2017 CELEBRATION OF STUDENT RESEARCH + CREATIVITY

Tuesday, April 18, 5:00-6:30 p.m.
Student Research Poster Session and Reception
Frazier Hall

Wednesday, April 19, 5:00-7:00 p.m.
Annual Student Art Show Reception
McGrath Gallery

Thursday, April 20, 5:00-7:30 p.m.
Celebration of Scholarship & Creativity in the Arts & Humanities
Wyatt Center for the Arts & Norton Health Science Center

5:00-7:00 p.m.
Presentations and readings from students in the performing and fine arts and humanities programs

7:00-7:30 p.m.
Dress Rehearsal of Lauren Bidwell’s Theatre Production “Crooked”

Sunday, April 23, 12:30-5:15 p.m.
Honors Student Thesis Presentations
Centro Atrium
See page 52 for additional information on presentations
About the Artist in Residence Program

The Lansing School of Nursing and Health Sciences established the Artist-in-Residence program in the 2002-2003 academic year. This program exemplifies the art and science of Nursing and Health Sciences through the eyes of the artist in music, visual art, creative writing, and/or drama. Endowed by Mrs. Arthur N. BecVar in 2006 in honor of her husband, this program exemplifies the diverse and many creative and artistic talents of the BecVar family. Having earlier established an endowed nursing scholarship fund during Art’s lifetime, with this endowment Jayne BecVar further connects her desire to support and provide to our community caring, ethical graduates. It is our mutual desire that the students’ experiences in this program, as viewed through the arts, will give them new ways of thinking to inform their clinical practice, the health care profession and patient contact and care.

ARTISTS IN RESIDENCE

Shae Goodlett and Alyssa “Allie” Jensen

About the Artist in Residence Program

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Goodlett’s Artist Statement
Shae Goodlett is an illustrator who has been fortunate enough to work for a number of organizations around Louisville such as the Kentucky Derby Festival, Kentucky Harvest, and the American Heart Association. He is double major in Art and Design, Arts, & Technology specializing in pen, acrylic ink, or digital media.

The pieces developed for the BecVar artist residency program speak to the hands of the healthcare industry. After interviewing nursing students, Shae requested the students participate in a word association exercise about “hands” or “limbs” in their field. The most common answers included: fingers, broken, band-aids, IV, or oximeter. The illustrations produced are derived from student responses. Cover title: Hand

Jensen’s Artist Statement
During the informational meeting for the BecVar Artist in Residence (AIR) Program, student artists were encouraged to design an interactive art piece that would engage the Nursing and Health Sciences programs at Bellarmine. In the process of brainstorming with students, patients, professors, family members, and health care professionals, I quickly recognized a unifying theme. Each conversation had touched on the subject of human emotion. It was agreed upon by people from all social roles that we can't separate our health from our emotions. Every feeling we have affects some part of our bodies. As a result, I decided to explore this concept by constructing a data map that indicates where in the body we experience specific emotions. Through self-reporting, participants are able to help create a visualization that illustrates the connection between mind and body.

To participate, you may choose one more colored thread/s that corresponds to a specific emotion. According to your individual experience, arrange the thread around the pegs within the framework of the body. For the final product, I hope to see the community come together to create a visualization, a weaving, that is representative of how we feel.

To view the piece and participate, please visit the Allen Building Lobby Tuesday, April 18th. I encourage all members of the Bellarmine community to participate.

Finally, I’d like to recognize the generosity of Mrs. Jayne BecVar, founder of The BecVar Artist in Residence as she has provided students like me with the opportunity to engage in their community, experience a real-world application of art, and receive scholarship funding. Through this program, I have found a connection between myself as an artist and with the students from the Lansing School.

Fall In - 2016
2017 CELEBRATION OF STUDENT RESEARCH + CREATIVITY POSTER SESSION

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SPECIAL THANKS TO
Dr. Doris A. Tegart—Interim President
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Ms. Connie Hurley—Grant & Research Specialist
Ms. Allison Becker—Administrative Assistant to the Dean of Bellarmine College
Mrs. Kathleen Kelty—Director of Campus Communications
Chalcones are molecules commonly found in plants and foods, as a precursor to flavonoids, which serve as an important pigmentation molecule. Chalcones are known to possess anti-cancer properties as well. These anti-cancer properties are due to the fact that chalcones can serve as a Michael acceptor, which enables them to interact with a variety of pathways to disrupt the initiation, promotion, and progression of cancer tumors, through the inhibition of mitotic division. Various chalcones have been screened against HEK 293 cells to determine the growth inhibitory potential. Cellular assays involving counting and plating cells in 96 well plates, followed by drug application, and then an MTS cell proliferation assay was performed to measure cellular growth. Data produced thus far indicates that the flexibility of the structure plays a role in its ability to interrupt other cells, with the most flexible chalcones killing the most cells, and the most rigid ones producing the highest rates of survival among the drugs tested so far on healthy mammalian cells. However, further experimentation is required in order to produce reliable and consistent results, which can then be later used in the treatment of a wider range of drugs on HEK 293 cells, and eventually against pancreatic cancer cells as well.

Chalcones are a type of natural product that are found in many plants. Natural products are substances or compounds that are found naturally in the environment. Naturally occurring chalcones as well as their synthetic derivatives have been shown to have chemopreventative, chemoprotective, and antimutagenic effects on cancer cells, without producing a negative effect on non-cancerous cells. It is important that toxicity be limited in non-cancerous cells, so that regular cell processes may be maintained. This library of synthetic chalcones has been designed to probe the effects of substituent electronic properties as well as flexibility and orientation of the molecule on biological activity. It was found that in some cases the flexibility and or substituents of the chalcones played a role in inducing or reducing cell death. However, trials were high in error, due to unknown factors during preparation. No definite trend could be established without further experimentation and closer monitoring of cells during drug treatment.
A Timeless link between Circadian Rhythm and tumor suppressor RASSF1A in cancer.
Justin Nacpil and Ramon Batista Torres / Faculty Sponsor: Dr. Katharine Hobbing

Cancer is a widely-researched topic for it is a significant threat in people’s lives. Even though extensive research has been done to cure cancer, it appears there is a lot more to it than meets the eye as multiple proteins are responsible for controlling tumorigenesis. One such protein, RASSF1A, has been identified as a key tumor suppressor protein. Inactivation of RASSF1A, due to promoter methylation, has been shown to occur in almost every cancer type ranging from lung, breast, prostate, to ovarian, leukemia and melanoma, with frequencies up to 99%. While RASSF1A is frequently inactivated in human cancer, several single nucleotide polymorphisms (SNPs) have also been associated with an increased risk for developing cancer. One example, SNP A133S, is associated with an increased risk of breast cancer. Studies indicate that RASSF1A acts as a scaffold protein, coordinating several protein-protein interactions. Many of these interactions are key in regulating several cellular processes including: apoptosis, inflammatory signaling, cell cycle control, genomic stability, microtubule dynamics, and motility/invasion. One such interacting protein is Aurora Kinase A (Aurora-A). Aurora-A is highly expressed in human cancers including breast, colorectal, and bladder cancers as well as ovarian, prostate, neuroblastoma, and cervical cancer cells. Increased protein expression along with increased activity of Aurora-A has been linked to tumorigenesis. Aurora-A is known to phosphorylate RASSF1A at Threonine202 and/or Serine203. Studies have indicated that Aurora-A phosphorylation results in diminished RASSF1A-dependent cell cycle control. We propose that loss of RASSF1A cell cycle control is due to a novel downstream target, Timeless (TIM). TIM, is known for controlling cell cycle and is linked to circadian rhythm. We propose that aberrant Aurora-A activity in combination with RASSF1A SNP expression alter TIM protein expression resulting in dysregulation of cell cycle.

The SERF gene modulates SMA severity and SMN protein abundance in a D. melanogaster disease model
Trevor Stantliff / Faculty Sponsor: Dr. Caroline Doyle

Spinal muscular atrophy (SMA), the leading genetic cause of infant mortality, is primarily the result of diminished levels of the Survival of Motor Neuron (SMN) protein. The number and types of genetic factors which might influence disease severity is unknown. The Human SERF1/H4F5 gene was identified in a comparative genomic study as a possible genetic modifier of SMA (Scharf et.al, 1998). SERF is phylogenetically conserved but its natural function is not known and its impact on SMA has never been tested in any animal model. Here we are using genetic approaches to investigate the natural function of SERF and to test the hypothesis that expression of the Drosophila SERF (SERF) buffers the impact of SMN mutations. Using RNA interference, we created a SERF knockdown allele and combined this with a series of SMN mutants showing different levels of phenotypic severity. Previous lab results have shown that SERF is not required for viability, but the loss of this gene inhibits adult climbing behavior independent of SMN status. Moreover, consistent with our hypothesis, SERF expression is required for maintaining a full complement of the essential Drosophila SMN protein. Here we present our investigation on whether the knockdown of SERF can exacerbate the normally impaired development and larval growth of fly SMN mutants.
Scientists among the Bryozoan community have been perplexed by the germination process of the freshwater species Pectinatella Magnifica, leaving numerous questions unanswered. This species is viewed as a pest to humans as it can obstruct plumbing intake valves and encrusts boat hulls in freshwater waterways. The mechanisms behind the process of germination, and how exogenous factors such as light affects this process, are not well understood. Pectinatella magnifica statoblasts were collected from the dock at Hancock Biological Station (Murray, KY) and then stored in the laboratory refrigerator at 8°C for 4 months prior to the start of the experiment. Each replicate was placed in a 100 mL glass beaker with approximately 50 statoblasts per beaker and lake water obtained at the time of collection and each treatment (0 lux, 500 lux, and 1500 lux) contained 5 replicates. Number of statoblasts germinated were counted after 14 days. A one-way analysis of variance with a Holm-Sidak post-hoc pairwise comparisons test indicated that the low (500 lux) treatment had significantly more germination than the other treatments (p < 0.001). The results of this study indicate that P. magnifica germination is significantly affected by the intensity of light. Therefore, conditions in P. magnifica’s natural habitat that affect statoblast exposure to light as well as changes in light intensity may affect germination of this species of bryozoan.

Cadmium is a toxic industrial and environmental pollutant found in groundwater, air, soils, food and cigarettes. Chronic intake of low levels of cadmium has been shown to result in renal dysfunction due to cell death which can occur via apoptosis as well as necrosis. Previous studies have shown that plant extracts containing quercetin, a flavonoid found in many fruits and vegetables, protect against cadmium toxicity in rat liver hepatocytes. To determine if quercetin may have a protective effect in a cadmium-treated human embryonic kidney cell line, HEK-293 cells were treated using concentrations of cadmium chloride from 10 to 50 QM for 24 hours. Using a cell proliferation assay, it was determined that 30 QM cadmium chloride was able to induce toxicity in this cell line. Pretreating these cells for 24 hours before cadmium exposure with concentrations of 10 QM to 200 QM suggested that quercetin partially protects HEK-293 cells from cadmium at all levels of treatment. While these results suggest that quercetin protects against cadmium toxicity, it is unclear if quercetin is inhibiting an apoptotic or necrotic pathway. Since previous studies have suggested that cadmium-induced apoptosis activates the phosphorylation of p47-phox, an NADPH oxidase, immunoblot analysis will be used to determine if 24-hour pretreatment with quercetin inhibits phosphorylation of p47-phox cadmium-treated HEK-293 cells. The results of this study will determine if quercetin protects against cadmium-induced apoptosis.
**POSTER 7**

**General Metabolic Characterization of Persistent Contaminant Ralstonia pickettii and four Unidentified Soil Bacteria.**

Edmond Talbott and Katie Wegenast / Faculty Sponsor: Dr. Joanne Dobbins

A persistent contaminant was observed in our lab during the summer of 2016. It was isolated from a culture of Mycobacterium smegmatis by repeatedly streaking for isolation and re-plating until pure. The contaminant was then identified and characterized via phenotypic analysis using the provided protocol of Biolog GEN III Microplate™. This contaminant was determined to be Ralstonia pickettii, a common species of soil bacteria that has been observed having exceptional tolerance to heavy metals according to corresponding literature. To observe this metabolic phenomenon, the turbidity of Ralstonia pickettii was measured on a copper gradient ranging from 0.5 mM to 4 mM using a spectrometer. While attempting to revive the Ralstonia pickettii cultures the following semester, four additional contaminants were isolated from the Ralstonia pickettii culture. These four contaminants, likely soil bacteria, were tested for a variety of metabolic characteristics for comparison with Ralstonia pickettii. The custom protocol includes screening for antibiotic resistance, copper tolerance, and oxygen affinity. Given these organisms are all soil bacteria, it is expected they will share several metabolic characteristics with Ralstonia pickettii because they hail from the same environment.

