy and excessive media consumption of undergraduate and Master's level graduate students and their GPA. The independent variables of average daily screen time, gender, and class year in college were found to be predictors of academic performance. Different perceptions of higher education and trends in leisure behavior amongst students were also explored in relation to media consumption tendencies and academic performance.

Podium Presentations

31. **Title: Victory at What Price?: Reexamining the Legacy of Major-General Elwell S. Otis and the Development of Guerilla Warfare in the Philippines, 1899-1900**

Principal presenter: Benjamin Houston

Major: History

Faculty mentor: Dr. Febe Pamonag

Abstract: The Philippine-American War of 1898-1902 was a complex and brutal conflict, which remains highly debated among American and Filipino historians. Major-General Elwell Stephen Otis served as the first military-governor of the Philippines and commanding officer of the United States 8th Corps in the Philippines from August, 1899 to May, 1900. He oversaw the initial phases of the conflict between American forces and the revolutionary Army of Liberation commanded by Emilio Aguinaldo. Otis's place in the story of the conflict has been the subject of considerable debate among historians, and his detached style, overly cautious attitude, and proclamations of military victory against a backdrop of violent guerilla resistance have been criticized by both historians and military subordinates alike. Some historians argue that Otis's command style and strategy for military victory hastened the transition of the conflict to a state of guerilla war and attrition during the early years of the twentieth century. This paper examines the course of Otis's military campaigns conducted in the island of Luzon during the summer and fall of 1899 and winter of 1900. It urges for a rethinking of a commonly held belief that Otis bears primary responsibility for failing to anticipate and plan for continued guerilla resistance in the Philippines. Drawing on a variety of sources, including Otis's official reports and correspondences of his subordinate officers, I argue that both Otis's obsessive focus on the destruction of the Filipino army in open battle and the opinions and observations of the officers of the 8th Corps pushed many Filipinos to seek alternate means of resisting American occupation. Otis was not alone his belief that his strategy of decisive battle was succeeding. Most of his subordinates in the field expressed similar views and felt that Filipino resistance had been crushed. By pursuing a narrow military course of action, underestimating the resolve of Filipino commanders, and misinterpreting the withdrawal of Filipino troops as a sign of victory, Otis and his command staff unintentionally sowed the seeds of the guerilla war, which plagued the general's successors for the next several years. By taking into account all of these factors, this paper offers a more complete history of the Philippine-American War and of the genesis of American occupation policy in the Philippines.

32. **Title: The Two World Divide in Tracks and The Grass Dance**

Principal presenter: Kelly McCormick

Major: English

Faculty mentor: Christopher Morrow

Abstract: Since the arrival of the first colonists, American Indians have asserted and defined their culture. Like Jill Lepore describes in her book, *The Name of War: King Philip's War and the Origins of American Identity*, contact between settlers and American Indians caused both groups to first question their cultural identity, and in the case of King Philip's war, then affirm their identity and superiority through warfare. In the 1960s and 1970s, American Indians continued to publically declare their cultural presence through sit-ins and demonstrations organized by the American Indian Movement. Recent American Indian literature, literary scholarship, and historical readings have mapped the results of the cultural contact. Recent historians like Joseph Genetin-Pilawa refute the binary that Native Americans inhabit either a native or white world. And authors Jace Weaver and Craig Womack advocate a stance in which Native Americans can reject this idea of hybridity and claim a strictly native identity. I will argue that two texts, Susan Power's *The Grass Dancer* and Louise Erdrich's *Tracks*, incorporate fictionalized historical events into their works in ways that reject hybridity and instead promote nationalistic sentiments. Furthermore, I will explore how these two texts arrive at a new concept of American Indian identity by re-envisioning history from an American Indian perspective.

33. **Title: Feminism and Socialism in the German Empire: A Study of Lily Braun's Attempts to Unite Women**

Principal presenter: Ann Rosentreter

Major: History

Faculty mentor: Dr. Ute Chamberlin

Abstract: The topic of this research presentation is the class-based divisions in the German feminist movement during the German Empire (1871-1918) and the reasons for the gulf between the bourgeois and working-class women's movements before the Great War. My research examines the connection between feminism and socialism during the empire by analyzing the unsuccessful attempt of Lily Braun, a prominent member of the Social Democratic Party (SPD), to bridge the abyss between middle-class feminists and socialist women through the creation of a common organization. In addition to works by Braun, the writings of Clara Zetkin and August Bebel, both leading members of the SPD, will be analyzed, as well as those of Aleksandra Kollontai, a Russian socialist and later Communist who provides parallels to both Braun and Zetkin. My research also examines secondary sources written about these figures and about feminism within the Social Democratic Party of the German Empire. While many women in the Social Democratic Party were socialists, first and foremost, who supported the feminist cause only to the extent that it aligned with their socialist goals, Lily Braun was convinced that these groups could work together to improve the lives of women. Braun faced opposition to this idea from members of both the socialist women's organization and the middle-class feminist movement. She had an especially tense relationship with Zetkin, the leader of the socialist women's group. While Bebel in many ways was a figure positioned between Braun and Zetkin-placing the good of socialism first, but understanding the value of the middle-class feminist movement-the

sources examined here do not indicate that he used his influential position as a leader of the SPD and as role model to both Braun and Zetkin to ease the tension of their relationship. In studying Kollontai, whose privileged background offers similarities to Braun's circumstances, aspects of Braun and Zetkin's relationship can be viewed in a larger comparative context. My research shows that there were three key factors that precluded a bourgeois-socialist feminist alliance: Deep-seated ideological differences between the bourgeois and working-class women's movements, personal animosity between Braun and Zetkin, and SPD internal programmatic divisions. The ideologies of middle-class women and working-class women were unlikely to be meshed in a way to allow collaboration, and the hostility between Braun and Zetkin precluded any personal cooperation. Studying the connection between bourgeois feminism and socialism is important to the history of the German Empire for a number of reasons. First, it provides a gendered view of class divisions within the German Empire. Second, understanding the relationship between the middle-class and working class women's movements presents a fuller picture of the political system at this time. Lastly, examining the divisions between the bourgeois and socialist women's movements is a way to address the Sonderweg ("separate path") thesis from a gendered perspective. One can question whether the inability of bourgeois feminists to overcome their hostility toward organized socialist women is yet another indication of the failure of liberalism in Imperial Germany.

34. **Title: Working-Class Antifascists: Average American Women in the Spanish Civil War**

Principal presenter: Frank S. Shaw

Major: History

Faculty mentor: Dr. Ginny Boynton

Abstract: The Spanish Civil War (1936-1939) has been viewed by various scholars as a prologue to the European conflict of World War II. Francisco Franco's forces were openly supported by the militaries of Adolf Hitler and Benito Mussolini. The allied countries were less open in their participation, but citizens from Great Britain, France and the United States did fight on the side of the Second Spanish Republic. Thousands of American men volunteered in the famed Abraham Lincoln Brigade, although the U.S. government took pains to maintain official neutrality. Still, men did not represent the full extent of this country's participation. A small cohort of working-class American women participated in this war, serving primarily as nurses. Though prominent journalists and socialites such as Martha Gellhorn also went to Spain in support of the Republicans, the experiences of these average women provide a more nuanced understanding of U.S. participation in, and attitudes concerning, the Spanish Civil War. The literature available in English concerning the Spanish Civil War is typically broad and written from a top-down perspective, and few studies consider gender. Stanley Weintraub, in 1968, wrote *Last Great Cause: Intellectuals and the Spanish Civil War*, which recounts the activities of male and female American elites in Spain during the war. Yet Weintraub's focus on socialites and those in literary circles limits the usefulness of his volume. John Gerassi, in *The Premature Antifascists*, released in

1986, published oral histories of the North American volunteers, but was not primarily focused on women's experiences. Cary Nelson and Jefferson Hendricks edited *Madrid 1937: Letters of the Abraham Lincoln Brigade from the Spanish Civil War*, which includes letters written by American men and women, but their analysis is limited. Dr. Paul Preston has written extensively on the Spanish Civil War, though not specifically about women's roles. Eric R. Smith's *American Relief Aid and the Spanish Civil War* chronicles American women and their work organizing funds for humanitarian supplies for Spain. However, these women worked almost exclusively within the U.S. The history of the working-class nurses who served in Spain is little known. This research examines case studies from working-class women using a primary documents such as letters and interviews, as well as secondary scholarship. It presents the contributions of these women within a broader historical context, the lead-up to the cold war and the male-centric American culture of the 1930s, which ultimately prevented their experiences from having a lasting impact. As they sounded the alarm against fascism, their voices were silenced because of their gender and their affiliation with communism. In this way, the experiences of these women have been disregarded and all but forgotten. This paper argues that their story provides both an important and compelling addition to our understanding of America's complex role in the European power struggle of the mid-twentieth century and the ways in which women contributed to that effort.