**POSTER 8**

**Isolation of a Mycobacterium Virus from Loamy Clay Soil from Central Kentucky**

Katie Wegenast / Faculty Sponsor: Dr. Joanne Dobbins

Isolation techniques developed by the HHMI and the SEA-PHAGES program were used to obtain a bacteriophage from a mixture of loamy clay soil. The samples of soil were retrieved from a forest edge in central Kentucky. The samples were then tested for virus that would infect Mycobacterium smegmatis. Three samples were incubated with the bacterium to obtain virus because the bacterium seems to be rare in the soil. There was success with one of the three samples. It seems as though the virus is temperature dependent because soil samples taken in the months of June and July showed no virus, but samples taken from the same locations taken in October showed presence of there being a virus. The isolate produced large lytic plaques on a lawn of the bacterium Mycobacterium smegmatis. The bacteriophage was purified, amplified, and analyzed using restriction digest analysis with visualization by gel electrophoresis. Mycobacteriophages are placed into distinct groups based on DNA sequences comparison. Restriction digest analysis suggests the virus belongs to a group known as “A” mycobacteriophages. The next step in the procedure will be to document with an electron micrographic image. The virus will then be sequenced, so the genome can be annotated. The virus will be able to be further characterized in its cluster during the annotation process. Future studies include testing rates of infectivity of at various temperatures. It is our goal that these studies will allow the determination of a novel bacteriophage.
Tardigrades have the evolutionary adaptation of entering cryptobiosis, or minimizing their metabolism, during times of environmental stress. They will form a tun, in which they decrease the surface area exposed to the environment, and no longer require food or water. However, the mechanism(s) involved in tun formation are not well understood. In recent decades, aquatic pollution has increased dramatically. With the increase in fossil fuel combustion and use of fertilizer, as well as an increase in the popularity of caffeinated beverages, nitrate and caffeine concentrations in waterways have increased, yet the impact(s) of nitrate and caffeine on freshwater tardigrades are not known. Many aquatic species are adversely affected by nitrate exposure, which is known to directly cause elevated mortality rates and the development of unusual behaviors whereas caffeine exposure has been directly associated with oxidative stress and DNA damage. We performed two studies, investigating the impact of nitrate and caffeine on tardigrade tun formation and survival. Over the course of seven days, freshwater tardigrades (Hypsibius sp.) were exposed to two different concentrations of sodium nitrate (15 mgL⁻¹, 80 mgL⁻¹), and three different concentrations of caffeine (50 mgL⁻¹, 300 mgL⁻¹, 1210 mgL⁻¹). In both studies, the number of live, dead and cryptobiotic tardigrades in each treatment were compared to those in control treatments. We found no significant difference between any of the nitrate treatments, however the number of dead tardigrades was significantly higher after exposure to the highest concentrations of caffeine (two-way ANOVA, p < 0.001). Therefore, exposure to observed nitrate concentrations in waterways appears to have no direct effect on the metabolism of tardigrades, whereas exposure to observed caffeine concentrations has an adverse effect on tardigrade survival. This effect of caffeine could indicate an adverse effect on other aquatic species as well, most of which have not been studied.

The surrounding landscapes of college campuses have important effects on people. This project focused on educating the public about the different species of trees and shrubs that grow on the Bellarmine University campus. Our goal was to create an online resource that would indicate the location, identity and features of 30 different plant species. While researching the online tree maps from other college campuses, it was observed that many lack detailed photographs that clearly show identifying characteristics of the plants. Therefore, we took numerous photographs of the plants and created collages composed of both landscape and close-up images, including distinctive features such as bark texture, node arrangement, and leaf shape. The interactive mapping software used was provided by ESRI ArcGIS, a program that was free, accessible, and relatively easy to learn. The online map includes a satellite image of the campus with the 30 different plants indicated by numbered markers located in the correct position on the map. Eventually, we hope to publish this interactive map on the Internet, thus providing the Bellarmine community with the ability to understand more about the flora surrounding them. This map will expose students, faculty and staff to the outdoors in a different way, thus helping them relax and develop mindfulness.
BUSINESS

POSTER 11
A Cross-Cultural Comparative Analysis of Print Advertisements: World Cup Sport Magazine Issues
Sarah Elliott / Faculty Sponsor: Dr. Julie Toner

This study analyzes advertisements in the top sports magazines in the United States and United Kingdom, Sports Illustrated and SPORT respectively, during the 2014 FIFA World Cup. With an estimated 1 billion viewers watching the 2014 final match, the popularity of the World Cup is unlike any other event. Sports magazines see an increase in sales during the time of the World Cup, meaning companies will put more effort into the production of their advertisements. The study uses content analysis methods to gain insight into the informational content and gender representation in the advertisements. The results demonstrate both hard and soft sell approaches to selling goods and services. The study uses predictive analysis to suggest the target market for each advertisement.

CHEMISTRY

POSTER 12
Fluorescence Analysis of Deepwater Horizon Oil and Contamination of Bluefin Tuna Larvae
James Bruce / Faculty Sponsor: Dr. Joseph Sinski

In the summer of 2010 the Deepwater Horizon oil spill occurred in the northern Gulf of Mexico in the same location where larval Bluefin tuna resided. Because of the proximity of the oil sheen to the fish larvae, there was a high likelihood for petroleum contamination. Research done by James Franks of the Gulf Coast Research Laboratory collected larvae found under an oil sheen at the time of the spill and the samples were stored in ethyl alcohol for preservation. Past researchers, connected with James Franks, attempted to find contamination but their results were inconclusive. Due to our laboratory’s recently published work on the successful detection of petroleum in crab larvae, Franks requested our lab to develop techniques of fluorescence spectroscopy to determine polycyclic aromatic hydrocarbon (PAH) contamination in extracted samples of tissue. Five larvae, as well as ten additional larvae collected prior to the spill, were analyzed by fluorescence. These samples were compared alongside a Red-Shift Cascade of the crude oil found in the same location. We present here the results of this analysis.
Nosework is a sport that trains and utilizes dogs to detect scents such as birch and clove. The purpose of this study is to determine the sensitivity of the canine olfactory and compare with the detection of Bellarmine University’s Shimadzu Gas Chromatograph/ Mass Spectrometer (GC/MS) (GCMS-QP5000) instrument. Experiments are conducted using six, three-holed odor tins with one having 50 μL of birch that is diluted with Gemini Masterpiece Odorless Mineral Spirits to different concentrations. The samples of birch are serial diluted with a one-half dilution factor, and the calculations of dilution are measured in parts per million (ppm). One Pomeranian at the age of two is used to identify which tin contains birch oil at different concentrations by lying down. Similarly, the GC/MS is used to determine the limit of detection of birch in the same tins. The limit of detection of the canine olfactory is determined when the dog is no longer able to identify the right tin, and the limit of detection of the GC/MS is determined when the noise level is greater than three. With this experiment, the goal is to determine if the dog or the GC/MS has a lower limit of detection. Researchers at University of Hebei found the limit of detection of methyl salicylate to be 0.0578 ppm using the GC/MS and we conclude that our canine compared was 15.259 ppm.

This study is conducted by the training team, which includes Terry VanHook, who is an experienced and credentialed Canine Nosework Trainer, and the handlers, Jennifer Sinski and Aleah Green.
**POSTER 15**

**Synthesis of Chalcone Derivatives as Cytotoxic Agents against Cancer Cells**  
Amber Hill / Faculty Sponsor: Dr. Francis Barrios

In the last 20 years, there has been a strong interest in the research of chalcones and their effect on different types of cancer. Chalcones are a class of natural products which serves a wide variety of biological activities and are made of two aromatic rings linked by an α,β-unsaturated carbonyl system. The anti-cancer properties of chalcones result from the different functional groups on both aromatic rings. These compounds are simple to synthesize by reacting the appropriate benzaldehyde and acetophenone derivatives. A series of chalcone derivatives have been synthesized through the Claisen-Schmidt condensation reaction of 1-indanone and a variety benzaldehydes derivatives including electron donating and withdrawing groups. These synthesized products are purified by recrystallization technique, and their identities are confirmed through Nuclear Magnetic Resonance (NMR), infrared spectroscopy (IR), and Thin Layer Chromatography (TLC). The anti-proliferative activities are going to be evaluated against a series of cancer cells to understand their structure-activity relationship.

**POSTER 16**

**Excited State Dynamics of Tris-Bipyridine Complexes**  
Alexander Kurzhals / Faculty Sponsor: Dr. Patrick Holt

Ruthenium tris-bipyridine (RuBpy) is an organometallic compound which has been involved in many different types of research in recent years because of the model properties it possesses. In this research, the already well-documented excited state dynamics of RuBpy are used as a baseline against which to compare the photophysical properties of the rhodium tris-bipyridine complex. Rhodium is chosen as the transition metal of the target compound because it is immediately adjacent to the ruthenium on the periodic table which implies that they should react comparably to the same stimulus; however, because transition metals frequently do not adhere to many of the classical predictions of chemistry, it is possible that the observed properties may vary from significantly. In order to obtain the necessary data, a pump-probe laser spectroscopy system is utilized to excite the samples and simultaneously record electronic transitions via oscilloscope.
The Synthesis and Biological Evaluation of Hydroxy Chalcone Derivatives
Jordan Pierce / Faculty Sponsor: Dr. Francis Barrios

In the past decade, research has focused on chalcone derivatives as a possibility for cancer therapy. Chalcones are structurally diverse compounds that are more readily available and inexpensive in comparison to other anticancer drugs. This alternative could also provide other benefits, such as a lower level of toxicity when compared to marketed drugs like cisplatin. Chalcones fight cancer through methods such as preventing, reversing, or delaying the growth of tumors, rather than attacking carcinogenic cells. The methods used for this research focus on producing several chalcone derivatives that each contain a hydroxyl group on the base of the structure. To synthesize these chalcones, 1-hydroxy-5-indanone reacts with various benzaldehydes. These benzaldehydes contain either electron-withdrawing groups such as halogens in the para or meta position or electron-donating groups such as oxygen and nitrogen based groups. The identity of each purified structure is confirmed through nuclear magnetic resonance spectroscopy, infrared spectroscopy, and mass spectroscopy. The products will then be tested to determine their efficacy as biological agents against cancer. The efficacy of each chalcone will be compared in order to determine the influence of the various side groups on biological activity.

Quantitation of Caffeine in Workout Supplements Containing Proprietary Blends Via High Performance Liquid Chromatography
Leah Wolf / Faculty Sponsor: Dr. Joseph Sinski

Many athletes consume supplements before, during, and after workouts in order to increase their performance. Several of these supplements contain proprietary blends, a mixture of compounds in a specific ratio set by the manufacturer. According to the United States Food and Drug Administration, if a company uses a proprietary blend, only the total weight of that blend needs to be listed in the supplement facts along with a list of its constituents. The quantities of each compound in the proprietary blend are frequently omitted from the label. The goal of this project is to determine the amount of caffeine in several supplements containing proprietary blends. This will be done using high performance liquid chromatography (HPLC) with a photodiode array (PDA) detector. Standard samples have been prepared to create a calibration curve. To prepare these samples for injection into the instrument, the supplement was sonicated in water to dissolve all of the caffeine. The solution then was gravity filtered and passed through a syringe filter to remove unwanted compounds. At the time of this abstract’s submission, the method for quantitating caffeine in a sample has been established. It has been determined that the samples will be injected into the instrument using a gradient elution of methanol and water. In the near future, a calibration curve is being established using the prepared standard samples. After this is completed, the amount of caffeine in each supplement will be quantitated.
Implementing Semi-Autonomous Robotics on a Hexapod Platform
Brooke Kennedy / Faculty Sponsor: Dr. Akhtar Mahmood

Natural and human-created disasters often leave search-and-rescue missions reliant on human efforts in dangerous scenarios where there is the potential for more loss of life. In this research, we propose an alternative solution which removes humans from the immediate danger of many search-and-rescue missions. We experiment with applying semi-autonomous functionality to a hexapod robot in order to aid human operators in safe and efficient search-and-rescue operations. This research is intended to highlight the advantages of implementing semi-autonomy over fully autonomous or fully human-operated robotics. This Hexapod research project involves two phases. In phase one, we focused on assembling and analyzing the Lynxmotion H3 Hexapod kit. This kit included the necessary components to build a human-operated mobile hexapod. In phase two, we focused on using the body of the Lynxmotion hexapod while implementing our own software and sensors to pursue the goal of semi-autonomy, which would be ideal for situations such as search-and-rescue missions.

Impact of Hosting Sport Mega-Events on Developing Nations’ Short-Term Employment
Sarah Elliott / Faculty Sponsor: Dr. Frank Raymond

There is a perception that hosting mega-events such as the FIFA World Cup or the Olympics will jumpstart employment and growth for host nations. More recently, selection committees appear to have adopted this view by awarding hosting rights to developing countries, which forgo other projects and take on additional debt in order to complete the project. However, both research and recent experience are challenging this perception. While there may be short-term gains in the development of infrastructure and tourism, long-term benefits require strategic planning for dual use. In this study, I model the impact of hosting such events on employment and growth after the event has concluded. I also consider the impact of lost opportunities and debt on host countries and suggest elements countries should consider to more realistically estimate the benefits and costs of hosting these mega events.
POSTER 21

Immigration and Economic Growth: Qualities of Immigrants which have the Greatest Impact on the Host Nation’s GDP
Jared Kemper / Faculty Sponsor: Dr. Frank Raymond

This research paper considers how changing immigration patterns have influenced economic growth in several OECD member countries. I specifically focus on the origin, age, skill-level, and legal status of immigrants in the host nation. Using thirty years of panel data from the United States, France, Germany and the United Kingdom, I address the extent to which the immigrants’ attributes have significantly impacted GDP growth. This research paper will provide evidence towards the attributes in which the host nation should seek for when accepting immigrants into the country.

POSTER 22

Multilateral Free Trade Agreements and the Transpacific Partnership
Charles Laun / Faculty Sponsor: Dr. Frank Raymond

Increasing globalization has led to the creation of large trade blocks such as the EU and NAFTA to promote economic growth and stability. The Transpacific Partnership (TPP), the largest proposed trade block to date, faces an uncertain future due to the fact that the US has withdrawn its support in order to appease citizens concerned with the expansion of freer trade on specific industries. However, economic theory demonstrates that freer trade increases competition which in turn increases both efficiency and net job growth. Employing standard regression techniques, I measure the impact of existing trade pacts on job growth and postulate the benefits and costs of the US forgoing participation in TPP.

POSTER 23

Crime, Investment, and Economic Growth in Latin America
Thomas Sapp / Faculty Sponsor: Dr. Frank Raymond

Many developing nations in Latin America rely on flows of foreign direct investment (FDI) to make up a consistent portion of national income and to promote economic growth. Despite the importance of FDI to such nations, many continue to struggle with high levels of criminal activity that threaten foreign investment and, in turn, economic development. This research uses ordinary least squares regression to estimate the influence of criminal activity and other explanatory variables on net FDI inflows to eighteen Latin American countries from 2008 to 2014.
POSTER 24

Economic Growth Through Financial Globalization: Spain’s FDI Outflows in Latin American Countries
Craig Skinner / Faculty Sponsor: Dr. Frank Raymond

Examining Spain’s Foreign Direct Investment (FDI) outflows to the economies of Argentina, Brazil, Chile, and Mexico produces an observation about how financial globalization can affect economic growth. FDI from Spain is directed to these Latin American countries via multinational enterprises, which permits economic growth as productivity increases and firms become more specialized and technically efficient. The results from an econometric analysis indicate that increased financial globalization will also increase the income inequality as these developing economies continue to grow. These findings can be explained by the Kuznets Hypothesis, which connects the relationship between income inequality and Gross Domestic Product growth.

POSTER 25

How the CIP and Related Factors have influenced per capita GDP in Rwanda
Alex Swartz / Faculty Sponsor: Dr. Frank Raymond

Despite the importance of a stable food supply, several countries in Africa have yet to achieve dependable processes and institutions to ensure food stability. Specifically, nutrition influences the development and productivity of labor and human capital, key components of economic growth. This paper considers factors related to the Crop Intensification Program in Rwanda (CIP) to determine the effect of the CIP on per capita GDP in the years since its inception. In particular, this model compares how factors directly tied to the CIP, such as cereal production and the amount of agricultural land, affect per capita GDP in Rwanda.
The Centers for Disease Control and Prevention defines autism spectrum disorder (ASD) as a developmental disability that can cause significant social, communication, and behavioral challenges; and estimates that one in 68 children in the United States are affected by it (CDC, 2014). This prevalence rate is much higher than that of prior decades and has led to trends and factors related to educational programs that include an increase in the inclusion of students with autism in general education classrooms where general education teachers are not always prepared to handle the behavioral needs and challenges associated with ASD. For this reason, it is crucial that teachers have access to efficient, teacher-friendly, and research-based interventions for students with autism that can be implemented in the general education environment. One strategy that has been implemented in many different settings to influence behavior is a token economy system. However, there is little research on the effect of a token economy system on a student with autism in the general education environment. The purpose of the current study was to examine the effectiveness of a token economy in decreasing disruptive behavior displayed by a student with ASD in a fourth-grade general education classroom. Using an ABAB single subject design, results showed that the student’s disruptive behavior was at an increased level during the initial baseline condition; decreased as the intervention was introduced; returned to an increased level during the second baseline condition; and decreased again once the intervention was reinstated. Furthermore, the student’s behavior continued to stay at decreased levels during a maintenance phase.

Lichens are the result of a unique symbiotic relationship between a fungus and photosynthesizing partner: cyanobacteria or green algae. Due to their symbiotic nature, both the photobiont (photosynthesizing partner) and mycobiont (fungal partner) are able to provide its other species with essential needs such as protection or photosynthate. Lichens are commonly used as bioindicators of air quality as they obtain all their required nutrients from the air due to the lack of roots or other structures to retrieve nutrients from soil. Historically Louisville, Kentucky has had high amounts of air pollution yet there have been few studies on local lichen and how they may be affected by these high amounts of air pollution. For this project, two species of lichen were collected from a non-polluted site (Daniel Boone National Forest) and transplanted to four sites around Louisville that historically have been identified as having significant air pollution. After five months at these sites, the samples were collected and sent to the University of Minnesota Research Analytical Laboratory to be analyzed for trace elements and heavy metals to determine if the samples accumulated various pollutants relative to those at the non-polluted site. Results from this analysis will be presented.
POSTER 28

The urban heat island effect and its impact on lichen abundance and diversity
Austin Adam / Faculty Sponsor: Dr. Roberta Challener

For the past century, it has been widely accepted that air pollution (such as SOx and NOx) causes lichen mortality in urban areas. In recent years, however, the Urban Heat Island Effect (UHI) has also been explored as a possible cause of lichen mortality. Lichens are the result of a unique symbiotic relationship between fungi and a photosynthesizing partner. One of the benefits obtained from the fungus partner is water retention. The UHI is associated with an increase in impervious surfaces and a decrease in tree canopy coverage. The UHI also impacts the amount of air moisture, as increased impervious surfaces increase evaporation rates and reduce humidity. Therefore, it is expected that areas with less impervious surface cover, and therefore more air moisture, should have higher healthier lichens and therefore greater lichen species richness and abundance. In this study, eight sites were chosen around Jefferson County in Kentucky. Air temperature and humidity data were obtained from each site along with the abundance and diversity of lichen species. Species richness was done by the rubber band and circle method on six trees at each of the eight sites. Abundance values were obtained by using only the rubber band method. Both the Shannon and Simpson indices were calculated and compared for each site. Our results suggest that lichen species richness decreases with increasing temperature in Jefferson County. Species abundance decreased as air temperature increased and increased as air humidity increased, which we expected to find. Analysis of Shannon’s index indicates that species richness and evenness decreases with increased air temperature and are unaffected by changing air humidity. Our findings highlight the need for more studies investigating the impacts of UHI on local ecosystem health. Further areas of study should look at impervious surface and tree canopy coverage in accordance with lichen biodiversity.
Riparian vegetation along streams has many positive effects on water quality and macroinvertebrate communities, especially in agricultural areas. Some of these effects include erosion prevention, pollutant removal, and lower summer water temperatures. There has been much research done examining the link between these riparian areas and streams; however, riparian vegetation is understudied in karst areas. Karst is a geologic formation that is composed of limestone, which dissolves in acid, forming sinkholes. Thus, the question this paper seeks to answer is does riparian vegetation around sinkholes in a karst plain influence water quality within a watershed? Water quality, land cover, and topography were analyzed, in the Blue River watershed in Southern Indiana. Water quality variables analyzed as dependent variables were nitrate concentrations, and the ratio of pollution intolerant macroinvertebrates to pollution tolerant macroinvertebrates (EP T:C). Land cover variables included percentage of forest and agricultural land use within the watershed. Topographical variables included watershed area, sinkhole density, total number of sinkholes, number and percentage of non-vegetated and vegetated sinkholes, and the average riparian buffer width; these topographical data were collected using ArcGIS. The statistical analysis was done using a multiple linear regression. The analysis showed that more riparian vegetation around sinkholes led to lower nitrate concentrations in the stream when watershed area was used as a covariate. Analysis also showed that higher nitrate concentrations led to higher EPT:C. Agricultural land cover in the upper watershed was shown to have negative impacts. These findings are useful in determining whether riparian vegetation should be maintained in agricultural areas if water quality is to be maintained.

Florida’s coastal and inland waters make up some of the primary habitat for manatees, a federally endangered marine mammal species. Due to their slow-moving behavior, manatees are susceptible to collisions with watercrafts. This study, which was conducted as part of an Introduction to Geographic Information Systems (GIS) course, uses GIS data to look at manatee carcasses recovered from Florida waters between 1974 and 2016. It focuses on the causes of deaths and locations of carcass recovery. The goal of this study is to determine the proportion of manatees killed by watercraft collisions during this period as well as the effect of the proximity to major ports on number of watercraft collisions recorded. Results of this study support the hypothesis that watercraft collisions have played a significant role in manatee deaths between 1974 and 2016. Over 20 percent of all recorded manatee deaths were caused by watercraft collisions. The results also support the hypothesis that proximity to ports is positively correlated with the amount of watercraft collisions, with over 30 percent of all collisions occurring within 15 miles of major ports. This correlation is likely due to the density of boats traveling in and out of these ports. Ports also offer ideal habitat for manatees, which prefer warm, calm waters. This study could be used to implement management plans to better protect manatees through measures such as decreased speed zones and manatee protection areas near ports.
Nitrate exposure and its effect on germination of the freshwater Bryozoan, Pectinatella magnifica
Eli Miller / Faculty Sponsor: Dr. Roberta Challener

This research sought to examine the effect nitrate exposure has on the germination of Pectinatella magnifica statoblasts in freshwater systems. P. magnifica are freshwater organisms of the class Bryozoa and are commonly found in lakes and ponds in North America and Europe. Nitrate is a common chemical found in nearly all water systems due to the bacterial decomposition of macro and micro-organisms in sediments at lake bottoms, and runoff due to fertilizer-based agricultural practices. Previous work on the germination of P. magnifica statoblasts has indicated that chemical exposure may inhibit germination. However, the impact(s) of nitrate exposure on statoblast germination has never been tested. Statoblasts were collected from the dock at Hancock Biological Station (Murray, KY) and transported back to Bellarmine University where they were held at 8°C for four months prior to the start of the experiment. Forty five statoblasts were placed in 100ml glass beakers with 5 replicates for each treatment (control = 0 mgL-1, low = 65.5 mgL-1, high = 374 mgL-1). Number of statoblasts germinated were counted after 7 and 14 days. A two-way analysis of variance (ANOVA) with a Tukey-post-hoc analysis indicated that nitrate exposure (low and high) significantly negatively affected germination as fewer statoblasts germinated in these treatments (p < 0.001) relative to the control treatment. The results of this study indicate that P. magnifica may take longer to germinate in waterways where nitrates become ≥ 65.5 mgL-1 concentrations of nitrate.

Environmental Injustice in Louisville Metro
Dara Ricketts / Faculty Sponsor: Dr. Martha Carlson Mazur

Environmental justice is an issue prevalent in the United States as well as globally. The presence of environmental risks and healthy living conditions are unevenly distributed between varying levels of socio-economic status. Food security issues such as food deserts and lack of nutrition disproportionately affect areas of low socio-economic status. Exposure to pollutants from industrial complexes as well as many environmental risks are prevalent among low-income and minority populations. Non-white and poor communities consistently face harsh environmental circumstances. The basis of this study is to determine the presence and extent of environmental injustice experienced by areas of low socio-economic status in Metro Louisville, KY. Three indicators of environmental justice analyzed using geographic information systems (GIS) and spatial analyst tools within the program show the stratification of healthy and safe living conditions. Louisville Metro communities and neighborhoods classified by socio-economic status have been evaluated on their relative proximity to industrial complexes, grocery stores, and flood zones using buffers and/or other spatial analyst tools. These variables provide data on exposure to air pollution, access to healthy food, and natural disaster risk experienced by different levels of economic and social status. Each variable has been mapped to determine the correlation between socio-economic status and environmental conditions in Metro Louisville. Areas with a high concentration of poor and/or non-white individuals experience more environmental health hazards than non-poor and predominantly white communities. In line with data findings across other metropolitan areas, class and race are key indicators of the quality of environmental living conditions in Metro Louisville.
Practical Blood Flow Restrictive Training as a Proactive Recovery Intervention

Jared Allen / Faculty Sponsor: Kent Brown

Background: Low-intensity resistance training coupled with practical blood flow restriction (LI-pBFR) has been shown to increase muscle strength and hypertrophy without inducing significant delayed onset muscle soreness (DOMS). Previous research has found that LI-pBFR can induce strength and hypertrophy adaptations to the same degree as traditional high intensity resistance training (HIT). However, no research has examined the effects of combined HIT and LI-pBFR on DOMS or muscle strength and hypertrophy compared to traditional HIT.