35. **Title: Reproductive Fitness of Fakers: Effect of Artificial Enhancement on Perceptions of Friends-with-Benefits Partners and Same-Sex Competitors**

Principal presenter: Emmaly L. Schwartz

Major: General Experimental Psychology

Other presenters or co-authors: Hannah K. Bradshaw and Zeinab Hosseini

Faculty mentor: Dr. Kristine Kelly

Abstract: Buss and Barnes (1986) found that women and men value specific mate-characteristics, where men desire physical attractiveness in potential partners while women value resources. Further, Fink, Klappauf, Brewer, and Shackelford (2014) found that men and women view same-sex others who have high levels of desired mate-characteristics as rivals. Recent advances have allowed men and women to artificially enhance their desired mate-characteristics by undergoing plastic surgery or incurring credit-card debt. Few studies have examined whether artificial enhancement of desired mate-characteristics affects men and women's desire for opposite-sex individuals as sexual partners or their view of same-sex others as rivals. The current study sought to examine this phenomenon. Heterosexual college students ($N = 48$) were randomly assigned to the artificially-enhanced or natural desired mate-characteristics condition. All participants viewed a blog of a same and opposite-sex target. The blog was used to manipulate the IV: mate-characteristic enhancement. In the artificially-enhanced condition, the female-target was described as having breast implants, and the male-target was described as having credit-card debt. In the natural condition, both male and female targets were described as having natural levels of

desired mate-characteristics. Participants then rated on a 1 (strongly agree) to 5 (strongly disagree) Likert-type scale how likely it was that they would engage in a solely-sexual "friends-with-benefits" (FWB) relationship with the opposite-sex target and how "sneaky" they perceived the same-sex target to be. An ANOVA indicated a two-way target-sex x enhancement interaction ($p = .02$), whereby men reported a greater desire to engage in FWB relationships with the artificially-enhanced target compared to the natural target, however women reported a low desire to have a FWB relationship with either target. A second ANOVA yielded a significant main effect for enhancement ($p = .005$), where both sexes rated the artificially-enhanced same-sex target as "sneaky" compared to the natural same-sex target. The results for opposite-sex targets suggest that for solely-sexual FWB relationships, men, but not women, desire partners who have artificially enhanced desired mate characteristics over partners who have natural levels of desired mate characteristics. This could be because males place high importance on physical attractiveness and desire partners who have exaggerated secondary-sexual characteristics. Results for same-sex rivals suggest that men and women view artificially-enhanced same-sex rivals as more "sneaky" than rivals with natural levels of desired mate-characteristics.

36. **Title: Loneliness and Emotional Intelligence: Factors Underlying Social Deficits in Individuals with Alexithymia**

Principal presenter: Alicia Vallorani

Major: Experimental Psychology

Other presenters or co-authors: Naoyuki Sunami, Sandra L. McFadden, and Kristine M. Kelly

Faculty mentor: Sandra L. McFadden

Abstract: The Need to Belong Theory (Baumeister, & Leary, 1995) suggests that people are driven to form and maintain interpersonal relationships; however, multiple clinical disorders may prevent people from forming healthy social relationships. Alexithymia is a sub-clinical disorder traditionally described as an inability for individuals to process and label their emotions (Samur et al., 2013). Recent research has shown that individuals with Alexithymia also experience difficulty processing the emotions of others (Cook, Brewer, Shah, & Brid, 2013) as well as behave oddly during social interactions (Hesse, & Floyd, 2011). It is currently unknown if individuals with Alexithymia interact unusually because they do not wish to be social or because they experience deficits in social abilities. Thus, the current study investigated the underpinnings of abnormal social interactions in individuals with Alexithymia. A sample of 124 undergraduate students completed an online survey including measures of Alexithymia, emotional intelligence, the need to belong, loneliness, and rejection sensitivity. Data analyses yielded a non-significant correlation between Alexithymia and need to belong ($p = .30$). However, Alexithymia was positively correlated with loneliness ($p < .001$) and rejection sensitivity ($p = .005$), and negatively correlated with emotional intelligence ($p < .001$). Regression analysis revealed that together emotional intelligence and loneliness accounted for 36.5% of the variance in Alexithymia. These

findings suggest that the abnormalities seen in social interactions in individuals with Alexithymia are not due to antisocial motives and rather due to social deficits. Individuals high in Alexithymia have the same need to belong as those who are low in Alexithymia, but their loneliness and rejection sensitivity suggest their need is not being satisfied, indicating that clinical/social intervention might be warranted. Based on the findings, addressing loneliness as well as implementing strategies to increase emotional intelligence may allow individuals with Alexithymia to form meaningful relationships with others.

37. **Title: Making Noise: Creating Sound in Graphic Novels**

Principal presenter: Julie Kaiser

Major: English Lit

Faculty mentor: Dr. Christopher Morrow

Abstract: Comic book fans are all familiar with the tried and true sound effects in the cartoon world. "BAM! WHAM! POW!" exist in the lexicon of sounds we associate with the medium. However, there is more to sound in comics than merely the "KA-POW" of a fist hitting a jaw. In graphic novels, the reader is left to judge the soundscape of a story through visual cues that do not exist in other literary mediums. In novels, a character's tone of voice can be summed up with adverbs and background noises become part of the storytelling process. In contrast, sound effects, tone of speech, and ambient noise within comics are presented through artistic choices as well as phonetic onomatopoeia when the literal shape of words on a page leave an impression of the tone. Despite the importance of sound to narrative, the understanding of sound within graphic storytelling, however, is often neglected in literary scholarship. Scott McCloud, author of *Understanding Comics*, describes the function of comics as alphabetic text and images as representations, working together to "send essentially the same message" (McCloud 153). Though McCloud applies his explanation to the understanding of messages or meanings in comics, the same thought process can be applied to making sense of sound in graphic novels. My paper addresses how the connection between text, image, and form working together create sound in a comic in a way that impacts and creates meaning. Beginning with the small "snap" of Gwen Stacy's neck in *The Amazing Spider-Man*, my paper examines the ways artists use form to create and communicate sound and the effect it has on our understanding of the graphic novel.

38. **Title: A Survey of Entomopathogenic Fungi from a Temperate Pine Forest Soil**

Principal presenter: Noland Deaver

Major: Biology

Other presenters or co-authors: Andrea Porras-Alfaro: Associate Professor of Biology, Western Illinois University, and Cheryl Kuske, DOE BER Biological System Science Division Program Manager, Los Alamos National Laboratory

Faculty mentor: Andrea Porras-Alfaro

Abstract: The goal of this study is to explore the diversity of entomopathogenic fungi in

soils from a temperate forest. Many entomopathogenic fungi parasitize living insect hosts, and past research on these fungi has focused largely on applications of the genera *Metarhizium* and *Beauveria* as biological control agents of insects. As such, the diversity of entomopathogenic fungi outside of agroecosystems is poorly explored. This study seeks to address two goals: 1. Establish culture collections of entomopathogenic fungi; 2. Use direct and indirect sampling methods to compare differences in fungal communities across horizons in a temperate pine forest soil. Samples were collected in the Duke Forest in North Carolina. In indirect sampling experiments, sterilized and living tissues of *Galleria mellonella* were placed in moist soil samples; these insect tissues were used as baits to isolate fungi from soil, and all isolates were grown on Sabouraud's dextrose agar (SDA). In direct sampling experiments, soil samples were diluted and placed on a selective medium containing cycloheximide, chloramphenicol, and thiabendazole; these cultures were also isolated on SDA. Fungi isolated from insect segments and selective media have been identified by sequencing the ITS rDNA region and currently represent three phyla: Ascomycota, Basidiomycota and Zygomycota. A total of 42 unique OTUs were identified. Sequence data will be compared with next-generation sequence data from the same site to better understand the distribution, relative abundance, and ecology of entomopathogenic fungi in different soil horizons, and bioassays will be conducted to test entomopathogenic activity of the isolates.

39. **Title: Making Life Matter: A Psychological Investigation**

Principal presenter: Matthew Ryan Jamnik

Major: Experimental Psychology

Faculty mentor: David J. Lane

Abstract: How does feeling as if one's life matters provide benefits to well-being?

Psychological literature on meaning primarily draws from positive and existential psychology and spans several decades (Frankl, 1959; Becker 1973; Baumeister, 1991); although a clear definition is often not easily identifiable. Acknowledging this limitation, Steger (2009) conducted a systematic review that widely supported defining meaning as understanding and having purpose in life. Rebutting this, George and Park (2014) suggest that this definition addresses a lower level of meaning that deals with the self and daily life, but fails to address the higher level of meaning that they call existential mattering. In order to investigate their proposed construct, they created the Multidimensional Existential Mattering scale (MEM) which includes three components: comprehension, purpose, and mattering. Respectively, they define these subscales as understanding life, holding valued life goals, and feeling importance in the world. The current study was designed with the intention of furthering the psychological literature on meaning, while additionally exploring variables related to existential mattering through the use of the MEM. Due to the relative infancy of meaning in psychological literature, the significance of this project is twofold. First, it provides evidence for outcome variables that relate to existential mattering, and secondly, it distinguishes which subscale of the MEM (i.e., comprehension, purpose, or

matter) appears to be the most influential contributor to different aspects of well-being. Participants (half of whom were college students) included 148 individuals (mean age = 24.05, SD = 7.42) who were recruited using the website, SampleSize. This website allows researchers to gather global responses through a volunteer basis of users who enjoy participating. During testing, participants completed the MEM scale in addition to questions addressing basic needs, identity, positive and negative emotions, aspirations, mindfulness, social support, and spirituality. Data were analyzed using multiple hierarchical regression models in order to further examine the relationship between the MEM subscales and the variables of interest. Through the use of a two-step model, the amount of unique variance accounted for by each scale (i.e., comprehension, mattering, or purpose) could be interpreted in relation to the correlated outcome variables. These findings revealed important distinctions between the subscales. Comprehension appeared most important for variables that dealt with self-awareness (e.g., autonomy, commitment to identity, mindfulness), highlighting the influence that it has on personal reflection. On the other hand, purpose uniquely impacted aspirations and social relationships, which alludes to the role it plays in achievement. Lastly, mattering was seen to be most important for spiritual and religious practices, which emphasize the focus of this subscale on beliefs higher than oneself. The data presented confirm the relationship between meaning and many aspects of well-being. Given the findings, the importance for understanding how one's life matters appears to be essential for positive life outcomes. Furthermore, the differences seen within the aspects of meaning provide evidence that multiple avenues for achieving the "good" life may exist.