Objective: To Investigate the effects HIT with LI-pBFR on perceived DOMS, muscle strength and hypertrophy, as compared to HIT alone.

Methods: Twenty healthy college-aged male participants who have completed regular resistance training twice a week for a minimum of 1 year were recruited. Participants were randomly assigned to one of two groups: control (CON) or Proactive Recovery Intervention (PRI). Both groups completed a 2-week training program utilizing the leg press. The CON group completed four HIT workouts with two days of rest between each HIT workout. The PRI group completed four identical HIT workouts with two days of LI-pBFR training between each HIT workout. Body composition (via BodPod), mean thigh cross sectional area and 1RM strength were assessed at day 0 and day 15.

Results: Data collection is currently ongoing, with anticipated completion April 10th 2017. 11 participants (Age = 21.09 ± 1.22, Body weight = 189 ± 23.32 lbs.) have completed baseline testing including body composition (Body Fat % = 12.22 ± 5.38), 1-RM leg press (1RM = 637.27 ± 105.36 lbs.), and thigh cross sectional area (Left Leg = 191.66 ± 51.49 cm², Right Leg = 190.87 ± 50.48 cm²). Upon completion of data collection, 1RM strength, mid-thigh CSA, and perceived muscle soreness will be analyzed using a two-factor ANOVA (Group x Time).
Elbow Injury Prevention in American and Dominican Baseball Players: A Training Intervention Pilot Study
Bailey Biggs and Aliya Thompson / Faculty Sponsor: Dr. Chelsey Franz

Research suggests improper throwing mechanics, due to shoulder and elbow weakness, may explain the role of upper extremity pain in baseball players, and more specifically, injury to the ulnar collateral ligament. Several studies have examined the role of rehabilitation programs after operative treatment known as Tommy John surgery, however few studies have focused on preventative measures for this injury. A recognized upper extremity injury prevention method cited throughout the literature is the Thrower’s Ten program. This program was designed to strengthen the muscles surrounding the shoulder and elbow joints creating elbow stability when pitching and throwing. To explore the feasibility of teaching this program to coaches in a Spanish-speaking, developing country (Santiago, Dominican Republic), and to understand their attitudes and beliefs towards injury prevention programs, researchers utilized a mixed methods approach. Results suggest that coaches and trainers from both the Dominican and Bellarmine University, believe that strengthening muscles within the shoulder and elbow joints will reduce the risk of injury for their players.

The Effect of Ankle Braces on Vertical Jump Performance in Female College Volleyball Players
Ashley Jefferson, Gwen Casper, and Jacqueline Neuman/ Faculty Sponsor: Dr. Tony Brosky

Ankle sprains are one of the most common injuries in sports. Ankle braces are often used to stabilize the ankle joint of an athlete to prevent initial injury to the area while participating in athletic activity or to protect the joint from reinjury when an athlete returns to play. The ankle joint’s range of motion (ROM) plays an important role in the ability to exert a maximal vertical jump. If ROM is limited, an impedance in performance may occur. However, when an athlete’s ankle is forced into plantarflexion (PF) and inversion (IV) to the point where the ligaments are stretched or torn, it can take an athlete out of competition.

The purpose of this study is to examine the effect of application of three different braces on vertical jump performance. Thirty (30) female varsity and club college volleyball players >18 years of age currently participating in practice or competition were invited to participate. A health history of lower extremity (LE) injuries was recorded. After a short dynamic warmup, participants were tested for four randomized conditions: unbraced (control), lace-up brace, single-upright rigid brace, and double-upright rigid brace. After each condition, participants were asked to rank each brace regarding appearance, application, comfort, and stability. Athletes and coaches may be able to use the feedback and results from this study to determine which type of brace would be most suitable for a person’s needs and circumstances.
Empathy Among College Students Post Short-term Immersion Trip
Emily Terry / Faculty Sponsor: Dr. Chelsey Franz

Cultural immersion trips among college students consist of educational programs that often allow a group of students to travel beyond their country of origin. Thus, students are granted access to new cultures and experiences that may impact them in some way (Conroy, 2015). Studies show that experiencing an immersion trip can help students improve in areas such as empathy and compassion (Plante, 2009). However, a limited number of studies have examined effects of short-term immersion trips on the attitudes and beliefs among college students. Therefore, the purpose of this study is to examine changes in attitudes and beliefs of cultural perspective in undergraduate and graduate students after a 7-day immersion trip to the Dominican Republic. The design is quasi-experimental, consisting of a pre and post-test for the students travelling to Santiago, Dominican Republic with Bellarmine University over the University’s Spring Break 2017 (n=13), as well as a post test of the students who went on the same trip in 2016 (n=16). The surveys include basic demographics, and will measure personal empathy towards other people. The will also assess how true the students are to themselves and their faith. The total number of subjects will be 29 (4 males, 25 females). Literature suggests short-term immersion trips may affect empathy and compassion among students.

The Impact of Community and the Built Environment on the Population of Santiago, Dominican Republic
Samantha Zuber, Allison Gullifor, Dillon Pruett, and Emily Terry / Faculty Sponsor: Dr. Chelsey Franz

According to Healthy People 2020, the five social determinants of health include economic stability, education, social and community context, health and health care, and neighborhood and built environment. To improve an individual or population’s health, each of these areas must be addressed (Social Determinants of Health). During an immersion trip to Santiago, DR over Spring Break, Bellarmine Exercise Science students partnered with Go Ministries, a Louisville based non-profit organization, providing sports medicine education to Go athletes and coaches. In addition, the EXSC students were given the opportunity to see, first hand, the impact of neighborhood and built environment on a population’s health. Neighborhood and built environment includes “access to healthy foods, quality of housing, crime and violence, and environmental conditions” (Social Determinants of Health). Houses located in neighborhoods of high poverty within the Dominican Republic are in close proximity to each other; trash lines the streets and sewage water flows between the houses. Due to these issues, health among residents in these neighborhoods is directly and negatively affected.
POSTER 38
Developing Post-Modern Portfolio Theory for Private Portfolios
Michael Adkerson / Faculty Sponsor: Dr. Anne Raymond

In the process of planning financial objectives such as standard of living, family and retirement, the limiting resource is typically wealth. Wealth creation depends on the appreciation of value of an investor’s composite assets, or portfolio, over time. Analysis of virtually infinite assets and how they interact in various environments is a grandiose task. However, the development of portfolio theory in the 20th century provides a body of literature to simplify such analysis. Harry Marokwitz established Modern Portfolio Theory in 1952 with his contribution of a formal and quantifiable risk/return framework for optimal portfolio composition. His work influenced the foundation of Post-Modern Portfolio Theory, which integrates behavioral finance ideas into the definitions of risk and return as they relate to the construction of optimal pension plans that match the life goals of the clients. In this research I further investigate quantitative behavioral constraints for age, tax treatment and financial market cycles that would add to individual portfolio optimization models in Post-Modern Portfolio Theory.

POSTER 39
The Mathematical Beauty of Music: A New Approach to Compositions
Audrey Hehman / Faculty Sponsor: Dr. William Fenton

The analytical and creative sides of the brain work together when music is created. Notes, rhythms, and harmonies all have mathematical concepts behind them. This research project looks at one way that music and mathematics relate, with an emphasis on symmetry in musical compositions. Inversion, repetition, and retrogression have geometrical equivalences. These are used to create musical phrases, and to create entire segments in a piece (such as compositions with an ABA form). This research shows how these geometric symmetries are used by composers such as Bach and Beethoven, and why these symmetries create pleasing music. My research shows that even the least experienced musician, with a little bit of math and music theory, can create simple and pleasing compositions.
POSTER 40

Blackjack: A Mathematic Explanation of Strategy and Expected Return
Jared Kemper / Faculty Sponsor: Dr. Susan White

Over the last 4 centuries, the growth of Casino Blackjack can be credited to the variety of options a player has throughout a hand and the freedom to determine the outcome of the game. The fact that these options directly affect the returns one should expect has resulted in an abundance of analytical studies in the game. As the rules changed and the advantage for the dealer declined, strategies were developed by gamblers and mathematicians to guarantee long-run positive returns. This research article provides a mathematical explanation that links strategy to expected returns. The basic strategy is broken down and applied to areas of probability including conditional probabilities and expected values. The strategy of counting cards begins with a similar analysis that transitions into its connection with stochastic processes. Markov chains are used to analyze probabilities associated with given hands as well as monitor the advantage based on unseen cards.

POSTER 41

Modeling Strava Times with the Lognormal Distribution
Charles Laun / Faculty Sponsor: Dr. Michael Ackerman

This project examines bike segment times for athletes using the activity tracker phone app Strava. The overall goal is to model the top times for selected segments with the lognormal distribution in order to find an estimated fastest time for each segment. Each segment differs with respect to such characteristics as length, whether the segment is downhill or uphill, and the type of biking (mountain or road). These characteristics affect the distribution for each segment and are studied herein. All data is gathered from Strava and analyzed in Excel. The lognormal distribution is the best fit for the segment times because bike times naturally reach a positive limit of the fastest run. The primary result of this project is the determination of the fastest time for each segment.

POSTER 42

Math in a Meteorological World
Kathryn Lukjan / Faculty Sponsor: Dr. Anne Raymond

Meteorology is the branch of science concerned with the processes and phenomena of the atmosphere, especially as a means of forecasting weather. Mathematics is everywhere in meteorology. My area of interest revolves around global warming, particularly on how temperature and weather contribute to global warming. Global warming affects the climate which, in turn, affects the weather and, more specifically, temperature. In a way, all these terms can be related to the study of meteorology. By examining the mathematical models and equations within meteorology, I am able to efficiently determine what and how temperature and weather impact global warming. These are all intertwined and the beauty of mathematics allows us to illustrate those relationships.
Mathematical Advantage in Board Games
Alex Noll / Faculty Sponsor: Dr. Anne Raymond

This research seeks to establish some sort of metric or guidelines for the advantage given to players based on starting position in board games. This is accomplished by analyzing common tropes in board game design in order to determine exactly what gives players the advantage in a particular game (e.g. board advantage, resource advantage, “card advantage”, etc.), and then showing how varied starting position and randomness serve to minimize the advantage given to one player over another. Advantage can be thought of as the propensity for present conditions in a game to create paths to victory based on player choice and random events. Board advantage can be defined as the advantage afforded by a player’s position in a play area and that position’s relation to points in the play area that promote victory. Resource advantage can be defined as the advantage afforded to a player based on that player’s ability to perform actions in a game. Card advantage is a unique case of resource advantage that refers to “hidden” resources where the amount of possible actions (usually cards) is known to all players, but the value or relative utility of those cards is not. In examining advantage in games I address optimal strategy theory along with a survey of selected popular games that employ one or more of the aforementioned “advantage tropes” in order to see how the board game industry at present seeks to ensure the greatest reduction in advantage possible. Additionally, I provide generalized optimal solutions to balance differences in advantage created by differing starting positions at the outset of a game.

Modeling NBA Margin of Victory with Regression
Casey Phillips / Faculty Sponsor: Dr. Michael Ackerman

This research examines an NBA betting model that centers around three elements: explanation, implementation, and results. First, I provide a brief summary of the terms used within the betting model. The statistics used in the model are almost all advanced metrics, such as Player Efficiency Rating and usage rate, which are unknown to the average sports fan. Furthermore, not all sports enthusiasts are familiar with linear regression analysis either. Because of this, information related to regression is explained before examining the actual model. Next, the actual setup of the model is explored and explained. Further, the linear regression model and its application are shown. Finally, an examination of how the model fares in predicting NBA games outcomes is delineated. Discussion includes exploring whether the model is a viable tool for continued use and compares what one might have predicted by merely researching games versus using the model for predictions.
POSTER 45

Free Speech? An Investigation of Zipf’s Law and Quantitative Linguistics
Thomas Sapp / Faculty Sponsor: Dr. Anne Raymond

Language and speech are frequently considered hallmarks of creative expression and freedom; however, recent discoveries in mathematics and linguistics suggest that diction and speech are not as truly free as once thought. Zipf’s law states that in any large corpus of written or spoken language, the rank and frequency of words used will be approximately inversely related. This research endeavor traces the historical discovery and development of Zipf’s law as well as its contribution to the emergence of quantitative linguistics in the late twentieth century. An investigation of the mathematical phenomenon emphasizing the pattern’s underlying probability theory, practical applications, and potential explanations follows. This paper concludes with an examination of the presence and strength of the Zipfian distribution in various types of socioeconomic and literary data.

POSTER 46

An Application of Game Theory: Euchre
Carolyn Trier / Faculty Sponsor: Dr. Anne Raymond

Game theory is an application of mathematics that looks at the choices people make in various situations. The goal of Game Theory is to understand the strategies of each player and the best choices available to each player at certain points in the game. It is applicable to almost any situation that involves strategic choices. The core of the theory is in mathematics but so many other fields use it today, including evolutionary science and war tactics. Herein I examine the card game of Euchre and apply Game Theory applications to illustrate best “moves” to win the game. Specifically, this research addresses what a player should lead with, whether it be a trump card or a high non-trump card. These are examined with imperfect and private information, and possible signaling between players. The strategies that already exist within Euchre are tested based upon each player’s payoffs, which are determined by probability and the goals of each player. Using Game Theory, I model the choices and the strategies that the players have and provide rational solutions to play and win the card game of Euchre.
Applying Critical Path Analysis to Large-Scale Sporting Events
Shannon Welch / Faculty Sponsor: Dr. William Fenton

Critical Path Analysis is a beneficial tool for project management which aids in the organization and prioritization of the many events that must occur in order for a project to be completed. Consequently, this tool helps to maximize the efficiency of the project. The research herein looks into how critical path analysis can be used to benefit the planning and success of large-scale sporting events. Frequent headlines surround large sporting events, such as the Olympics, about the workers falling behind schedule and lacking resources. Many large-scale sporting events have a set start date, so it is imperative that everything is prepared prior to the starting date. This requires having a rigorous planning process that keeps all the events on track. My research identifies typical obstacles encountered in the planning of large-scale sporting events and the role that critical path analysis plays in minimizing such obstacles. In particular, I examine the planning of the London Olympics and the important role critical path analysis takes in making the process as efficient as possible.

Hemoglobin Louisville: Unstable Hemoglobin Variant
Maria Paz Sta. Maria-Chan / Faculty Sponsor: Dr. Karen Golemboski

Unstable hemoglobin disorders are rare conditions that are mostly congenital and familial. Symptoms vary and may range from a mild hemolytic anemia to more severe manifestations. The symptomatology of the disorders is directly related to the structure and function of the various hemoglobin variants and the location of the mutation in the hemoglobin chain. The current case is an individual described as having a hemoglobin variant named Hemoglobin Louisville since 1967. The patient along with all of the diagnosed family members presented with a low oxygen saturation and mild hemolytic anemia. This hemoglobin variant showed a decreased stability after warming at 650 and an increased tendency to dissociate in the presence of sulfhydryl group blocking agents. This unstable hemoglobin variant has a mutation at the beta chain of wherein the phenylalanine residue in the position 42 was replaced by a non-polar leucine residue. Current techniques at diagnosis involve molecular testing and DNA sequencing.
Mutations and horizontal gene transfer have allowed for rapid evolution of many species of bacteria, allowing them to become more virulent and resistant to antibiotics. As a result of these changes, Acinetobacter baumannii has become one of the most prominent drug-resistant bacteria in hospitals. This nosocomial pathogen is capable of causing a range of infections—from pneumonia to sepsis—and is extremely difficult to eradicate from hospital settings. Despite its current status, this species has not always been apparent in healthcare. The emergence of this organism has been extremely rapid; once an innocuous environmental organism, A. baumannii is now resistant to all classes of antibiotics. To better understand its rise to its present status, the genomes of several clinical isolates of A. baumannii were annotated and analyzed. Upon analysis, several intact and incomplete prophages were discovered that were contained within these bacterial chromosomes. Remnants of these bacterial viruses have been shown to be advantageous in a number of other bacteria, but no relationship to A. baumannii has been previously described. Unlike other non-pathogenic Acinetobacter species, A. baumannii has maintained greater numbers of incomplete prophages within its genome, particularly Acinetobacter phage Bφ-B1251. The acquisition and maintenance of defective phage elements appears to be increasing over time, suggesting that A. baumannii has selected for the advantages they confer.

Here, a typical case of EGPA with cutaneous involvement is reported in a female, 37 years old, who presented to the emergency department with joint pain, palpable purpura, and multiple urticarial lesions. Laboratory testing revealed leukocytosis (WBC 17 x 10⁶/mm³) with profound eosinophilia (11.5 x 10⁶/mm³). A history of chronic obstructive pulmonary disease (COPD) and allergic rhinitis gave cause to investigate EGPA as a possible cause of eosinophilia. The patient was started on corticosteroid therapy and referred to hematology, rheumatology, and dermatology. Biopsies of the urticarial lesions revealed eosinophilic granulomas. Additional chemical and hematological testing established a diagnosis of EGPA, resulting in the initiation of long-term therapy.
NURSING

POSTER 51
Antibiotic Stewardship in the Acute Care Setting
Alexandria Bassler / Faculty Sponsor: Dr. Teena Darnell

The purpose of this capstone is to assess the knowledge of antibiotic therapy in patients and families in the acute care setting. The overuse of and inappropriate use of antibiotics can lead to resistant organisms, adverse reactions as well as an increase in healthcare costs. Antibiotic stewardship seeks to decrease the spread of drug resistant microorganisms by providing patient appropriate medication therapy. To determine existing knowledge related to use of antibiotics, a twelve question antibiotic questionnaire titled "S1 Antibiotic Questionnaire" was used with patients and their families. The results of this survey demonstrated a disparity in knowledge of antibiotics, their use and antibiotic resistance. Acute care facilities wanting to implement an antibiotic stewardship program in their facility will want to consider all stakeholders. The anticipated outcome of implementing a patient education system is one that contributes to patient accountability, provider responsibility and antibiotic stewardship.

POSTER 52
All Aboard the Ticket to Ride
Amanda Blume / Faculty Sponsor: Beverley Bone

Problem: This evidence-based practice capstone project collected baseline quantitative data from Baptist Health La Grange staff to assess whether the interdepartmental handoff tool Ticket to Ride is being used for all patient transport events, and measure staff members’ knowledge of isolation protocols and code status definitions as printed on the handoff tool. Background: Hospital management has received reports of isolation protocols not being adhered to during the patient transfer process, and of staff confusion over the definition of “conditional code.” Research shows handoffs are an essential practice to ensure patient safety, but no single method has been shown to be superior. Method: A survey was developed and distributed anonymously to staff members within six different departments: medical-surgical, intensive care, skilled nursing, women’s center, diagnostic imaging and emergency. A total of 34 completed surveys were collected from 18 RNs, 13 diagnostic technicians, 2 LPNs, and 1 transporter. Results/ Discussion: Questions assessing knowledge of when to use the Ticket to Ride and isolation precaution procedures were answered correctly by most responders (82% and above). 68% of responders said they used the Ticket to Ride “all of the time.” 20% answered “part of the time” and 12% responded “I’ve never used the Ticket to Ride form.” 44% of responders identified the correct definition of “conditional code.” Conclusion: The survey results revealed the Ticket to Ride is not being fully utilized by staff members. A majority of responders were unable to identify the definition of the code status “conditional code.” It is recommended an educational program be developed on the Ticket to Ride incorporating information on the different code statuses used within Baptist Health’s electronic health record. It is suggested the program be piloted in the diagnostic imaging department because 66% of its staff members were unfamiliar with the definition of “conditional code.”
POSTER 53

Reduction of Noise Levels on a MICU Unit
Melanie Escartin / Faculty Sponsor: Dr. Sherill Cronin

Patients in the intensive care unit are prone to sleep deprivation and increased noise levels exacerbate the problem. Elevated noise levels can have deleterious physiologic and psychological effects on critically ill patients, leading to decreased patient satisfaction and poorer outcomes. The purpose of this project was to test the efficacy of noise reduction strategies, including quiet hours and white noise machines, in lowering noise levels and improving patient and visitor perceptions of quietness on a medical intensive care unit.

This was a quality improvement project conducted at the Robley Rex Veterans Administration Medical Center and used a convenience sample of patients admitted to the medical intensive care unit and their visitors. Data were collected on noise levels and patient and visitor perceptions of quietness three months before and two months after implementation of noise reduction strategies. Sound level measurements were obtained using a 3M SoundPro SE/DL series sound level meter. Patient and visitor surveys were collected at the time of discharge and/or transfer from the unit. The final project will test for significant changes over time. Project limitations and implications for practice will also be discussed.

POSTER 54

CLABSI: Utilizing Evidence Based Practice & Education to Work Towards Zero
Brittany Estridge / Faculty Sponsor: Beverley Bone

Central line-associated blood stream infection (CLABSI) is a major area of concern for Norton Women’s and Children’s Hospital (NWCH). Not only does improper care of central venous access devices (CVAD) place patients at risk, it also costs hospitals millions of dollars each year. During 2016, NWCH recorded a total of 21 CLABSIs in their facility; all of which are preventable. It is the goal of this project to use evidence based practice (EBP) coupled with education to both reduce the number of CLABSIs and increase employee compliance with proper procedure regarding insertion and care of CVADs. To accomplish this goal, changes were made to the CLABSI protocol at NWCH. Evidence based literature recommends the additions that were made to the protocol, as well as the education of staff RNs related to care for CVADs. The effort to reduce CLABSIs is an on-going process that must undergo continuous evaluation through audits and continuing education in order to ultimately strive for zero.
Examining the Utilization, Safety and Cost Effectiveness of Midline Catheters in Adult Patients
Chioma Holland / Faculty Sponsor: Dr. Teena Darnell

Background: In the acute care setting, venous access is a centerpiece of treatment therapy. Midline catheters have the potential to be used widely in the adult acute care population but there is little research based evidence that shows its benefits and risks. To ensure the best outcome for patients, it is important to consider the patient’s clinical status and ongoing need for intravenous therapy. The use of midlines is consistent with the Centers for Disease Control and Prevention (CDC) recommendations for safe strategies to reduce CLABSIs. The continued need for reliable, extended vascular access has sparked a rejuvenated interest in midlines in the acute care setting. Research question: Is there a decrease in infection rates with midline catheter IV devices in adult patients who require continuous IV therapy compared to peripherally inserted central catheters (PICC)? Method: this was a literature review using CINAHL and Medline database. Result: literature suggest that the complication rate of midline catheters was less significant than that of other vascular access devices and that they are cost effective. Conclusion: although more research is needed, available evidence suggests that midlines are a safer and more reliable form of vascular access in reducing cost and catheter related infections especially in patients with difficult venous access.

Evaluating the Effectiveness of Provider in Triage within the Robley Rex VA-MC Emergency Dep
Aneshia Nunley / Faculty Sponsor: Dr. Linda Mefford

Usage of the Emergency Department as a portal for primary, non-urgent care has placed constraints on the timeliness of care provided to patients. When the demand for emergency department care exceeds the capacity to supply care, the results include increased patient wait times, increased numbers of patients leaving without being seen by a provider, and decreased patient satisfaction. From a hospital operational perspective, hospitals must go on diversion status and non-urgent patients occupy acute emergency beds. In response to emergency room overcrowding, the Robley Rex Veterans Administration Medical Center introduced a Provider in Triage (PIT) program to facilitate throughput of non-urgent patients in the Emergency Department. An interdisciplinary team consisting of a Nurse Practitioner, Triage Registered Nurse, and a Health Tech work together to alleviate the increased wait times for patients with serious but non-urgent medical conditions. The team appropriately classifies patients per the Emergency Services Index (ESI) then the Nurse Practitioner completes a focused assessment and orders labs/radiologic exams while the Health Tech performs phlebotomy, complete EKGs, and collects samples. The purpose of PIT is to have a Nurse Practitioner or Physician Assistant assess patients classified as an ESI III within 25 minutes (per the National standard) rather than having patients wait for hours in the waiting area. Data collected and analyzed included door to provider time (MD/PIT), diversion status, and patients leaving without being seen. The implementation of the PIT program was associated with significant decreases in these metrics. Emergency Department overcrowding will continue until appropriate access to primary healthcare stabilizes through health care reform. Implementing a Provider in Triage program proved to be an effective approach to improving access to care in the Emergency Department at the Robley Rex VA-MC.
POSTER 57

Music Listening as an Adjunct to Pain Management
Rayza Perales / Faculty Sponsor: Ramona Psiones

Over the past decades, the alarming rates of opioid overdoses have led researchers to focus on nonpharmacological interventions that can effectively manage and treat pain in a more holistic manner. Among these interventions, music listening has been proven to be an effective nonpharmacological method that can considerably reduce pain level, anxiety level, and the requested amount of pain medications. In addition to these benefits, music listening can also improve physiological responses, mood, feelings of empowerment, and patient care satisfaction during normal care delivery. This project aims to educate health care providers about the benefits and the importance of implementing music listening as an adjunct to pain management. During the pilot study, a postoperative patient was chosen and provided with five different types of music genres, among which the patient decided to listen to Bluegrass Country music. Pre- and post-assessments indicated that the patient’s pain level decreased from 7 to 3 out of 10 and the blood pressure decreased from 176/89 (116) to 151/68 (96). In addition, positive behavioral and psychosocial changes were observed. This study clearly shows the effectiveness of music listening as an adjunct to pain management in physiological, behavioral, psychological, and social changes.