40. **Title: Position and Velocity Offsets between Formaldehyde and Water Masers in G23.71-0.20**

Principal presenter: Mark T Smith

Major: Physics

Faculty mentor: Eseteban D. Araya

Abstract: G23.71-0.20 is a massive star forming region located approximately 6.2 kpc from Earth and it is one of only nine known regions where formaldehyde masers have been detected. Han et al. (1998) reported a water maser at a LSR velocity of -40.3 km/s, which is significantly blue-shifted (by more than 100 km/s) with respect to the formaldehyde maser. We report Very Large Array observations intended to confirm this high velocity water maser. The maser reported by Han et al. (1998) was not detected in our observations, i.e., the maser could be variable or an artifact. Instead, we detected a water maser blue-shifted by 11.4 km/s with respect to the formaldehyde maser. The water maser is offset by 6.04 arcsec (37,000 AU) with respect to the formaldehyde location. We discuss how the velocity and angular offsets between formaldehyde and water masers compare to those found in other massive star forming regions.

41. **Title: Emotion Processing Differences Between Individuals with Autism Spectrum Disorder and Alexithymia**

Principal presenter: Alicia Vallorani

Major: Experimental Psychology

Other presenters or co-authors: Naoyuki Sunami, Sandra L. McFadden, Masu Omura, Ariel J. Wilson, Undergraduate Research Assistant, Phillip C. Berg, and Lindsey K. Robinson

Faculty mentor: Sandra L. McFadden

Abstract: Autism Spectrum Disorder (ASD) is defined by impaired social interactions, communications and restricted interests (American Psychiatric Association, 2013).

Alexithymia is a sub-clinical disorder described as an inability for individuals to process and label emotions (Samur et al., 2013). Recent research suggests that the social-emotional deficits generally attributed to ASD, including emotion recognition (Cook, Brewer, Shah, & Bird, 2013), empathy (Bird et al., 2010) and eye-fixation (Bird, Press, & Richardson, 2011), are attributable to comorbid Alexithymia. Other research, however, suggests that Alexithymia is nothing more than a deficit in verbal IQ (Montebarocci et al., 2011). With this in mind, the current study explored if Alexithymia or ASD accounts for deficits in emotion processing and labeling. A sample of 79 undergraduate students completed measures of Alexithymia and then performed an emotion-labeling task while event related potentials were recorded; 29 participants also completed the Autism Spectrum Quotient test. Data analysis revealed a significant relationship between Alexithymia and ASD ($r = .37$). Individuals high in ASD reported typical responses to emotion-evoking images (from Mikels et al., 2005), but showed altered early and late slow wave activity when viewing images that typically evoke sadness. Individuals high in Alexithymia did not show differences in neural activity, but were less likely to report feeling sad in response to sadness-eliciting stimuli. The findings suggest that individuals with ASD may not attend to sad emotional content whereas individuals with Alexithymia may have deficits in feeling or labeling sadness.

42. **Title: Coexistence of superconductivity and itinerant ferromagnetism in single crystalline Y9Co7**

Principal presenter: Jerold E. Young III

Major: Physics

Other presenters or co-authors: R. T. Gordon

Faculty mentor: Ryan T. Gordon

Abstract: The ac magnetic susceptibility of a crystalline sample of the compound Y9Co7 has been measured in applied dc fields ranging from 0 - 6.7 kOe by utilizing a tunnel diode resonator circuit. In agreement with previous measurements on this material, a superconducting transition has been observed to occur at TSC = 2.5 K. A broad maximum has been observed in the zero field susceptibility measurements from 2.5 K < T < 8 K and its behavior with applied dc magnetic fields is consistent with that of the itinerant

ferromagnet ZrZn_2 , which supports previous claims of itinerant ferromagnetism in this compound. The susceptibility has also been measured as a function of applied magnetic field and the results indicate that the actual Curie temperature for this system is higher than that suggested by previous reports based on Arrot plots, which were constructed from dc magnetization.

43. **Title: Distribution of Fungi in Arid Microenvironments and their Potential Role on Plant Growth**

Principal presenter: Cedric NDINGA MUNIANIA

Major: Biology

Other presenters or co-authors: Katrina Sandona, Biological Sciences WIU, Cheryl Kuske, Los Alamos National Lab, and Andrea Porras-Alfaro, Biological Sciences WIU

Faculty mentor: Andrea Porras-Alfaro

Abstract: In arid ecosystems, fungi form complex microbial communities with plants and other photosynthetic organisms. Many of these fungi are likely to contribute to plant survival, soil protection and enrichment. However the role and diversity of these fungi is not well known, especially their potential pathogenicity or growth promoting potential that could impact nearby plants. We collected soil and isolated fungi from different microenvironments in the Moab Desert in Utah. The biocrust fungi were isolated from lichen, moss and cyanobacteria, and some rhizosphere samples were collected from two plants, *Bromus* and *Hilaria*. Fungi were isolated using a serial dilution technique and sequenced using ITSrDNA region. From the 906 fungi isolated, 405 were sequenced and Ascomycota was the dominant phylum. Pleosporales was the dominant order in BSC and Eurotiales was the dominant order in rhizosphere soil. The most dominant genera included *Aspergillus*, *Coniochaeta*, *Embellisia*, *Preussia*, *Cladosporium*, *Chaetomium* and *Penicillium*. Seed germination experiments using dominant taxa will be conducted in corn and soybean to determine potential roles of these fungi on plant growth.

44. **Title: Feminine Subjectivity and Narrativity in the Music of Jane Austen Film Adaptations**

Principal presenter: Alyssa Yealy

Major: Musicology and Clarinet Performance

Faculty mentor: Brian Locke

Abstract: From 1995 to 2005, English and American filmmakers and moviegoers were captivated by a series of motion picture adaptations of Jane Austen novels. These films included both historical costume dramas and modernized retellings of Austen's stories. The year 1995 saw the release of *Sense and Sensibility*, *Pride and Prejudice*, and *Clueless* (based on *Emma*), followed by *Emma* in 1996. *Bridget Jones's Diary*, which brought themes and characters from *Pride and Prejudice* into the twentieth-century, was released in 2001, and a new adaptation of *Pride and Prejudice* was released in 2005. These films concretized Austen's narratives in various ways, not least of all through their use of music. In my thesis,

I investigate the music of these films to draw conclusions about how their respective scores narrate cinematic action, particularly in relation to the leading female characters of each. For the purpose of this presentation, I provide an overview of my thesis research in which I draw from the second chapter on *Sense and Sensibility* and the fourth chapter on *Pride and Prejudice*. I examine and discuss how music of these films underscores, and occasionally undermines, the narratives of Austen's central female characters. Feminine subjectivity and narrativity are expressed through the films' scores and soundtracks, and are subject to the mutual influences and interpretations of creators (authors, composers, film adaptors), performers (actors, musicians), and spectators. I define "feminine subjectivity" in two ways: first, through the theoretical lens of Louis Althusser's *On Ideology*, as the act of being made a subject through interpellation, the process through which an object is made a subject by being "hailed." Interpellation occurs through music given to a character by a composer or producer, or music played by a character. Secondly, I define feminine subjectivity as how music given to and played by characters expresses their own "subjective" views. I also investigate narrativity and subjectivity through Carolyn Abbate's idea of phenomenal and noumenal music, where "phenomenal" music is performed by characters and "noumenal" music is not. In each film, the phenomenal songs performed by women demonstrate a certain degree of agency, imposed by the composer and director. These portrayals of women as musicians are imbued with implications about the place of women in Regency era and late twentieth-century societies. Finally, I consider narrative meanings in relation to Anahid Kassabian's concept of "identification processes." "Assimilating identifications" create meaning by enabling the observer to understand socially and historically unfamiliar positions via music; these identifications are usually created in classically styled scores. "Affiliating identifications" create meaning through the observer's preexisting associations with a film's music; these identifications typically occur in compiled scores. The films I discuss utilize both composed and compiled scores to create both kinds of identifications. In this presentation, I synthesize these theoretical approaches to depictions of feminine subjectivity and narrativity in the film music of Jane Austen film adaptations in order to gain a deeper understanding of how music contributes to the reification and modernization of the author's original narratives.