POSTER 58

Educational Interventions to Improve Isolation Protocol Adherence of Visitors and Decrease Infection Rates
Katherine Robbins / Faculty Sponsor: Beverley Bone

The purpose of this project is to find effective pathways to improve patient and visitor adherence to infection control protocols. Especially those patients that are placed on isolation protocols. METHODS. The methods involved in this project included meetings with stakeholders, a literature review, and direct patient and visitor surveys. RESULTS. The survey indicated that there were educational shortcomings for all patients that were interviewed, including those that indicated that they were following protocols. The efficacy of education in improving compliance is supported by 6 of the reviewed pieces of literature. Meetings with stakeholders indicated that this was an area that had opportunity for improvement. RECOMMENDATIONS The results of this project indicate that there is a desire and need from visitors and patients for greater signage and education. The script for nurse education of patients should be circulated and patient education documented in EPIC. A follow up evaluation of the documentation of patient education should occur at the one month, three month, and six month mark to ensure efficacy. New signage should be posted on the current isolation kits that hang from isolation rooms. Observers should be dispatched to evaluate the effectiveness of the signs in aiding visitor adherence to isolation protocols. Updated flyers on infection control from the CDC with patient friendly language can be made available to the Unit Secretary and staff to be disseminated upon request. All staff should be encouraged to proactively help visitors to adhere to isolation protocols.
POSTER 59

Overcoming Hypothermia in Pediatric Trauma Patients
Lauren Royse / Faculty Sponsor: Beverley Bone

Trauma remains the leading cause of death in children from 1 to 18 years of age according to the Centers of Disease Control. One of the major complications of trauma is hypothermia. Studies have shown that when a trauma patient moves into the severe level of hypothermia there is a 100% rate of mortality. An extensive literature review was conducted and determined there are currently no evidenced based practice recommendations for re-warming the pediatric trauma patient. A retrospective study of pediatric trauma patients arriving at Norton Children’s Emergency Department in November and December of 2016 was completed looking at temperature upon arrival, interventions, and outcomes. A 9-question survey to local EMS was also distributed to gain understanding of hypothermia interventions being performed in the field. It was found that there was very little education on this subject and more evidenced based research is crucial to gain further understanding to provide the best quality of care.

POSTER 60

Reducing Risk of Suicide Through Point-of-Entry Screening
Samuel Simkoff and Rebecca Joest / Faculty Sponsor: Beverley Bone

Background: In 2007, the Joint Commission made identifying patients at risk for suicide one of its National Patient Safety Goals. A 2016 Sentinel Event Alert further recommended the screening of incoming patients at all hospital points of entry. Despite rising suicide rates and a clear mandate, many medical facilities still have no systematic measures in place to screen and treat patients suffering from suicidal ideation. Purpose: This project’s chief aim was to identify a brief, evidence-based screening tool appropriate for point-of-entry screening. Further aims included identification of a suitable pilot unit and formulation of protocols regarding screening, assessment and referral.

Methods: A review of literature utilizing MEDLINE, CINAHL, the Cochrane Database, and the National Guideline Clearinghouse identified a list of potential screening tools as well as at-risk patient populations. Two Likert-scale surveys measuring willingness to participate and comfort with the supplied screening tool were administered to management and front desk staff of potential pilot units. Results: A five-item suicide screen utilized in a 2013 study by Allen et al. was chosen for brevity, ease of use and projected sensitivity. Of management surveyed (N=4), 100% indicated willingness to participate in a pilot program. 100% of front desk respondents (N=6) indicated comfort with the provided screening tool and corresponding decision map. Review of literature identified the cardiac patient population at elevated risk of depression and suicidal ideation with rates of major depression approaching 20%. Conclusion: A 90-day pilot unit is to be enacted on the outpatient Cardiology unit at the target hospital. All incoming patients are to be provided by front desk staff with the Allen et al. (2013) screening tool upon admission to the unit. Screening, assessment and referral policies and procedures are outlined in a formalized document. Pending clearance by Risk Management, the pilot program is currently ready for implementation.
Hospitalized patient falls are considered a sentinel event. According to the Joint Commission’s Sentinel Event Alert, hundreds of thousands of patients fall in hospitals and 30-50% of those patients obtain an injury (2015). Falls prevention strategies are a focus in healthcare settings. One strategy is the use of standardized assessment tools which identify patients at risk for falling. High risk patients often warrant the implementation of additional falls prevention interventions.

At Baptist Health Louisville, nurses use the Baptist Health High Risk Falls Assessment (BHRFA) tool for assessing high fall risk patients. The tool was introduced in 2013 and scores the patient based on age, history of falling, mental status, elimination, mobility, medications, and nursing clinical judgement. Annual education provides basic guidance to nurses regarding assessment and care of high fall risk patients. However, an increased number of patients falling who were not scored as a high fall risk was noted. These patients are considered standard risk patients who did not have the additional fall prevention strategies in place.

This project investigates the nurse’s use of the BHRFA and its relevance on patient falls. A scenario based pre survey was administered to nurses (n=23) working on a telemetry unit at Baptist Health Louisville. Results showed a wide variance in risk assessment scores. Education on the BHRFA was provided and a post survey is currently being conducted. Heavy emphasis will be placed on educating nurses regarding the clinical judgement section of the BHRFA. Score variability will be compared pre- and post-education. Sensitivity and specificity of the BHRFA will also be examined.
PHILOSOPHY

POSTER 62

Do we need Metaphysics? : Aristotle’s Challenge to our Modern World.
Emma Bryan / Faculty Sponsor: Dr. Evanthia Speliotis

In Aristotle’s Metaphysics, Book 1 982b he states, “It is through wonder that men now begin and originally began to philosophize; wondering in the first place at obvious perplexities, and then by gradual progression raising questions about the greater matters too, e.g. about the changes of the moon and of the sun, about the stars and about the origin of the universe.” Metaphysics asks questions about first principles which are topics such as, “What is being? What is nature? What is knowledge?” He goes on to state that this wonderment was because individuals realized they were ignorant and “it is obvious that they pursued science for the sake of knowledge, and not for any practical utility.” (line 23) Do we still pursue science for the sake of knowledge in itself today? Or do we collectively as moderns only use knowledge for our gain technologically, politically, financially, or otherwise? Furthermore, is there anything wrong with the latter? Is there something missing from that equation? This separation from metaphysics even in the own discipline of philosophy originates from modernity and a cluster of American philosophers who are entitled Pragmatists. The Pragmatists ask questions not about first principles but about the world, about what it can do for the individual questioner. They ask questions until they can discover what works for their own experience. Is this form of questioning better suited for our lifestyle as modern Americans? Or are we missing something because we have turned our questioning away from first principles and metaphysics?

PHYSICS

POSTER 63

Parallel Computing with a Raspberry-Pi (RPI) Beowulf Cluster Using Open MPI
Zachary Eckert, Shawn Frazier, and Carlos Galindo / Faculty Sponsor: Dr. Akhtar Mahmood

The Raspberry Pi platform can be used to build an energy efficient, very low-power, portable table-top Beowulf cluster computer, cheaply. We have built a 33 node Raspberry-Pi (RPI) Beowulf Cluster with the first generation Raspberry Pi-1 Model B+ CPUs running the Raspbian 7 operating system (based on the Linux Debian operating system which is optimized for the Raspberry Pi hardware). Each of the Raspberry-Pis has a 700MHz processor with 512MB of RAM. All the Raspberry Pi processors communicate via a 100Mbps Ethernet switch using the Open MPI 1.3 middleware. The same set of MPI based parallel codes that ran on our conventional Beowulf Cluster was used on the Raspberry Pi Cluster. One of our goals of this project was to test and explore the capabilities of the Raspberry PIs to determine how well the Raspberry Pis perform in a cluster computing environment for parallel processing tasks. We will present the results of the parallel computations using the Raspberry Pi Cluster. The Raspberry Pi technology has a great potential to revolutionize computer science education and can be used as a hands-on tool for teaching and research in the cluster computing environment.
Alternative energy is environment friendly. In order to promote the advantages, and the usage of both “clean”, and “green” forms of alternative energy, we are advocating that a basic set of alternative energy labs be implemented in the lower-level/introductory physics lab courses in the undergraduate physics curriculum, for both physics majors and for those students who want to become K-12 school teachers. We have experimented with the following alternative energy labs: (i) Using solar panel to power LED modules, (ii) Using solar panel to power a small fan/wheel motor module, (iii) Electrolyzer module and solar powered hydrogen production, (iv) Electrolyzer module and wind powered hydrogen production, (v) Using polymer electrolyte membrane (PEM) fuel cells to convert hydrogen into electricity, (vi) Using a PEM fuel cell to power an LED module, (vii) Using a PEM fuel cell to power a car wheel, (viii) Using a PEM fuel cell to power a small fan, wheel, and LED in parallel, and (ix) Using wind energy to power an LED module. From these labs, students will be able to identify renewable sources of alternative energy, and understand how different sources of renewable energy work to produce electricity and how renewable energy provides a clean source of energy.

Beowulf clusters are typically built with cost-effective hardware and open software/middleware- the Linux operating system, and the Message Passing Interface-MPI middleware to communicate between all the nodes. The goal is to reduce the execution time of a parallel code by aggregating the computing power across all the cluster nodes for the various computational tasks, by spreading the computations across all the nodes of the cluster in parallel, using MPI. Theoretically speaking, a code being executed across n nodes might execute n times faster than it would if the same code is run on a single node. For the performance studies, we have built three separate 8-Node Beowulf Clusters with different CPU speed, Linux OS and MPI flavor. Two of the Beowulf clusters are installed with the Linux Fedora Core-3 OS and the LAM-MPI middleware, while the third one is installed with the Linux Debian-8 OS and the Open-MPI middleware. We have also written bash scripts to automate all our parallel jobs. The output is stored in a data file via the bash script for further analysis. We will present the results of the performance studies of the parallel computational tasks by running different parallel codes on the three Beowulf clusters.
Beyond the Standard Model (BSM)- Search for the Z-Prime Boson Using the Data from the ATLAS Experiment at CERN
Veronica Winters / Faculty Sponsors: Dr. Akhtar Mahmood and Dr. M. Saleem

At Bellarmine University, we are searching for new subatomic particle, called the Z-Prime Boson.

The Z-Prime Boson has been predicted to exist by new Physics theories, collectively known as the Beyond the Standard Model (BSM). The Z-Prime Boson could give us new insights into physics processes that are not in the Standard Model. Just like Standard Model Z-Boson, the Z-Prime Boson also decays into a pair of matter-antimatter particles - electron-positron and muon-antimuon. We are using data events that have been filtered from several petabytes of ATLAS datasets. In our analysis, we are looking for deviations in mass from the Standard Model expectation in electron-positron and muon-antimuon decay modes from 130 - 3000 GeV/c². The data analysis tasks were carried using a state-of-the-art high resolution Hiperwall visualization system that is linked to nine high-end Tier4 workstations. The data analyses studies were carried out using the 2D Hypatia and the 3D Camelia software packages.

POLITICAL SCIENCE

POSTER 67

Does Candidate Gender Matter?
Lilly Pinhas, Julia Click, and Cheyenne Younger / Faculty Sponsor: Dr. Lee Williams

In our project, we study the relationship between gender and support for political candidates. Our primary independent variable is respondent gender. Our dependent variable is support for political candidates. We control for party identification, race, income, education and location (state). We expect to find that respondents are more likely to vote for candidates of their same gender.