45. ***Title: Collaborating on Instructional Video Games to Scaffold Science Learning***

Principal presenter: Jonathan Counce

Major: Experimental Psychology

Faculty mentor: Virginia Diehl

Abstract: This study's objective was to assess the effects of different collaboration types on knowledge retention of scientific concepts. The cognitive elaborative perspective (as described by Slavin, 1996) suggests that collaborative learning can be effective because learning is facilitated when the to-be-learned information is elaborated upon and explained to others. Roschelle and Teasley (1995) noted that the collaborative learning process is erratic and differs greatly between dyads. It is successful when partners make a decision to

coordinate their actions. The instructional video game used in the current study, Selene (Selene.cet.edu), required participants to create a moon, following scientific principles of how Earth's moon formed. We focused on accretion, the most complex phase of moon creation. Participants either collaborated on one computer (CollaborateOnOne, 16 dyads), collaborated on separate computers (CollaborateOnTwo, 17 dyads), or did not collaborate (NoCollaboration, 14 dyads). (This presentation will not include results from the latter condition.) Two independent coders used Observer XT to code the participants' behaviors while playing the game. The number of times a player gave or received help (Collaboration), the time it took to complete the stage (Time), and the difference between their accretion knowledge scores pre- and post-game (Knowledge) were recorded. One set of scores was available from each CollaborateOnOne dyad (because they worked on one computer), and two sets (one from each person) from CollaborateOnTwo dyads (because they worked on separate computers). CollaborateOnTwo participants ($M=1.56$, $SD=1.39$) scored marginally better on Knowledge than those in CollaborateOnOne ($M=0.77$, $SD=1.22$, $t(48)=1.92$, $p=.06$). Frequency of collaboration was greater for CollaborateOnOne ($M=32.19$, $SD=32.06$) than CollaborateOnTwo ($M=14.50$, $SD=11.61$, $t(48)=3.07$, $p<.01$). There was no Time difference. Considering CollaborateOnOne and CollaborateOnTwo together, the correlation between Knowledge and Collaboration was practically zero. Individually, however, the correlation for CollaborateOnOne was $r(14)=.64$, $p<.01$, and for CollaborateOnTwo, $r(29)=-.14$, ns. Fisher's r to z transformation revealed that the correlations were significantly different, $z=2.68$, $p<.01$. The stronger correlation between Knowledge and Collaboration for CollaborateOnOne might be due to it being a truer collaboration than CollaborateOnTwo. Studies have shown that the most effective collaboration involves a common goal (Tsai et al., 2008; Gillies, 2014) and individual accountability (Smith, 1995; Slavin, 1989; Sun & Chou, 1996). These constructs are less represented by CollaborateOnTwo, where partners worked on separate computers and were not directly responsible for each other's outcome. Frequency of collaborations, which was significantly greater for CollaborateOnTwo, has been shown to be a necessary component of successful collaboration (Okada et al., 1995; Schunn, Okada, & Crowley, 1995), especially when knowledge retention is tested (Cohen, 1994). The current study's findings suggest that collaboration can be successful in helping students retain knowledge about difficult science concepts. Even though CollaborateOnTwo participants scored slightly better on knowledge, frequency of collaboration predicted knowledge retention only for CollaborateOnOne. These results are important, because they help clarify which specific components of collaboration make a difference. Shared responsibility for a common goal may lead to more productive collaboration rather than simply larger quantities of it. Future studies could investigate further which collaboration elements contribute to effective learning.

46. **Title: German Nationalism As Expressed in the Works of An**

Principal presenter: Debra Kolz-Olson

Major: History

Faculty mentor: Dr. Ute Chamberlin

Abstract: This paper examines and analyzes the symbols of nationalism found in the paintings of German artist Anton von Werner (1843 - 1915). The artist traveled with the Prussian army during the campaign against France in the Franco Prussian War and witnessed the January 1871 ceremony in the Hall of Mirrors at the Palace of Versailles when Wilhelm I of Prussia was formally proclaimed as Emperor of the newly united German Empire. His series of paintings from 1877, 1880 and 1885, each memorializing the same event, yet painted for different clients from different perspectives, all illustrate the power of the artist to interpret history and in this particular case, to play a part in the creation of national identity. When the German nation-state was formally created in 1871 its inhabitants did not instantly "feel" German; the state had to promote the new national identity and "sell" it to its citizens. This was done through education and national celebrations, but also through art. In addition to the symbolism of the setting - the new German nation being proclaimed in a location which celebrates French greatness - artist von Werner uses groupings of subjects, uniforms, flags and banners, clothing and gestures to represent German unity and national identity. Unlike photography, which was a new development for the documenting of events and which produced an exact picture, an artist could add or subtract aspects of a scene which did not conform to his purpose. In the case of these paintings, the scenes created by von Werner were useful in projecting and promoting a new national ideal. His appointment in 1875 as the Director of the Academic Institute for the Fine Arts in Berlin and his oversight of the German art section at the Paris International Exposition in 1878 underscores that he came to be acknowledged as an arbiter German Imperial Culture. Historian Peter Paret argued in *Art as History* (1988) that the changes in von Werner's painting can be attributed to a changing political culture: more recently, historian Matthew Jefferies has emphasized the importance of client wishes in explaining these changes in his study of *Imperial Culture in Germany, 1871 - 1918* (2003). This paper argues that these two interpretations have to be considered as complementary, not as contradictory. Furthermore, a third factor needs to be considered to fully understand these changes in von Werner's work, that is his personal background; his upbringing in a military family; his professional training and his personal experience of the events that he captured on canvas.

47. **Title: Effect of combined control strategies on wildlife**

Principal presenter: Nazar Emirov

Major: Mathematics

Other presenters or co-authors: Advisor: Dr. Dinesh B Ekanayake, and Advisor: Dr. A. Ekanayake

Faculty mentor: Dr. Dinesh B Ekanayake, Dr. A. Ekanayake

Abstract: There are many wildlife disease control methods discussed in literature, involving either treatment of the host species or reduction of vector agents. Host populations may be managed by immunization, by altering their distribution or density to reduce contacts, or by removal of local populations to eradicate known reservoirs. Vectors can be removed primarily using pesticides, though only limited to local eradication. (See "Disease in Wild Animals - Investigation and Management by G.A. Wobeser, 1994 for more information). However many factors limit the effectiveness of each of these removal methods. Here we analyze how combined management strategies can be used to control a special class of susceptible-infected (SI) diseases. Mathematical evaluation of wildlife disease control methods is based on optimal control of established strategies. However, complex new methods cannot be identified using this approach. One can find all potential solutions using Lyapunov partial stability theory, where the solution is assumed to be unknown and known disease dynamics are used to obtain the most effective solution. Using this method, many possible mathematical solutions arise, though most of them may not be biologically feasible. Here we use a comprehensive solution for an SI model and discuss how each element may relate to the ecological system. Next we numerically evaluate the effectiveness of different combinations of feasible methods to investigate the control compared to the application of the optimal solution for the single control method.

48. **Title: Quantum Error Stabilization**

Principal presenter: Timothy Woodworth

Major: Physics

Faculty mentor: Kishor T. Kapale

Abstract: Quantum Error Correction is used to correct an error after it occurs. If we are able to stabilize the code to decrease the effects of the errors, we could speed less time on correction and more on computation. If we can decrease the chance of error enough, we could neglect checking it at all. This would free up qubits, normally used as auxiliary for correction, to be used in computation. I will be talking about the numerical effects of a set of stabilizers on the 5 qubit code using the trace norm on the difference in density matrices between the ideal and real system.

49. **Title: The Big Five, the Motivation to Respond Without Prejudice, and Homonegativity: A Path Model**

Principal presenter: Zachary C. Roth

Major: General Experimental Psychology

Faculty mentor: Julie C. Herbstrith, Ph.D.

Abstract: Purpose: There has been longstanding interest in the relationship between prejudice and personality, specifically the Big Five Model of personality (Ekehammar & Akrami, 2003). In particular, less prejudice has been linked to higher levels of two traits: Agreeableness, the tendency to seek smooth social interactions, and Openness to Experience, the tendency to seek out novel people, places, and situations (Ekehammar &

Akrami, 2003). Less is known about the mechanisms through which these traits influence prejudice. There are differences in individuals' motivation to respond without prejudice, with some doing so for internal (personal) reasons and some for external (social) reasons (Plant & Devine, 1998). This study sought to examine whether these motivations serve as a mechanism through which personality influences prejudice. Specifically, we examined whether the Internal and External Motivations to Respond Without Prejudice mediated the relationships between the Big Five traits (Agreeableness and Openness to Experience) and anti-gay attitudes. Procedure: One hundred ninety-seven college students were recruited from a university in the Midwest. Participants were administered the Big Five Inventory (John & Srivastava, 1999), Internal and External Motivation to Respond Without Prejudice Scales, adapted for gays and lesbians (Plant & Devine, 1998), and the Homonegativity Scale (Morrison, Parriag, & Morrison, 1999). Results: A series of multiple regression analyses were conducted. First, Agreeableness and Openness were entered as predictors and External Motivation to Respond Without Prejudice was entered as the criterion; the analysis was not significant, $F(2,194) = 2.14$, ns. Next, Agreeableness and Openness were entered as predictors and Internal Motivation to Respond Without Prejudice was entered as the criterion. Results indicate that both traits were significant predictors of the criterion, $F(2,194) = 10.21$, $p < .01$. Finally, Agreeableness, Openness, and Internal and External Motivations to Respond Without Prejudice were entered as predictors and Modern Homonegativity was entered as the criterion; the analysis was significant, $F(2,196) = 30.38$, $p < .01$. Agreeableness and the Internal and External Motivations to Respond Without Prejudice accounted for 38.8% of the variance of Modern Homonegativity. Conclusions: The Big Five factors Agreeableness and Openness to Experience both predicted Internal Motivation to Respond Without Prejudice scores, which in turn predicted Modern Homonegativity scores. These results indicate that personality exerts its influence on expressions of anti-gay attitudes by first influencing individuals' personal motivation to respond without prejudice. However, Agreeableness still exerted a direct influence on anti-gay attitudes after accounting for motivations, indicating that there may be other mechanisms through which this trait reduces prejudice. References Ekehammar, B., & Akrami, N. (2003). The relation between personality and prejudice: A variable and a person centred approach. *European Journal of Personality*, 17, 449-464. John, O.P., & Srivastava, S. (1999). The Big Five trait taxonomy: history, measurement, and theoretical perspectives. In L.A. Pervin & O.P. John (Eds.), *Handbook of personality: Theory and Research* (2nd ed., pp.102-138). New York: Guilford. Morrison, T.G., Parriag, A., & Morrison, M.A. (1999). The psychometric properties of the Homonegativity Scale. *Journal of Homosexuality*, 37, 107-122.

50. **Title: Predator-prey stage structured model for Bythotrephes and its planktonic prey**

Principal presenter: Kanwal Ayub

Major: Mathematics

Faculty mentor: Dinesh B. Ekanayake ; Amy Ekanayake

Abstract: The spiny water flea, *Bythotrephes Longimanus*, is an invasive predatory species that is spreading rapidly in water bodies of North America. Though tiny, this invasive species has the capacity of causing a great deal of damage to the aquatic food web. Many small fish avoid eating the spiny water flea because of its barbed tail. *Bythotrephes*, being a predator, feeds on the same native zooplankton that is food for many native fish, reducing the food supply for the juvenile fish (R.P Barbiero and M. L. Tuchman, Canadian Journal of Fisheries and Aquatic Sciences 61.11, 2004). The objective of this presentation is to model the predator-prey relationship between the water flea and its prey to understand the extent of prey damage in water bodies. The spiny water fleas do not overwinter, so each year a new population is initiated when the resting eggs that were sexually produced in the previous year hatch in spring (M.J. Wittmann, et al. Biological Invasions 13.11, 2011). The number of resting eggs depends on reproduction dynamics, environmental factors, and seasonality (H.J. MacIsaac, et al. Archiv für Hydrobiologie 149.1, 2000). Consequently, these factors play a significant role for the prey population. The predator-prey model discussed here includes a time-dependent stage-structured model for *Bythotrephes* to incorporate each of the prominent factors. For *Bythotrephes*, the sex is determined environmentally and not genetically (Egloff D. A., Fofonoff P. W., Onbé T. Reproductive biology of marine cladocerans. Adv. Mar. Biol. 1997;31:79-168). During summers, there are few male *Bythotrephes* individuals found and reproduction is mostly parthenogenetic. However, when the water temperatures go down during autumn, the male population of *Bythotrephes* is at its peak (Straile, Dietmar, and Astrid Hälbig. "Life history and multiple antipredator defenses of an invertebrate pelagic predator, *Bythotrephes longimanus*." Ecology 81.1 (2000): 150-163). It is at that time that the encounter rate between males and females is highest and resting eggs are produced. The eggs sink to the sediment and stay there until the next spring (Brown ME, Branstrator DK. 2005. Seasonal dynamics in *Bythotrephes* diapause egg emergence and production, and the role of dormancy in range expansion. Verh. Internat. Verein. Limnol. 29: 174-178). We model these dynamics and use appropriate parameters to numerically investigate the population pattern for various environmental conditions. This research project will shed light on any possible management strategies for the prey population.

51. **Title: Challenge Of Islam With Democracy In The Modern World**

Principal presenter: Azat Jumayev

Major: Sociology

Faculty mentor: Oswald Warner

Abstract: The modern age brought new challenges to the Muslims around the world notably in the political sphere. It seems that Muslim socio-historical experience is not compatible with the current political developments. The recurring conflicting problems in the Muslim world seem to be not studied and revisited deeply by the modern Muslim scholars and Muslim activists (Islamists). The recurrent ruling style in Central Asia such as authoritarianisms and dictatorships raised some concerns in the western world too

especially whether Islam is compatible with democracy or whether socio-historical experience of Turkmenistan lends credit to democracy. I believe there should be a question of whether these governments refer to Quranic discourse or not while engaging in politics. For these reasons, I would like to analyze and visit Islamic theory whether Islam is compatible with democracy.

52. **Title: The Impact of *United States v. Windsor* on the Legal Landscape of Same-Sex Unions**

Principal presenter: Vicki S Darwin

Major: Sociology

Faculty mentor: Davison Bideshi

Abstract: The purpose of this research was to examine the impact on same-sex unions in the aftermath of the Supreme Court decision in *United States v. Windsor*. I conducted a review of over twenty scholarly journal articles and wrote a 20 page research paper on my findings. The legal landscape for same sex couples was very complex prior to the *Windsor* case, as states had developed their own laws regarding such unions. In the states that had laws recognizing same-sex unions, the terminology and the rights the couple had varied extensively. Thus a civil union in one state did not necessarily have the same legal rights as a civil union in another state. Another issue was the lack of uniform recognition of these same-sex unions. Another issue that became apparent during the research was the difficulty these couples face when attempting to dissolve their union, especially if they have moved to a non-recognition state. During the research for this paper, it was made apparent that the *Windsor* decision had not effectively dealt with the issue of same-sex marriage in the U.S. and, while allowing for federal recognition of same-sex marriages, it does not give that same recognition to civil unions and domestic partnerships. Because of that distinction, *Windsor* has led to even more problems for couples in same-sex marriages, civil unions, and domestic partnerships. The research, revealed that since the *Windsor* decision, many states that allow same-sex marriages have automatically converted the civil unions and domestic partnerships to marriages, something that may or may not have been what was originally intended by the couples involved. While perhaps well intentioned some of the unintended consequences of such state actions have included issues such as unintended bigamy, tax implications, pension issues, adoption issues, and much more. The conclusion of this paper was that the Supreme Court needs to make a definitive decision that same-sex marriage is legal under the Constitution and that all states must allow and recognize such unions.

53. **Title: Compositional dependence of the optical properties of Sm³⁺ doped lead borate glasses**

Principal presenter: William Heidorn

Major: Physics

Other presenters or co-authors: P.K. Babu and Saisudha B. Mallur

Faculty mentor: P.K. Babu

Abstract: A series of lead borate glasses with the composition $x\text{PbO}:(99.5 - x)\text{B}_2\text{O}_3:0.5\text{Sm}_2\text{O}_3$ ($x = 29.5$ to 69.5 in steps of 10 mol%) were prepared using the melt quench technique followed by 3 hours of annealing near the glass transition temperature. Optical absorption and fluorescence spectra of Sm^{3+} (RE) doped in lead borate glasses were analyzed using Judd-Ofelt theory. The compositional dependence of Judd-Ofelt intensity parameters, Ω_t ($t = 2, 4, 6$), were determined. Ω_2 and Ω_6 were found to decrease with increasing PbO concentration indicating a decrease in the asymmetry of the crystal field at the RE site, and a change in the covalency of the RE-O bond. The intensity parameters were then used to calculate the radiative transition probability of the excited states. The total radiative transition probability shows a maximum for the base glass containing 49.5 mol% PbO. The stimulated emission cross section, branching ratios and radiative lifetime of the excited states were calculated. The stimulated emission cross section for the intense fluorescence transition ($4\text{G}_{5/2} \rightarrow 6\text{H}_{7/2}$) calculated from the radiative transition probability shows a maximum value ($6.2 \times 10^{-22} \text{ cm}^2$) for the base glass containing 29.5 mol% PbO.

54. **Title: Diminished Effect of Ostracism on Power-Provocation Needs among Lonely Individuals**

Principal presenter: Naoyuki Sunami

Major: General Experimental Psychology

Faculty mentor: Kristine M. Kelly, Ph.D.

Abstract: The Needs-Threat Model (Williams, 2009) suggests that ostracism leads to thwarting of the fundamental needs of belongingness, self-esteem, control, and meaningful existence. Which need receives the priority for fortification depends on situational and personality factors. If the inclusionary cluster (belongingness and self-esteem) receives precedence, subsequent behavior will be prosocial, and if the power-provocation cluster (control and meaningful existence) receives precedence, antisocial responses will be likely. The Belongingness Theory (Baumeister & Leary, 1995) suggests that loneliness should produce less antisocial and more prosocial responses. Thus, we hypothesized that lonely individuals would report more thwarting of inclusionary needs and less thwarting of power-provocation needs following ostracism. On the other hand, non-lonely individuals would experience more thwarting of power-provocation needs and less thwarting of inclusion needs. A sample of 46 college students participated in the study. They first completed the UCLA loneliness scale (Russell, 1996) and then were randomly assigned into either the inclusion condition or the ostracism condition, which was manipulated via Cyberball (Williams & Jarvis, 2006). Finally, they completed the Need-Threat Scale (Jamieson, Harkins, & Williams, 2010), which measured both the inclusionary and power-provocation needs. For the model predicting loneliness as a moderator between ostracism and inclusionary needs, the coded ostracism variable and loneliness were entered in the first step. In the second step, the interaction term between ostracism and loneliness was entered.