POSTER 68

The S.M.A.R.T. Probation Program’s Effect on Recidivism Rates
Alexandria Thompson / Faculty Sponsor: Dr. Lee Williams

This is a study of the relationship between the S.M.A.R.T. Probation Program and recidivism. The primary independent variable is a criminal defendant’s participation in the S.M.A.R.T. Probation Program. The dependent variable is recidivism. Control variables include age, race, gender, education level, employment status, number of tattoos, conviction type, current disposition, probation violation(s), and number of years in probation. I expect to find that probationers in the S.M.A.R.T Probation Program will have a lower recidivism rate compared to probationers in standard probation programs.
This study examines the question of what exactly impacts political socialization between parents and children. Political socialization is a lifelong process by which people form their ideas about politics and acquire political values. The family, educational system, peer groups, and the mass media all play a role. The aspect of gender is something that has not been examined through the lens of the gender roles that parents and children both experience. The relationship between fathers and sons and mothers and daughters could have an impact on the specific political issues that get passed through generations. Previous literature looks at the impact that religion also has on strengthening gender roles and political socialization separately. This study will be combining those ideas together and looking at how college students have been affected by this. The method is that the participants will be taking a survey on their political beliefs, partisanship, political expression, religious orientation and the Bem Sex Role Inventory. After they complete all of this information about themselves, they complete the exact same survey about their maternal and paternal figures about political beliefs, partisanship, political expressiveness and religious orientation. The data is analyzed to examine a potential connection between the father-son and mother-daughter relationships and how political socialization can occur differently within a single family. The hypothesis states that if the parent, who is most politically expressive, matches the gender of the child in the home and that household is self-proclaimed as Catholics, then that child will express very similar beliefs to that parent. So if a father is the most politically expressive of his opinions in a Catholic household, the son of that family will most likely express the same political opinions as his father. This follows the trends that are found on these topics in the previous literature.

The purpose of this study was to examine the relationship between parenting styles and self-esteem across three generations: Baby Boomers, Generation X, and Generation Y. The researchers hypothesized that parenting styles from Baby Boomers to generations X and Y had shifted from authoritarian to permissive, and that this change in parenting styles would be negatively correlated with the self-esteem of each generation. 111 subjects, both males and females were surveyed and data were collected using an online survey that combined the Parental Authority Questionnaire and the Rosenberg Self-Esteem Scale. The results of this study revealed that Baby Boomer parents were more authoritarian than Generation Y parents, and Generation Y were more permissive than other parents. In addition, Generation Y had lower self-esteem than the Baby Boomers. However, there was little evidence linking the two factors. Generation X revealed no discernible patterns with parenting style or self-esteem. Therefore, in support of the hypotheses, there was evidence that parenting styles had gotten more permissive, and that self-esteem has gotten lower, but there was little evidence revealing a relationship between the two.
Experience with a foreign language is considered a highly valuable skill in workplace and school settings alike. However, studies in the field of psychology exploring the process of acquiring a second language have limited applicability, especially for adults with English as a first language. This study sought to explore the relation between encoding modality (auditory, visual, or visual and auditory; based on Baddeley’s model of working memory) and rehearsal strategy (active or passive; based on Craik and Lockhart’s Level of Processing approach and Roger’s Self-Reference Effect) in the recall of foreign language vocabulary words. One hundred and ten adult participants were assigned to one of six different conditions based on the interactions between the different encoding modalities and rehearsal strategy (auditory-active, auditory-passive, visual-active, visual-passive, visual/auditory-active, or visual/auditory-passive). The results indicated that encoding modality was significant, with those in the visual and visual/auditory conditions recalling more words than those in the auditory condition. However, there was not a significant difference between active and passive rehearsal strategy, which does not match pre-existing research in the field.

This research study is designed to show the changes in racial attitude that might occur during a student’s time during college. The research will look at multiple different reasons behind white student’s perceptions about race; some of these reasons include major, birthplace/origin, and political view. In doing this, the researchers hope to show a relationship between sociological factors, and white students perceptions on race. The goal of this research is to further prove the existence of racial tensions among white college students and try to generalize the findings to a boarder population, and to think of solutions to solve this tension.
My aim is to test whether established gender effects on group performance (specifically, groups that contain both men and women perform better than groups of a single gender) affect adolescents differently than adults. Not much research has been done comparing gender effects with age. This study will use participants choosing to play escape room games at Breakout Louisville, a type of game that gets a large number of groups of adults as well as groups of adolescents participating. In an escape room game, players have one hour in a room to solve problems, puzzles, and riddles in order to “escape.” Participants, after completing or failing to complete their game will be asked to grant permission for their game data to be used for a study, as well as provide their age and gender. During all escape games, regardless of participation in the study, data is collected during the games. This data includes the number of clues used, whether the group reached the last three steps (or puzzles) of the rooms, whether they completed the room, and how much time the group had left if they did complete it. I will be using these measures to examine the performance of the different groups. I am hypothesizing that mixed gender adolescent groups will perform significantly differently than mixed gender adult groups, even when controlling for age. My rationale behind this is that group dynamics and cooperation are viewed differently by teenagers than by adults, and teenagers may be more or less willing to communicate with each other in a game that requires cooperation.

This project involves looking at the effects that caffeine has on academic performance. Disciplined academic habits in college are important for students to succeed and prepare themselves for careers. Strong work ethic is demonstrated by a student’s higher grade point average. Not all students are successful in college and many drop out within the first year. “Only 56 percent of students who enter college in the United States graduate within six years (A National View of Student Attainment Rates, 2015).” Many different factors can play a role in a student’s ability to stay in college. Many students report feeling fatigued when trying to complete many hours of homework. A common way for a college student to beat the effects of sleep deprivation is to increase their caffeine consumption. There are negative side effects to caffeine that overtime can impact a student’s ability to do well in school. My study will look at the potential effects that caffeine can have on a student’s academic performance.

My questionnaire asked participants about sleep quality, stress level, caffeine use, and academic performance. I am using a previous study called “Perceived Stress, Energy Drink Consumption, and Academic Performance Among College Undergraduates” and adding questions about sleep quality. The previous study found that higher levels of energy drink consumption were correlated with a higher stress level and decreased academic performance (Pettit & DeBarr, 2011). My hypothesis is that the students who consume higher levels of caffeinated beverages will have increased stress levels and decreased academic performances. Stress level is measured with the Perceived Stress Scale (PSS; Cohen, 1983), and sleep quality is measured with the Pittsburgh Sleep Quality Index (PSQI; Buysse, 1989). Academic performance is measured with cumulative grade point average.
POSTER 75

Left Handedness and Creativity in Developmentally Disabled Adults
Hayley Davis / Faculty Sponsor: Dr. Hank Rothgerber

Left-handedness is thought to be more common in the disabled community than in normally functioning populations. A study conducted in 2007 found that left-handedness was more commonly found in adults with seizures and learning disability, and other studies have noted either preferred left-handedness or no hand preference at all. (Ferrari, 2007) The present study looks to address the potential association between left-handedness and creativity within the developmentally disabled community. Because of the perceived correlations between left-handedness and disability, and left-handedness and creativity, it can be hypothesized that members of the developmentally disabled community who are also left-handed may perform higher on creativity tests than their right-handed counterparts. This study also uses a population that has already self-selected as having a creative inclination, as the individuals attend a day facility geared towards the arts. The participants will be members of a local art studio geared towards adults with cognitive and developmental disabilities. This study will use the Almlia Handedness Assessment to determine hand preference, and a modified TTCT to measure demonstrated fluency, flexibility, elaborateness, and originality. Based on prior research, it is hypothesized that individuals that are left handed will demonstrate more creativity than their right handed counterparts.

POSTER 76

The Effects of Brief Mindfulness Meditation on Memory for Words
Kyndel Guyton / Faculty Sponsor: Dr. Hank Rothgerber

Chronic pain treatment plans direct much attention towards the reduction of the sensation of pain; however, the cognitive deficits chronic pain patients tend to exhibit are a common problem not well addressed. The research for effective and alternative treatment plans is necessary in order approach the issues of memory impairment. Previous research examines the effects of mindfulness meditation on pain perception, pain tolerance, and cognition. Here, the current study investigates if mindfulness can reverse how pain negatively affects memory in students at Bellarmine University. The study aims to extend previous research by testing if brief mindfulness training can improve memory performance while pain is constant during learning and memory tests. The researcher will conduct the study in an ice bath room located in the athletic training building. Participants will receive a brief introduction to mindfulness meditation or a control condition. While under an encoding period for positive, negative, neutral, and context-related words, the cold pressor test will expose participants to pain. Tests of free recall and recognition will assess memory during the second trial of the cold pressor test. It is predicted that participants in the mindfulness condition will exhibit greater performance on both free recall and recognition tests of memory and will have a less intense experience of pain. It is also predicted that all participants, regardless of condition, will exhibit the best memory score for context-related words.
The results of many research studies support the hypothesis that men possess better spatial abilities than women, particularly on versions of the mental rotation task (MRT; Burton, Henninger, & Hafetz, 2005). However, while this sex difference may hold true for any given sample of men and women from the general population, people within each of these sex categorizations differ on such characteristics as personality traits. These differences in personality can be seen on such diverse measures of personality as the Myers-Briggs Type Indicator (MBTI), the Bem Sex Role Inventory, and the Big Five Aspect Scales (BFAS). On each of these measures, sex differences in the occurrence of various traits have been reported (Weisberg, DeYoung, & Hirsh, 2011). The current study explored whether these personality traits, as returned by the aforementioned inventories, were better predictors of mental rotation task performance than sex, with a particular emphasis on determining whether women with traditionally “masculine” personality traits performed equally to men and better than women with stereotypically feminine personality traits on this version of the mental rotation task. Preliminary analyses on a sample of men and women (N=101) indicate that while men significantly outperform women on the MRT (p<.001), women with traditionally masculine traits perform no differently from men, though they do not outperform women with traditionally feminine traits on the MRT. Furthermore, certain personality traits were shown to be associated with MRT performance—those who were Thinking on the MBTI outperformed those who were Feeling (p=.04)—and others yielded a significant model for predicting MRT performance—participants higher in openness (p<.001) and intellect (p<.001) on the BFAS scored higher on the MRT. These initial results suggest that personality factors, like gender, may be a factor in determining spatial ability as measured by the MRT.

Leadership qualities vary from individual to individual, but is the perception and evaluation of these qualities affected by the leader’s gender or ideals? The researcher wanted to look at the correlation between gender, leadership style, and perception to see how these findings relate to leaders in our society. Participants are randomly assigned a written speech about a leader addressing their employees about receiving bad feedback on a project embodying either task-oriented or socioemotional leadership and whether the name associated with it is male or female. After reading the speech, participants are asked to answer questions about their perception of the leadership style and the speaker. They are then asked to complete the BEM sex role inventory to evaluate their personality. The researcher hypothesized that male participants will rate females more critically when given in the task-oriented setting contrary to the socioemotional setting and that their BEM sex role inventory results will impact their perception as well.
Poster 79

All Men Created Equally: Effects of Stereotype Threat on Male Task Performance
Kyla Schwinghammer / Faculty Sponsor: Dr. Hank Rothgerber

Previous research suggests that there is a relationship between stereotype threat and task performance. Stereotype threat is when a member of a specific group is reminded of a stereotype about their group. It has been shown that when a person of the stereotyped group is placed under a stereotype threat condition, their performance on the task at hand is worse than their counterparts who were placed under non-stereotype threat conditions. An example of this is women in math. It has been found that when a math exam is explained as being diagnostic of math abilities, women will perform worse on the test than the women who have the exact same test explained to them as being nondiagnostic of math abilities. This study will expand on the ideas of stereotype threat and look specifically at how different levels of perceived masculinity may have varying effects on males’ task performance under stereotype threat and non-stereotype threat conditions. The study will include approximately 30 college students, both males and females. The participants will be randomly assigned to one of two conditions (stereotype threat condition or non-stereotype threat condition). Stereotype threat will be manipulated by the different explanations that are told at the start of the crafting activity. The participants will conduct a crafting task for a set amount of time and after will complete the Masculine Behavior Scale and a revised version of the Bem-Sex Role Inventory to record perceived levels of masculinity. Analyses will be run to examine the connection between perceived levels of masculinity and task performance. Results will hopefully expand on the idea that feeling more closely associated with the stereotyped group is a key factor in how much stereotype threat affects the individual.