The results showed that loneliness was not a significant moderator between ostracism and inclusionary needs, $\Delta R^2 = .041$, $F(1,42) = 2.72$, $p = .107$. For the model predicting loneliness as a moderator between ostracism and power-provocation needs, the coded ostracism variable and loneliness scores were entered in the first step. In the second step, the interaction term between ostracism and loneliness was entered, which resulted in a significant increase in the explained variance ($\Delta R^2 = .11$, $F(1,42) = 18.36$, $p < .01$). Therefore, loneliness was found to be a significant moderator. The unstandardized simple slopes for participants scoring 1 SD below (Non-Lonely) and 1 SD above (Lonely) are presented in Figure 1. The results indicate that lonely individuals may experience less thwarting of power-provocation needs following ostracism than non-lonely individuals. Since thwarting of the power-provocation needs is related to increased aggression (e.g., Warburton, Williams, & Cairns, 2006), future studies should examine loneliness as a moderator between ostracism and aggression.

55. **Title: The Efficacy of Diplomacy in Managing Genocidal Crises**

Principal presenter: Kristin Bail

Major: Political Science

Faculty mentor: Dr. Vincent Auger

Abstract: A traditionally liberal emphasis on the prevention of violent conflict through international negotiation and diplomacy has grown to dominate global diplomatic rhetoric, with an increasing importance placed on the idea of the responsibility to protect. Realist theorists frequently discount normative and liberal attempts to justify preventative diplomacy and international intervention with the reasoning that ethnic or intrastate conflicts are often primordial and therefore inevitable, eventually burn themselves out, and that states will intervene only when such action aligns with their interests. Drawing on a framework produced by the Carnegie Commission on Preventing Deadly Conflict, the research seeks to test the effectiveness of international diplomacy and negotiation in managing intrastate conflict, focusing specifically on outbreaks of violence which are overwhelmingly perceived by the international community as unacceptable-genocide. To this end, the events and policies surrounding the clashes in the former Yugoslavia and East Timor will be investigated and placed within the provided framework. While not definitive due to the limited number of cases surveyed, this study will contribute to the discussion of international intervention as well as suggest policy lessons for future consideration.

56. **Title: What Works: Correctional Officers' Perceptions**

Principal presenter: Jessica McCorkle

Major: Law Enforcement Justice Administration

Other presenters or co-authors: Janet Lombe, Law Enforcement Justice Administration

Faculty mentor: Kimberly Dodson

Abstract: Studies have examined correctional officers' perceptions of their work environment, job satisfaction, burnout, and stress. Correctional officers' perceptions of rehabilitation and treatment are conspicuously missing from the literature. The purpose of this study is to compare correctional officers' perceptions of rehabilitation and treatment to the literature on evidence-based practices and policies. Qualitative interviews were conducted with a sample of correctional officers in a Midwestern jail. Misconceptions are presented along with suggestions for educating correctional personnel about evidence-based policies or "what works" with offenders.

57. **Title: Born Behind Bars: Prison Nurseries**

Principal presenter: Victoria Bailey

Major: Law Enforcement and Justice Administration

Faculty mentor: Kimberly Dodson

Abstract: Prison nursery programs have gained popularity in the last two decades. Women who will give birth while incarcerated are eligible to participate in prison nursery programs if they are short-term inmates, usually serving a sentence of 24 months or less, and have nonviolent criminal records. Although there has been a considerable amount of research on prison nursery programs, no one has collectively assessed whether these programs do increase mother-infants bonds and reduce recidivism among program participants. The current study uses the Mary Scientific Methods Scale to evaluate mother-infant bonds and whether prison nursery programs "work" to reduce recidivism. Directions for future research are discussed.

58. **Title: Navigating the Holocaust: Sephardim and Spanish Diplomacy in Vichy**

Principal presenter: Frank Shaw

Major: History

Faculty mentor: Dr. Chamberlin

Abstract: Over the past few decades, scholars such as Paul Preston, David Wingate Pike, Stanley Payne, Eduardo Martin de Pozuelo, and others have shed valuable light on the ways in which Spain was complicit in the Holocaust as a Nazi ally, despite their official neutrality. Yet, it is also well documented that many Jews were able to escape the Nazi genocide because the Franco regime permitted them to travel through Spain to safety. This paper, through an analysis of primary source documents from the United States Holocaust Memorial Museum, analyzes the circumstances of a particular group of refugees, Sephardic Jews in Vichy and Occupied France, and their varied degrees of success obtaining visas to enter Spain. General Franco and the Spanish government in Madrid gave their embassies

and regional consulates specific instructions as to how and under what very limited circumstances Jews were to be allowed to cross the border into Spain. Under these rules, a transit visa was extremely difficult to obtain, even for Jews with Spanish citizenship. This paper presents an analysis of several such cases, illuminating the complex and contradictory landscape that defined Spain's role in that horrific chain of events.

59. **Title: Poverty, Resource Endowment and Conflict in Sub-Saharan Africa**

Principal presenter: Melaine N Nsaikila

Major: Economics

Faculty mentor: Bhavneet Walia

Abstract: Contrary to the logical conclusion that the more natural resources a country has or controls, the more prosperous, rich and happy will be its people, the evidence from most Sub-Saharan countries is pointing to a different direction with numerous conflicts occurring mostly near mineral deposits or in countries heavily endowed with natural resources of various sorts. This paper seeks to tackle the basic questions of a sub-Saharan African and any person interested in the region; why are there so many conflicts in the region? Why is there absolute poverty despite the presence of enormous natural resources? What are the factors contributing to the present problems facing the region? This paper establishes the relationship between poverty, resource endowments and conflicts in sub-Saharan Africa. The paper reviews literature, stressing on the different conditions under which resource abundance can and have been a primary cause of conflicts. It argues that poverty and conflicts have re-enforced each other and that natural resources have played a role. The paper also makes use of conflict, resource and poverty data among other variables to establish the probable cause for the numerous conflicts in Sub-Saharan Africa. The paper suggests statistically that Political Stability and Absence of violent conflicts can only be altered by the lack of sustainable economic opportunity, failure to control corruption and rising levels of poverty. It is worth noting that the resource variables are not statistically significant. This however, do not dismiss the role of natural resources in the present conflicts of the region because the trend is observable that most conflict ridden countries in the Sub-Saharan African region are resource rich. It rather lays an emphasis on the fact that resource revenues could be used to avert the current situation by provision of basic needs like shelter, potable water, security, accountable institutions, education and the promotion of enterprise that will be a guarantor of sustainable economic opportunities. The paper employs Maslow's Human needs theory for some explanations and also multiple regression, using panel data for statistical analysis. Fixed and random effects estimation techniques are used, and other statistical testing to determine the validity of the different variable coefficients generated. The paper suggests concrete economic and policy recommendations to given the problems enumerated that could leapfrog the region out of the current bad situation it has been in for decades. Key Words: Sub-Saharan Africa, Poverty, conflicts, Natural Resource Abundance, resource curse.

60. **Title: How has Jamaican dancehall music contributed to hostility towards members of the LGBT community**

Principal presenter: Shyan R. Edwards

Major: Sociology

Faculty mentor: Dr. Davison Bideshi

Abstract: According to UN (2013) estimates, Jamaica has had one of the highest murder rates in the world. Some areas of Jamaica, particularly cities such as Kingston and Montego Bay, experience high levels of crime and violence. As a result, violent themes aimed at various minority groups have been incorporated in to Jamaican popular music, including dancehall. Common themes in dancehall focus on the LGBT community. Consequently, in recent years, mob attacks against gay people have been reported, prompting human-rights groups to call Jamaica "the most homophobic place on earth." Music is a powerful driving force in Jamaica and has been utilized to convey civic pride, social commentary, and homophobia. It is through the use of music that many homophobic sentiments have been transmitted to the population and the global community. In this paper, an analysis of the lyrics of 5 Dancehall songs and the violent homophobic message it conveys is undertaken.

61. **Title: The Influence of Negative Mood and Personality on Covert Attention**

Principal presenter: Lindsey K. Robinson

Major: Experimental Psychology

Other presenters or co-authors: Co-author: Naoyuki Sunami, Experimental Psychology, and Co-author/co-adviser: Dr. Kristy Keefe, Department of Psychology

Faculty mentor: Jonathan Hammersley

Abstract: Areas: Attention/Personality Problem or Purpose: The association of attentional difficulties with negative mood states (depression, anxiety, anger) and personality traits (Cumyn et al., 2009; Nigg and Casey, 2005; McKinney et al., 2011) have been documented. We examined the roles of personality traits in spatial attention performance, to better understand individual differences in attentional functioning. Procedure: A covert orienting of attention task (COAT; Posner 1980) with left, right and no-arrow cues each appearing on 60 trials, and personality inventories, were completed by 65 participants. Of 120 arrow-cue trials, 96 (80%) were valid trials and 24 (20%) were invalid trials. No-cue trials had either a 100 or 800 ms delay prior to targets. Each COAT trial consisted of the following sequence: a 1000 ms prompt to blink, a 500 ms central fixation cross, an 800 ms central arrow cue pointing left or right or absent (no arrow cue), a 100 ms asterisk target presented left or right of the fixation, and a 700 ms blank screen to reset the sequence. Analyses were based on correct responses between 100 and 1000 ms post-target measured in mean response times (RTs). Results: Validity effect (faster responses to valid versus invalid cues) and overall performance on uncued trials (aggregated across conditions, in total mean RT) were assessed as dependent variables and State-Trait Personality Inventory (STPI) and NEO-Five Factor Inventory NEO-FFI traits were assessed as predictors. Stepwise multiple regressions were conducted to determine whether each predictor variable made a unique

contribution to the model. The prediction model for Total Validity Effect was statistically significant, $F(1, 63) = 7.762$, $p < .007$, and accounted for approximately 30% of the variance, with higher STPI Trait Depression ($R^2 = .110$, Partial $R^2 = .096$) significantly predicting lower Validity Effects (poorer attentional orienting). NEO-FFI Neuroticism, $F(1, 63) = 4.135$, $p < .046$ ($R^2 = .62$, Partial $R^2 = .047$), accounted for approximately 24% of the variance when NEO-FFI Personality Traits alone were entered as predictors, with higher neuroticism associated with poorer attentional orienting. No significant results were found for uncued spatial attention performance. Conclusions and Implications: The current results indicate that higher levels of trait depression, and to a lesser extent neuroticism, predict poorer cued spatial attentional orienting on the COAT. The results will be discussed in the context of personality traits and the direct assessment of attentional difficulties.

62. **Title: Hezbollah's Influence**

Principal presenter: Ayesha J Montgomery

Major: Public Administration

Faculty mentor: Dr. Auger

Abstract: As non-state actors are becoming increasingly involved in domestic and international affairs, it is important to study these individual actors. Hezbollah is a unique actor in the international system. Since the early 1980s, this group has gained notoriety as a terrorist group. They have been linked to the Beirut incident in 1983 and numerous other terrorist attacks. Hezbollah seeks the removal of the state of Israel. It also dislikes western culture and influence in the Middle East. Despite its status as a non-state actor and a terrorist group, it has a massive amount of clout. Their political strength stems from the seats they hold in the Lebanese Parliament and social services they provide. Hezbollah's military is much bigger than the military power of the state it occupies, so it aids in protecting Lebanon against threats. Hezbollah is important because of its dual roles in Lebanon, its connections to other countries in the region, and activities which cause turmoil in the international system as a whole. This research seeks to broaden the common knowledge of Hezbollah by viewing it through a liberal lens to accurately capture its importance as an actor in the international system.

63. **Title: The influence of canopy structure on the abundance of Pink turtlehead (*Chelone obliqua*) in a floodplain forest**

Principal presenter: Anthony Kloppenborg

Major: Biology

Other presenters or co-authors: Co-author Dr. Susan Romano

Faculty mentor: Dr. Susan Romano

Abstract: The Pink Turtlehead (*Chelone obliqua*) is a perennial wildflower native to the Mississippi River valley, that rarely occurs in the Quad Cities Iowa/Illinois area. This species reoccurred in the summer of 2013 in the Mississippi River floodplain near Bettendorf, Iowa, after an absence of approximately 15 years. Throughout its range,

primarily central and southeastern United States, this plant is found under dense canopy along river banks, stream channels, and marshes, indicating importance of both light levels and the location of water bodies. The purpose of this study is to gain insight into why this plant, previously thought to be extinct in this area, has reoccurred. Percent canopy cover above the population clusters were measured with a densiometer, and percentage of light transmittance to the forest floor was measured with a quantum sensor collected as mmol of photons/m²/sec. *Chelone obliqua* occurred under the floodplain forest canopy within the broad range of 0 to 100 percent cover, and 2.91 to 40.76 percent light transmittance. Preliminary analysis indicated that population clusters typically occurred within 2.91 to 13.63 or 22.09 to 25.39 percent light transmittance, rarely found outside of these light ranges. Population clusters were also found near water sources, which may also provide a more consistent supply of water due to proximity. Possible reasons for reoccurrence could be a change in forest canopy cover due to species changes and river flooding, but also climate change, shifting the edge of the distribution range northward.

64. **Title: Understanding Islamophobia**

Principal presenter: Michael Kohler

Major: Political Science - International R

Faculty mentor: Dr. Jongho Lee

Abstract: This research analyzes data compiled from Pew Research concerning the perceptions of Muslims and seeks to understand what the origins of those perceptions are. The growing sense of Islamophobia is a salient topic that remains at the forefront of public discourse all over the world. The findings of the Pew Research reports are analyzed through regression models using variables such as the frequency of terrorism attacks, the percentage of Muslims, and the importance of religion within the country. The findings, while tentative, paint a fair picture so as to better understand the reasoning by widespread Islamophobia that has gripped various places within the world.

65. **Title: Measuring Quality of Life in the Regions of the Russian Federation**

Principal presenter: Taras Safonov

Major: Economics

Faculty mentor: Bhavneet Walia

Abstract: The search for a reliable measure of the quality of life (QOL) has long been a heavily discussed issue for many a researcher and a policy analyst. Such an interest in this field comes as no surprise since it could provide information on general welfare of any nation's ultimate asset - its own people. Despite much debate in theoretical and practical circles, there is still no consensus on either what exactly constitutes QOL or on the universal formula to quantify this concept. For instance, the United Nations' Human Development Index is arguably one of the most well-known indicators of people's welfare that allows one to compare QOL across countries and regional blocs. However, the practice of regional policy development and administration shows that government authorities at all

levels require a comprehensive tool that would allow them to assess QOL in different regions of a country to develop improved policies aimed at increasing people's well-being. This is of particular relevance for large federative countries, such as Russia, where official statistics do not employ a spatially comparable aggregate indicator that would measure QOL in the regions. Therefore, this study attempts to address this issue by following the three research objectives. Firstly, a spatially comparable standardized comprehensive Quality of Life Index (QOLI) is derived for each of the 83 Russian constituent territories based on the data provided by the Russian Federal State Statistics Service for the year 2013. The index is calculated across five dimensions (Physical Well-Being, Decent Standard of Living, Social Security & Inequality, Hospitable Environment, and Education) and incorporates 19 indicators such as Mortality Rates, Average Income, the Gini Coefficient, or Education Attainment, and does not have an analogue in Russian Official Statistics. The QOLI can be particularly useful for regional authorities since it would serve both as a map for policy adjustments and as a comparable measure of policy success. The study goes on to elaborate on the derived index formula, putting it at the base of the QOL model that allows the user to predict values of the QOLI given actual values of conventional official statistics indicators. Such an approach can help regional authorities reenact "what-if" scenarios of suggested policies, which could potentially affect QOL, at the step of feasibility research. Finally, the study measures *ceteris paribus* effects of each of the 19 elements on the QOLI, which allows to find out what indicator or a group of indicators have the most weight in determining the aggregate index and what parameters affect it only slightly. For instance, the study has found that the most influential parameters are those that are comprehensive and thus are resistive to swift improvements such as the Gini Coefficient and the Literacy Rate while income-related factors have a moderate, but steady, effect on the aggregate. The need for this type of analysis is suggested by practice: policy administrators at various levels usually need to know what factors are most important for reaching higher levels of well-being in order to formulate their policy plans.

66. **Title: Contest Theory**

Principal presenter: Rodney Burnett

Major: Economics

Other presenters or co-authors: Co-authors Jude K Geraldo Program: Economics, Shane D Sanders Program: Economics (Professor), and Co-presenters Jude K Geraldo Program: Economics

Faculty mentor: Shane Sanders

Abstract: Many economic researchers have observed studies on the negative effects of natural resource extractions and economic development. This idea is that countries that rely heavily on natural resource exports for balance trade do less well economically and are prey to corrupt, authoritarian rule. In recent years, the concept has gained status with its application to "Petro politics". When we look at the Middle East, countries like Nigeria, Venezuela, Russia etc., the discovery of massive volumes of oil and gas reserves has not

brought any real prosperity or liberty. On the contrary, we see a more authoritarian and corrupt leadership, which sows the seed of socio-political unrest and the feeling of injustice. Natural resources at their optimum extraction levels, provides these regimes with easy foreign exchange, which in turn allows them to avoid the hard work of social reforms and diversification. We cannot however say this applies to all regimes since we see counter examples in different regions such as the United States. This paper discusses how two groups (the incumbent and the rebel group) contest for the control of scarce resources. To show this it is necessary to form a model that can well represent what happens during conflicts over natural resources across time periods. It's important to know the cost to the country as well as rival groups when seeking natural goods. We will take steps to look at what it takes in order to acquire and maintain resources, which will be investigated and presented.

67. **Title: Energy Intensity**

Principal presenter: Jude Geraldo

Major: Economics

Faculty mentor: Dr. Walia

Abstract: The objective of this paper is to identify the factors that determine the level of energy intensity in each state and their impact on the energy consumption of the entire country. The research that I have conducted has not been observed in the same geography before. Data was collected for each observation from trusted government organizations such as the U.S Energy Information Administration and the US Census Bureau for the year 2013, and independently assembled for the purpose of this analysis. This paper does not only discuss the relationship between the independent factors (causation) and the dependent factors but also discusses how the different US States improve their energy consumption through R&D. The paper outlines the hypotheses for the expected results for each factor. In this paper, the ordinary least square model is adopted and a cross sectional multivariate data analysis is performed. The paper concludes with a discussion of the research results. **KEY WORDS:** Energy Intensity, British Thermal Units, Cooling and Heating Degree days.