Poster 80

Sleep Perceptions and Cognitive Performance
Elizabeth Short / Faculty Sponsor: Dr. Hank Rothgerber

Both sleep deprivation and poor sleep quality are endemic in American society and widely recognized as a significant public issue (APA, 2008; Colten & Altevogt, 2006; Coren, 1997 Morin, 2020; National Sleep Foundation, 2008). When students arrive at college their sleep habits are often one of their first daily routines to change and not usually for the better (Picher et al., 1997). It is important to know the effects of sleep and sleep deprivation on performance. It is especially important to know the effects of sleep on cognitive performance. In this study undergraduate students at Bellarmine University were randomly assigned to two conditions. Participants were asked to complete a demographic survey. After the survey they were presented with statistics about Bellarmine students. With these statistics they were given the average sleep norms. One group received the sleep norm as 4.5 and the other group was 6.5 hours. Once presented with these sleep norms they then had to complete a memory recall test. Their scores on the memory recall test would predict the effect of the different sleep norms.
POSTER 81

Internal/External Influences and College Major Persistence: Does Ego-Identity Play a Role?
Mikala Smith / Faculty Sponsor: Dr. Hank Rothgerber

This study will examine how internal/external factors that influence a student’s initial choice of major may impact their persistence in that major, whether ego-identity plays a role, and if there are gender differences. Internal factors are those influences that come from within (e.g., personal interest, aptitude, interpersonal career goals, etc.) whereas external factors are influences that come from one’s environment (e.g., family, peers, teachers, job opportunity, salary, prestige, etc.). An online survey will be designed and distributed to Bellarmine University students consisting of a demographic section pertaining to college major persistence, an influential factor inventory, and the Objective Measure of Ego-Identity Status (OM-EIS) (Adams, Shea, & Fitch, 1979). Since previous research demonstrates that internal factors are more influential than external factors, it is hypothesized that being influenced by internal factors may be more likely to predict major persistence than external factors. Marcia, in his outline of the four stages of Ego-Identity Status, suggests a connection between these stages and internal/external influences, so it is hypothesized that the strength of influence for internal and external factors may depend on what stage of ego-identity the student is in at the time of choosing their initial major. Past research has found that males and females differ in what factors influences their choice in major, so it is hypothesized that there may be gender differences within the findings of the first two hypotheses. Implications of this study on college major advising and future research will be discussed.

POSTER 82

Jail Time Versus Treatment Facilities
Kyra Vanover / Faculty Sponsor: Dr. Hank Rothgerber

This research project looks at attitudes toward rehabilitation facilities and jail time. Participants in my study will be asked to answer a variety of questions pertaining to given drug and alcohol scenarios. The race of the offender will be manipulated in each scenario to attempt to find a disparity between race and suggested punishment for equal crimes. This research aims to shed light on racial attitudes toward sentencing as well as political affiliation and suggested punishment for different races. Subjects in my study will be primed unconsciously with a video containing a quickly shown image of Donald Trump, so quick that it registers with the unconscious mind and not the conscious mind. Participants at the end of the questionnaire will be asked to answer who they most heavily supported in the 2016 presidential election. This study hopes to find that those who supported Donald Trump in this past election will have a greater bias toward racial minorities and be more likely to send them to jail rather than a rehabilitation facility. On the opposite side, it is suspected that this study will find that people who supported Trump will be more likely to send whites to a rehabilitation facility over jail.
Upon reintegration into civilian life and transitioning into university life, many veterans experience an identity crisis as a result of a more unstructured lifestyle, feeling as though they do not fit in, and being separated from their military cohorts. This identity crisis can be worse among female veterans compared to male veterans because women tend to experience more struggles related to identity during the time they serve since more stereotypical masculine traits are valued and respected in the military; the transition back to civilian life then leads to additional issues with identity. Previous researchers have analyzed the adversities that veterans (including specifically women) face upon return from the military and transition into a university setting. Additionally, they have discussed various services and support that universities can invoke to better help women veterans. However, there is not a large amount of research on how much of an impact this identity crisis may have on women veteran’s ability to transition into the university and what universities can do to make that transition easier. The purpose of this study is to analyze the prevalence of an identity crisis among women veterans, identify which factors may contribute to its severity more than others, and determine how much it may impact women veteran’s ability to reintegrate into civilian life and transition into the university. Participants will be asked to complete an hour-long interview discussing their military, civilian, and university experiences. It is hypothesized that women who have less interaction with other women throughout their military career, will experience a stronger identity crisis. Results from this study could provide more detailed insight into what services women veterans would like to have, thus, providing the tools and information to universities to create or adapt services on campus to better serve the women veteran population.
Inter-rater Reliability among Respiratory Therapists using a Pediatric Asthma Score
Sarah Hoban / Faculty Sponsor: Dr. Sherill Cronin

Asthma is the most common chronic disease in children and the third leading cause of hospitalization. Each year, direct costs associated with the treatment of asthma amount to $5.9 billion, with inpatient hospitalization contributing to the majority of these costs. Hospitals nationwide have worked to design various protocols in an attempt to improve inpatient asthma care, reduce length of stay and costs related to hospitalization.

Respiratory assessment of children with asthma can often be problematic because the various components of the assessment and their importance to the care of the patient often vary amongst care providers. By using a respiratory clinical score, assessments become standardized, which ensures that each component of the assessment is prioritized similarly. The clinical score used for this study incorporates the four standard physiological parameters of a pediatric asthma assessment; respiratory rate, retractions, wheezing and air entry.

This project evaluates the degree of inter-rater reliability amongst respiratory therapists (RTs) using an asthma scoring tool. Fifty provider pairs (RT-RT) independently assessed pediatric asthma patients between the ages of 1 and 18 years old, diagnosed with status asthmaticus. The final project will include statistical comparison of the overall asthma score and each individual component among raters, to determine equivalence. Implications for practice and recommendations for future research will also be discussed.
In October 2016, three respiratory therapy students, along with a respiratory therapy faculty member, traveled to Nejapa, Nicaragua with the Louisville-based Teach to Transform organization. This weeklong service trip was made possible by a generous donation from Carole and Joe Ferguson. To improve the health communities in developing countries, Teach to Transform uses a “train the trainer model.” This model empowers local pastors and area leaders to care for others within their community. Nicaragua is one of the most sparsely populated countries in Central America, with a population of 5.7 million spread over roughly 130,371 square kilometers. The level of poverty is extremely high with a daily income of less than one United States’ dollar. In addition, over one-third of the population lacks access to health services.

Dr. McKecchnie, a Louisville-area emergency room physician and founder of Teach to Transform, traveled with the group to Nicaragua. While in country, Teach to Transform partners with AMOS. AMOS, A Ministry of Sharing, is a Christian-based, non-profit organization that exists to improve the health of impoverished communities by working alongside them. During the trip, the respiratory therapy students taught Nicaraguan community members basic medical skills including physical assessment, burn care, and wound care. Students enjoyed spending time with community members and witnessed the community’s empowerment as they learned to provide adequate, basic healthcare. In the future, Teach to Transform will return to this community to teach these same community members more advanced topics such as the Helping Babies Breathe program. This program provides opportunities for students to experience other cultures and improve presentation skills while positively impacting the population. By empowering community members, Teach to Transform creates a sustainable model for improving access to healthcare. Bellarmine’s Respiratory Therapy Department plans to travel with Teach to Transform in the future.
Improving perception of value for Respiratory Therapists
Gina Maccaferri / Faculty Sponsor: Dr. Sherill Cronin

Poor communication has been suggested by respiratory therapist(s) (RT(s)) as a problem contributing to poor perception of value, which affects quality of work. In October 2016, management and a team of RTs at an acute care hospital began working on an improvement project in the RT department. The team addressed ways to improve communication from management to RTs and between RTs. The goal is to improve RTs’ perception of value, and improve quality of work.

The purpose of this project was to evaluate the effects of a recognition program among RTs, availability of management on all shifts and face to face communication during respective shift time on the RTs’ perception of value and accuracy of arterial blood gas (ABG) charting in the RT department at an acute care hospital.

An investigator-developed survey using a Likert like scale was administered to RTs regarding their perception of value in October 2016. (n=32). Interventions including a recognition program among RTs, availability of management on all shifts and face to face communication during respective shift time have been implemented. A follow-up survey was distributed in February 2017 to evaluate changes in value of perception based on these interventions. (n= 32). ABG charting data is not complete.

A comparison of the pre-and post-survey results revealed that RTs responded positively. Of the respondents, 71.9% responded positively to the shift time information delivery, while 56.3% responded positively to the departmental recognition program and 53.2% have noticed positive changes in the department since November. The overall mean perception of value declined from 62.6% to 56.3%. This decline was not significant.

The RTs surveyed developed a positive perception of the changes made in the RT department, however this did not significantly affect the overall perception of value. More research is needed to improve the perception of value of RTs.
On June 8th in the summer of 2016, after almost a year of applications, registrations, course approvals, and orientations, I finally touched down in Berlin, Germany. This was going to be the longest I had ever left Louisville, my first experience of Europe, and only my second time leaving the United States. Thanks to the generous scholarship donations I received I was able to come to Berlin as part of the KIIS Experience Berlin program. It still hadn’t hit me that I was about to be spending a month studying creative design, advertising, art, and photography in the same city as many of the world’s top designers, artists, and all around legendary creatives. I knew this trip was going to change my life, but I had no idea the kind of drive and inspiration I would discover while abroad. Now that I’ve been back home for almost 7 months, I can definitively say that I understand the true value of traveling abroad; the value that goes beyond earning credits or padding a resume or even gaining career experience. Being abroad allows you to immerse yourself into a totally different part of the planet and let yourself get lost in all the new and exciting things swirling around you. These influences and ideas inspire growth and ultimately change your outlook on your entire life and identity. The combination of these experiences with classes designed to stimulate creativity, think critically, and interact with the culture made for arguably the greatest experience of my life. I consider myself very lucky every day to have experienced Berlin.
HONORS THESIS PRESENTATIONS
SUNDAY, APRIL 23, 2017
CENTRO ATRIUM

Reception • 12:30-1:00 p.m.

Session I • 1:00-3:00 p.m. • Group A
“The Relationship Between Changing Parenting Styles and Self-Esteem for Successive Generations”
• Presented by: Molly Bee
• Faculty Advisor: Dr. Christy Wolfe

“Exploring the Effects of Encoding Modality and Type of Rehearsal on Foreign Language Vocabulary Recall”
• Presented by: Danielle Bestfelt
• Faculty Advisor: Dr. Christy Wolfe

“Exploring the Relationship Among Sex, Personality Traits, and Cognitive Task Performance”
• Presented by: Heather Kissel
• Faculty Advisor: Dr. Christy Wolfe

“Supporting Women Veterans: Transitioning from Military Life to University Life”
• Presented by: Kristen Zellers
• Faculty Advisor: Dr. Pamela Cartor

Session I • 1:00-3:00 p.m. • Group B
“Isolation of a Mycobacterium Virus with the Infectivity Rate Tested at Various Temperatures”
• Presented by: Katie Wegenast
• Faculty Advisor: Dr. Joanne Dobbins

“The Making of a Pathogen: Implications of Phage Domestication in Acinetobacter baumannii”
• Presented by: Allison Welp
• Faculty Advisor: Dr. Daniel Golemboski

“The Design, Synthesis, and Biological Evaluation of Chalcone Derivatives Against Ovarian Cancer Cells”
• Presented by: Tighe Harrod
• Faculty Advisor: Dr. Francis Barrios

“Determining the Protective Effects of Quercetin Against Cadmium Toxicity in Human Embryonic Kidney Cells”
• Presented by: Caroline Smith
• Faculty Advisor: Dr. Mary O’Malley Huff
Session II • 3:15-5:15 p.m. • Group C
“Shifting Gender Roles in Post-WWI Literature”
- Presented by: Elizabeth Gatten
- Faculty Advisor: Dr. John Gatton

“The Formation and Cultural Effects of American Nerd Culture”
- Presented by: Colton King
- Faculty Advisor: Dr. David Mosley

“Female Authors’ Critiques of Gender Roles: How Creating a Platform for Change has Transformed over 100 Years”
- Presented by: Faith Dawson
- Faculty Advisor: Dr. Kathryn West

“True Crime as a Literature of Advocacy”
- Presented by: Leslie Rowen
- Faculty Advisor: Dr. Jon Blandford

Session II • 3:15-5:15 p.m. • Group D
“Riparian Buffered Sinkholes and Their Effect on Pollution in the Blue River”
- Presented by: Colin Copler
- Faculty Advisor: Dr. Martha Carlson Mazur

“Cross-Cultural Comparative Analysis of Print Advertisements: World Cup Sport Magazine Issues”
- Presented by: Sarah Elliott
- Faculty Advisor: Dr. Julie Toner

“Movies, Memory, and Millennials: How Modern Films Have Influenced the Holocaust Discussion”
- Presented by: Audrey Hehman
- Faculty Advisor: Dr. Fedja Buric

Session II • 3:15-5:15 p.m. • Group E
“The Effect of Different Ankle Braces on Vertical Jump Performance in Female College Volleyball Players”
- Presented by: Ashley Jefferson
- Faculty Advisor: Dr. Tony Brosky

“Analyzing the Effects of Embedded Affective Items on High School Student Motivation and Engagement”
- Presented by: Courtney Vecheck
- Faculty Advisor: Dr. Corrie Block

“The Effects of a Token Economy on a Student with Autism in a General Education Classroom”
- Presented by: Taylor Webb
- Faculty Advisor: Dr. Todd Whitney