68. **Title: The Science of Survival: Exploring the Rational and Intuitive in Arthur Conan Doyle's A Study in Scarlet and "The Final Problem."**

Principal presenter: Chris Ivy

Major: English

Faculty mentor: Bill Knox

Abstract: If there is a common theme all popular depictions and retellings of the adventures of Sherlock Holmes agree on, it is Sherlock's necessity to partake in ritualistic behaviors. The narratives of Sherlock Holmes offer outsiders a chance to critically analyze the foundations and ideals of Victorian era Great Britain, defining the very essence of British success as seen through the eyes of the triumphant yet troubled Sherlock Holmes. Arthur Conan Doyle's original works A Study in Scarlet and The Final Problem give unique insight

into Holmes' ritualistic, scientific activities and drug abuse, allowing the reader to observe Holmes' unique status as the perfect British man who embodies the darkness of the outside, unknown world. Conan Doyle's works dissect the core beliefs of science and masculinity within British society during the Victorian era, challenging the reader to examine the effects the foreign world has on one's own morals. This essay utilizes Arthur Conan Doyle's original texts to analyze the profound impact rituals had on Sherlock's ability to solve cases, specifically narrowing focus onto his ability to achieve a state of liminality as the ideal figure of British masculinity who simultaneously engages and embodies the role of British idealism and the external world.

69. **Title: High School Football as a Catalyst for Disaster Recovery**

Principal presenter: Nick Swope

Major: Health Sciences

Other presenters or co-authors: Co-author, Dr. Jack Rozdilsky, Assistant professor of emergency management in the Health Science and Social Work Department, at WIU.

Faculty mentor: Jack Rozdilsky

Abstract: During Spring, Summer and early Autumn 2014, a quick response type of field study took place concerning disaster recovery in Central Illinois. This study was supported by the Quick Response Grant Program from the Natural Hazards Center located at the University of Colorado at Boulder. This study used qualitative methodology including snowball sampling for recruitment, primary informant interviews, and field reconnaissance. The event studied was the November 17, 2013, EF-4 tornado disaster which impacted the city of Washington, Illinois leaving three persons deceased and resulting in substantial community damage. Specifically, this study focused on social aspects of disaster recovery by taking a detailed look at how a high school football team contributed to a community's tornado recovery. Six days after the tornado, the Washington Panthers played in the state semifinal game despite adverse circumstances, including 10 team members losing their homes to the tornado. Quick Response Study Findings 1. In considering the question, "Can a high school football team provide services to a disaster recovery effort?" this study of the Washington Panthers determined that a high school football team can make a substantial contribution to disaster recovery. 2. In considering the question, "What are the specific types of services that a high school football team can provide to the community during disaster recovery?" This study determined that the Panthers provided services related to acting as ambassadors for their disaster stricken city, participated in an evolving role supporting recovery, and provided symbolism for a unity of spirit that drove the recovery. 3. In considering the question, "How can the value-added services provided by a high school football team be translated to other rural communities in the United States facing disaster recovery?" this study determined that the Panthers actions provide a method of operation by which other high school football teams can consider ways to help their communities during future disasters. 4. The coaches and young men of the Panthers acted as role models supporting disaster recovery. In other words, "If high school students could rally together

and play a football game less than a week after a disaster, why couldn't a community member work with equal vigor to rebuild Washington?" 5. The Panthers provided both tangible and intangible services supporting the recovery. An example of a tangible service was the Panthers' willingness to act as a conduit for establishing relationships between the Chicago Bears and the City of Washington. An example of an intangible service was providing a focal point for rallying the community recovery effort. 6. Circumstances surrounding the state semi-final game illustrated that some of the most appropriate disaster relief activities involve facilitating a circumstance where disaster victims can help themselves in restoring a small aspect of normalcy to their lives. An especially meaningful form of aid provided to the Panthers was when the opposing team provided them with circumstances to make their own traditional pre-game meal.

Podium with Performance Presentations

70. Title: Bertolt Brecht's Mother Courage - The Song of the Great Capitulation

Principal presenter: Matt Saltzberg

Major: Theatre - Directing

Other presenters or co-authors: Ryan McNeil, Music Composition

Faculty mentor: Rachel Chaves

Abstract: As part of the Spring 2015 Department of Theatre & Dance Studio Season, I am directing Bertolt Brecht's "Mother Courage and Her Children." Brecht was a German playwright, director, and theorist who is arguably the single most influential theatrical figure of the twentieth century. Written in 1939 against the backdrop of World War II, "Mother Courage" is set in the seventeenth century during the Thirty Years War, Europe's most catastrophic war until the world wars of the twentieth century. Courage is a mother of three who makes her living by following the war and selling provisions to soldiers. The war forces Courage into an irreconcilable dialectic: the only way for her to protect her family is to make her business thrive, but protecting her business destroys her family. In the end, all three children are dead and Courage's business is in tatters, and yet she still chases the war. Courage cannot change unless she recognizes that to live off the war is actually to die by the war. Brecht's 1949 production in war-ravaged East Berlin intervened in world history and cemented Brecht's far-reaching influence. The play's timeliness is rather eerie: war envelopes us, so much so that I fear we've normalized such violence as a constituent of our lives. Yet, the play reveals war as the human antithesis: war devours life. Therefore, our production will feature an ensemble of WIU students who will play a troupe of German actors returning to their theatrical home to find their war-battered space in ruins; they will then 'recover' their decrepit and decayed set pieces and props, and tattered, moth-eaten costumes, and perform the play "Mother Courage." I have made this choice because the play manifests philosopher Walter Benjamin's influence on Brecht: that one must look back at the rubble of history, that we cannot move forward until we have a clear sense of that which is piled behind us. "Mother Courage" exhibits a dozen songs that contain the most

direct illumination of Brecht's themes. Because there isn't any customary music attached to the lyrics, my production will feature a brand new score by current WIU Master of Music candidate Ryan McNeil. Owing to our post-war Berlin setting, the score will be influenced most thoroughly by German cabaret music, and the songs will function as raucous moments of direct audience address and involvement. Furthermore, the actors will play their own instruments in the production. In the scene we propose to perform, Mother Courage sings "The Song of the Great Capitulation," the most well-known of the play's several anthems. In the scene, Courage warns an enraged young soldier: he must have an anger profound enough to sustain him over time, that quick bursts of anger will not do. The "Song of the Great Capitulation" is her lesson. With the song, Brecht is not encouraging us not to protest, but rather asks us to contemplate the ways in which protest can be effective and actually change things.

71. ***Title: Collective Identity in the Making of African American Classical Music***

Principal presenter: Marius Louvine Anthony

Major: Music Composition and Musicology

Faculty mentor: Dr. Brian Locke

Abstract: Over the course of the early twentieth century, the African American Spiritual rose in prominence from a grass-roots folk idiom to a musical symbol of African American identity in the United States. This trend paralleled the rise in cultural consciousness across many aspects of African American life (notably the Harlem Renaissance), but came together most specifically in a series of new compositions and studies between 1900 and 1950. In this lecture recital I will perform and analyze a selection of pieces by African American composers for voice and piano, each of which reflects the growing cultural force of the Spiritual. Ever since the time of slavery, African American folk music has been a culturally complex discourse for historians in both the fields of music and African American studies. Though it is impossible to pinpoint an exact origin, sources indicate that the bulk of this music arose from the conditions of slavery and the religious influences of Christianity. The most ambitious efforts in understanding the Spirituals surfaced in the early twentieth century, a time when African Americans were just beginning to form a collective consciousness propelled by the advancement of Black music and literature. At this time, Harry T. Burleigh and John Rosamond Johnson each created arrangements of Spirituals published between 1917 and 1934. Burleigh performed his arrangements throughout Europe and the United States to great acclaim (much like Frederick Loudin did with the Jubilee Singers during the late 1890s). In the preface to Johnson's 1925 book, the composer's brother James Weldon Johnson included an in-depth, historical description of the Spirituals' various musical origins, evolution, and cultural meanings. The discourse of African American folk music, however, leads the historian beyond the geographical limitations of the United States to an English-born composer of African descent, Samuel Coleridge-Taylor. Inspired by such musicians and writers as Loudin, Dubois, and Booker T. Washington, Coleridge-Taylor arranged a set of Spirituals titled Twenty-Four Negro

Melodies for piano. Coleridge-Taylor became an important figure within the discourse of collective identity upon the arrangements' publication in 1905, a time when he made frequent visits to the United States. In my analysis, I will examine the writings of James Weldon Johnson, who discussed the Spirituals from a historical standpoint, and Zorba Neal Hurston, who questioned the authenticity of the arrangements, or what she termed, "neo-spirituals." I will also draw on the ideas of Benedict Anderson in *Imagined Communities* and Eric Hobsbawm and Terence Ranger in *The Invention of Tradition* to explore questions of how this genre emerged within African American collective consciousness and became a musical force for Black Classical music. I will divide my presentation equally between the performance of several Spiritual arrangements by Burleigh, Johnson, and Coleridge-Taylor and my scholarly analysis of them. I will require use of a piano and an audio system (computer with speakers).